EFFECTS OF ETOMIDATE ON VASOPRESSOR USE IN PATIENTS WITH SEPSIS OR SEVERE SEPSIS

Nerissa J. Alday, Pharm.D.*; Jennifer W. McCallister, BS Pharm, MD; Gary S. Phillips, MAS; Bruce A. Doepker, Pharm.D., BCPS
The Ohio State University Medical Center, 368 Doan Hall, 410 West 10th Avenue, Columbus, OH, 43210
Nerissa.Alday@osumc.edu

PURPOSE: Etomidate is a rapid-acting, sedative hypnotic agent commonly used to facilitate intubation. There is controversy surrounding the safety of single bolus etomidate use for induction due to its ability to suppress adrenal steroidogenesis. Critically ill patients depend upon the ability to mount a compensatory adrenal stress response to maintain vascular homeostasis; the clinical significance of this short period of relative adrenal insufficiency remains unclear. The literature to date remains inconclusive regarding the hemodynamic consequences of etomidate use for induction in septic patients and the implications of its use on clinical outcomes such as vasopressor requirements, inpatient length of stay, and mortality. The purpose of this study is to evaluate the effects of etomidate on the need for vasopressor support when used as an induction agent to facilitate intubation in patients with sepsis or severe sepsis.

METHODS: This is a retrospective, single-center, propensity matched cohort study comparing patients with sepsis or severe sepsis who either received etomidate or did not receive etomidate for intubation. Patients between 18-89 years of age will be evaluated if they were intubated at The Ohio State University Medical Center. Inmates, pregnant women, chronic adrenal insufficiency, use of vasopressors, etomidate or corticosteroids prior to intubation, and history of chronic immunosuppression are indications for exclusion. The primary outcome will be the difference in the need for vasopressor support between patients who received etomidate compared to those who did not receive etomidate for intubation. Secondary outcomes will include the use of multiple vasopressors, change in mean arterial pressure from baseline, duration of vasopressor use, duration of mechanical ventilation, intensive care unit and hospital length of stay, and the incidence of hospital mortality.

RESULTS: Data collection and analysis are currently being conducted; final results and conclusions will be presented at the 2012 Great Lakes Residency Conference.

Learning Objectives:
- Explain the mechanism through which etomidate causes adrenal suppression.
- Discuss the potential hemodynamic consequences of etomidate when it is used for intubation in critically ill septic patients.

Self Assessment Questions:
- Etomidate may cause adrenal suppression through inhibition of which enzyme?
- Which of the following adverse effects may result from adrenal insufficiency associated with etomidate use?

INFLUENCE OF ACCESS-SITE AND DRUG THERAPY ON BLEEDING DURING PERCUTANEOUS CORONARY INTERVENTION

Aaron J. Bagnola, Pharm.D.*; Danielle M. Blais, Pharm.D, BCPS; Montoya K. Taylor, M.D.; Quinn Capers IV, M.D, FACC, FSCAI
The Ohio State University Medical Center, 368 Doan Hall, 410 West 10th Avenue, Columbus, OH, 43210 1228
aaron.bagnola@osumc.edu

Purpose: Bleeding is a complication of percutaneous coronary intervention (PCI). Several trials have shown a reduction in access-site bleeding utilizing the radial artery for PCI. Other previous trials focusing on pharmacotherapy have touted a significant reduction in bleeding using bivalirudin versus a glycoprotein IIb/IIIa inhibitor with unfractionated heparin (UFH), but these trials have also noted a numerical increase in ischemic events. The current study is a single-center retrospective review evaluating bleeding outcomes of patients undergoing PCI via the radial artery and receiving a glycoprotein IIb/IIIa inhibitor with UFH versus the femoral artery and receiving bivalirudin.

Methods: Adult patients undergoing PCI between September 1, 2010 and September 30, 2011 at The Ohio State University Medical Centers Ross Heart Hospital will be included in this study if the intervention access-site was via the radial artery and the patient received a glycoprotein IIb/IIIa inhibitor with UFH, or the femoral artery was chosen and the patient received bivalirudin. Patients will be excluded if they are: undergoing PCI for a presumed ST-segment elevation myocardial infarction, under 18 years of age, or pregnant. Patient demographic and baseline data collected includes: age, sex, weight, serum creatinine, hemoglobin, INR, pertinent past medical and surgical history, and Mayo risk score. Procedural data collected will include PCI indication, access-site, drug therapy received (clopidogrel, prasugrel, UFH, abciximab, bivalirudin, and epifibatide) with appropriateness of the dosing strategy (per current guidelines and activated clotting time goals), and the primary treatment strategy. The primary outcome measure is bleeding events within 72 hours. Secondary outcome measures include site of bleeding, hematoma (including size), any blood transfusion, other vascular complications requiring treatment, length of stay, and in-hospital mortality. Outcomes were adjudicated per the American College of Cardiology Foundation definitions.

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

Learning Objectives:
- Review the current literature evaluating pharmacological and access-site options for patients undergoing PCI.
- Identify pharmacological and procedural methods to reduce bleeding complications in patients undergoing PCI.

Self Assessment Questions:
- The net clinical benefit of using bivalirudin for the management of patients undergoing PCI is driven by which of the following?
- Which of the following statements is true regarding the National Cardiovascular Data Registry (NCDR) CathPCI Registry bleeding events definitions?
Purpose: The purpose of this study is to use the electronic medical record (EMR) and pharmacist intervention to identify patients with stage 3, 4, or 5 CKD and improve care within a patient-centered medical home. Objectives of the study are to increase compliance with the National Kidney Foundation guidelines for monitoring and care of CKD, ensure appropriate dosing of medications based on patients calculated creatinine clearance, determine the percentage of pharmacist recommendations accepted by the patients primary care physician, and track pharmacist time spent completing the intervention.

Methods: The EMR will generate a list of adult patients with an estimated glomerular filtration rate <60 mL/min/1.73m2. A retrospective chart review of identified patients will be performed to: 1) confirm presence of CKD in patients with criteria for stage 3, 4 or 5 CKD, 2) assess completion of recommended laboratory monitoring and medication therapy for CKD, and 3) assess appropriate dosing of medications. Pharmacist recommendations for care will be communicated with the patients primary care physician through use of the EMR; patients will be contacted if laboratory measures or medication changes are recommended. A second review of the EMR will take place 30 days after communication to determine the percentage of recommendations acted upon by the physician.

Results: The proportions of patients with each recommendation for laboratory monitoring or medication changes ordered 30 days after intervention and a 95% confidence interval will be reported. Results from the EMR review leading to pharmacists recommendations will be reported. Statistical differences in the laboratory monitoring and medication use of patients with and without CKD listed as a medical problem in the EMR prior to intervention will be reported. Time spent by the pharmacist to complete this intervention will be reported to characterize implementation of this novel pharmacy practice model.

Conclusions: Pending

**Learning Objectives:**
Classify stage of chronic kidney disease based on patients calculated creatinine clearance
Outline the recommended laboratory tests and medication therapy for patients with stage 3, 4, or 5 chronic kidney disease

**Self Assessment Questions:**
DG is a 63 year old African American male with SCr of 1.72 and eGFR of 49 mL/min/1.73 m2. DG has
Which of the following is NOT a recommended laboratory test for DGs chronic kidney disease?
**RETROSPECTIVE REVIEW OF EMERGENCY DEPARTMENT TREATMENT PRACTICES FOR SKIN AND SOFT TISSUE INFECTIONS**

Starr-Maree C. Bedy, PharmD*; Jeffrey M. Caterino, MD, MPH; Mary Beth Shirk, PharmD

The Ohio State University Medical Center, 368 Doan Hall, 410 West 10th Ave, Columbus, OH, 43210-1228

Objective: Uncomplicated skin and soft tissue infections (SSTIs) are a common presentation in the Emergency Department (ED). Several pathogens are associated with SSTIs, and the most common is Staphylococcus aureus (Staph aureus). The purpose of this study was to evaluate current ED treatment practices for uncomplicated SSTIs at OSUMC.

Methods: This single-center retrospective study was approved by the local institutional review board. Adults discharged from the ED between January 1 and June 30, 2011 with a diagnosis of uncomplicated SSTI were included. Exclusion criteria were incarceration, animal bite wounds, and previous treatment for the current infection. The primary outcome was discharge antibiotic prescription rate for non-observation service patients. To account for the diversity of patients, the a priori sample size was 50. Descriptive statistics were used to summarize results. Subjects were identified through a computer generated patient list from the health systems centralized data repository.

Results: The initial query returned 1151 unique medical record numbers. Subjects were randomly selected for screening against exclusion criteria. At the interim analysis, 71 of 194 subjects screened were included. Antibiotic prescription rate in non-observation service patients was 92% (48/52) with 52% receiving multiple antibiotic prescriptions. The abscess size was less than or equal to 5 cm for 15 of the 20 patients with documentation of size. Cultures were performed in 14 subjects and 50% were positive for MRSA. All MRSA positive cultures were sensitive to clindamycin, trimethoprim-sulfamethoxazole, and tetracycline. Not all patients had follow-up information; however, 11 patients (11%) had treatment failure based on an unscheduled return visit or a scheduled return visit at which therapy was altered.

Conclusion: Current practices in the OSUMC ED show considerable variability between prescribers. There is potential to improve empiric prescribing practices based on local sensitivities and development of treatment guidelines.

**Learning Objectives:**
- Identify risk factors for community-acquired MRSA skin and soft tissue infections
- Identify the most common pathogens associated with skin and soft tissue infections

**Self Assessment Questions:**
- Staphylococcus aureus is the most common pathogen associated with:
  - Which of the following is a risk factor for community-acquired MRSA skin and soft tissue infections?
IMPACT OF BARCODE POINT OF CARE TECHNOLOGY ON MEDICATION ADMINISTRATION ERRORS IN THE EMERGENCY DEPARTMENT
Joseph Bonkowski; Joseph Melucci; Beth Prier; Cynthia Carnes; Jay Mirtallo; Robert Weber
The Ohio State University Medical Center,368 Doan Hall,410 W. 10th Avenue,Columbus,OH,43202
joseph.bonkowski@columbus.com

Background/Purpose: The medication use system is error prone with medication administration accounting for 34-54% of medication errors. Barcode medication administration (BCMA) improves the accuracy of medication administration in hospital inpatients, but has limited use in emergency departments (ED); this is mainly due to short lengths of ED stay and limited use of electronic medical records (EMR). The Ohio State University Medical Center implemented an EMR and BCMA in the ED, allowing the opportunity to study the impact of this technology on medication administrations errors.

Methods: A single-center, pre/post observational study was conducted to compare medication administration errors after implementing BCMA. Nave observers documented medication administration 2 months prior to and 4 months post BCMA. A medication administration error was defined as any discrepancy between the administered medication and the physicians order. The primary aim of this study, medication administration error rate, was calculated by dividing the number of medication administration errors by the number of medication observations. A secondary aim compared medication administration errors to the time of day and therapeutic class. Medications administered by non-nursing staff were excluded from observation. Pre and post medication administration error rates are compared using a 2 proportion z-test; time of day and medication category differences are calculated using linear regression.

Results: 996 medication observations were conducted in the baseline period with an error rate of 6%. 951 observations are planned in the study period (4 months post BCMA).

Summary/Conclusion: Data collection and evaluation is currently in progress.

Learning Objectives:
- Describe the rationale for using BCMA in the ED
- Identify challenges of implementing BCMA in the ED

Self Assessment Questions:
- Which of the following is a reason to implement BCMA in the ED?
- Which of the following is a challenge of implementing BCMA in the ED?
EVALUATION OF HYPOCALORIC VERSUS TYPICAL PARENTERAL NUTRITION REGIMENS FOR HOSPITALIZED OBESE PATIENTS
Matt Byrdy, PharmD*; Harish Yalamanchili, MD; Ainsley Malone, MS, RD, LD, CNSC
Mt. Carmel Medical Center, 793 W. State St., Columbus, OH, 43222
mbyrdy@mchs.com

Background: Standard predictive energy equations may overestimate caloric requirements for hospitalized obese patients receiving parenteral nutrition (PN) support. The hypocaloric regimen provides 22 kcal/kg of ideal body weight (IBW) whereas other predictive energy equations such as the Harris-Benedict (HB) and the Ireton-Jones (IJ) equations provide obese patients 25 - 30 kcal/kg of IBW + 10%. Compared to regimens based on traditional energy expenditure equations, the hypocaloric regimen permissively underfeeds the amount of total calories and provides higher amounts of protein in a range of 1.7 - 2 g/kg of IBW. The intent is to maintain basal metabolic processes by exclusively feeding lean body mass while avoiding hyperglycemia and associated complications.

Purpose: The objective of this study is to retrospectively compare the hypocaloric regimen to previously used regimens for obese hospitalized patients at this institution.

Methods: Institutional Review Board approval was obtained prior to initiation of the following procedures and data collection was subsequently commenced. A chart review was initiated and included all patients who were consulted to the nutrition support team (NST) service between 1999 and 2011. Eligible patients had a body mass index (BMI) greater than or equal to 30 kg/m2 and an indication for PN as per institutional policy. Obese patients were excluded on the basis of the following criteria: 1) renal insufficiency, defined as serum creatinine greater than 2mg/dL, 2) hepatic dysfunction, defined as total bilirubin greater than 3mg/dL, or 3) pregnancy. Qualifying patients were placed into one of two groups according to the date of consult: Group 1, years 1999-2005 and Group 2, years 2007-2011. Results will analyze the differences between groups in terms of macronutrient dosages, blood glucose levels, PN insulin additives, hospital length of stay, PN days, antibiotic days, and potential weight change.

Results and Conclusions: Data collection is currently underway and results are pending.

Learning Objectives:
Recognize the physiologic differences between obese and non-obese patients and the need for patient-specific PN formulations.
Describe the concept of hypocaloric feeding and its use in hospitalized obese patients.

Self Assessment Questions:
Which of the following statements is correct?
According to the hypocaloric PN regimen, the dosage is increased for which of the following macronutrients?

PHARMACIST INTERVENTIONS DURING HOSPITAL DISCHARGE MEDICATION RECONCILIATION AND THEIR IMPACT ON HOSPITAL READMISSION RATES: A PILOT STUDY
Andy, J. Caputo
Mt. Carmel Medical Center, 793 W. State Street, Columbus, OH, 43222
acaputo2@mchs.com

Purpose: Upon hospital discharge, 49 percent of patients experience at least one medical adverse event, often leading to a hospital readmission. Readmission rates for pneumonia, congestive heart failure and myocardial infarction are currently reported as outcome measures for Medicare. Currently at Mount Carmel West, pharmacists have a role in admission medication reconciliation but are not involved in discharge medication reconciliation. The study objective is to determine the efficacy and feasibility of pharmacist interventions on the process of hospital discharge medication reconciliation at Mount Carmel West.

Methods: The study protocol has been approved by the Institutional Review Board. The included population consists of adult patients admitted to the hospitalist physician group with a presenting diagnosis of pneumonia or chronic obstructive pulmonary disease (COPD) exacerbation. The study took place during two weeks in December 2011. Each patient discharge medication list was reviewed by the pharmacy resident for accuracy and appropriateness and medication counseling was provided at the time of discharge. The resident communicated with the attending physician in regards to any necessary changes to the patients regimen. Patient information collected for aggregate analysis included age, sex, number of disease states, number of admission and discharge medications, and length of stay. Interventions performed by the pharmacy resident were documented and categorized based on problem identification (i.e. inappropriate dosing, inaccurate medication list, etc.). The primary outcome statistic is the thirty-day readmission rate for patients included in the study. This statistic will be compared to the existing thirty-day readmission rates for patients with pneumonia or COPD exacerbation at Mount Carmel West.

Results and Conclusion: Preliminary results show that one of the thirteen patients in the study was readmitted within 30 days of hospital discharge. Final data analysis is underway and results and conclusions will be reported at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the importance of medication reconciliation and hospital readmission rates within the context of the current healthcare system.
Classify interventions that pharmacists can make through participation in discharge medication reconciliation.

Self Assessment Questions:
For which of the following disease states are 30-day hospital readmission rates currently reported by Medicare as outcome of care measures?
Which of the following statements best describes the positive impact pharmacists can make on patients through participation in discharge medication reconciliation?
EVALUATION OF VITAMIN B12 DEFICIENCY AND MEGALOBLASTIC ANEMIA IN DIABETIC PATIENTS
UTILIZING METFORMIN MEDICATION THERAPY
Rebecca M Castner, PharmD*, Alicia Pence, PharmD, CACP; Jennifer Endres, PharmD
UC Health-University Hospital,234 Goodman St,ML 0739,Cincinnati,OH,45219
rebecca.castner@uchealth.com

Background/Purpose
Research indicates a link between metformin use and vitamin B12 deficiency. The cause is under investigation, but displacement of divalent calcium cations by metformin at the lumen surface, leading to impaired uptake of B12-intrinsic factor complex, is considered the most likely mechanism for this association. Currently no guidance exists regarding management, although suggestions for new standards of care include annual megaloblastic anemia/B12 deficiency screening and calcium supplementation. The purpose of this study will be to determine if educating physicians regarding this link leads to improved detection and treatment of metformin-associated B12 deficiency.

Methods
This investigator-initiated, single-center, retrospective study will be conducted at UC Health General Medicine Ambulatory Clinics within University Hospital in Cincinnati, Ohio. Participants include adult patients with a diagnosis of diabetes mellitus type 2 utilizing metformin during the study period. Demographic information, complete blood count values, and dosing of metformin and B12 therapies will be recorded. If documented, serum folate, serum cobalamin, and calcium supplementation will be recorded. The purpose of this study will be to determine if educating physicians regarding this link leads to improved detection and treatment of metformin-associated B12 deficiency.

Preliminary Results
This study has been submitted and is pending approval by the University of Cincinnati Institutional Review Board.

Preliminary Conclusions
Preliminary research and observation suggests most participants in this study will not be routinely screened for vitamin B12 deficiency. However, physician education regarding deficiency may lead to increased detection and treatment. Payment for routine vitamin B12 levels remains a barrier to screening as tests ordered outside of known standards of care may not be deemed medically necessary by payers.

Learning Objectives:
Describe three possible causes of metformin-associated vitamin B12 deficiency
List appropriate pharmacologic treatment of B12 deficiency, including drug, dose, route, and frequency

Self Assessment Questions:
Which of the following is a currently proposed cause for development of metformin-associated B12 deficiency?
Which of the following is an example of appropriate treatment of vitamin B12 deficiency?
BRIDGING FOR AN UNINTENTIONAL SUBTHERAPEUTIC INR WITH LMWH: A COST ANALYSIS

Tiffany W. Chang, PharmD*, Alicia Pence, PharmD, CACP, Jennifer Endres, PharmD, Megan Lyons, PharmD, CACP, Sharon Wright, PharmD
UC Health-University Hospital, 234 Goodman St, ML 0740, Cincinnati, OH, 45208
tiffany.chang@uchealth.com

Background: Warfarin (Coumadin) is a commonly prescribed anticoagulant that is effective in preventing thromboembolic events, but has a narrow therapeutic index. For patients whose INR becomes subtherapeutic, there is concern that the gap in therapy may increase the risk of stroke and death. Bridging with a short-acting parenteral anticoagulant, such as low-molecular-weight heparin (LMWH), may be necessary for optimal anticoagulation. There are currently no guidelines on an optimal method of bridging in patients with subtherapeutic INRs during long-term warfarin therapy. The benefits and harms of anticoagulant bridge therapy, such as bleeding, cost, and risk for thromboembolism need to be weighed in assessing whether a patient with a subtherapeutic INR should be bridged with LMWH.

Purpose: To evaluate the clinical practice of initiating LMWH bridge therapy for an unintentional subtherapeutic INR and to potentially result in a change in practice that may subsequently reduce health care cost.

Methods: This retrospective chart review examined 270 episodes of unintentional subtherapeutic INR occurring in 196 patients at the Pharmacy Anticoagulation Clinic at UC Health - University Hospital. All episodes were categorized as bridged or non-bridged. Costs were estimated and compared between groups through calculating direct medical costs accrued within 90 days of the incidence of unintentional subtherapeutic INR. Adverse events were assessed for bleeding within 30 days and thrombosis within 90 days following subtherapeutic INR.

Results: Study subjects were predominately African American (65.3%) with mean age of 56.4 years. Indications for warfarin therapy were primarily venous thromboembolism (57.7%), atrial fibrillation (18.4%), and mechanical heart valves (12.2%). Sixty-six episodes (24.4%) were bridged with dalteparin (80.3%), lovenox (18.2%), or fondaparinux (1.5%). Costs were significantly higher in the bridged group. Data collection and analysis is still in progress.

Conclusion: The conclusion of this study will be developed upon completion of data collection and analysis.

Learning Objectives:
Identify possible predictors for bridging for an unintentional subtherapeutic INR.
Discuss the challenges, including potential risks, benefits, and costs, associated with bridging an unintentional subtherapeutic INR.

Self Assessment Questions:
According to guidelines by the American College of Chest Physicians for perioperative management of patients receiving warfarin, high risk patients should be bridged with which of the following?
Which of the following factors should be considered before bridging a patient with an unintentional subtherapeutic INR?

COMPARISON OF APPROPRIATE VITAMIN D DOSING AND MONITORING IN PATIENTS WITH VITAMIN D DEFICIENCY BEING FOLLOWED BY PRIMARY CARE VERSUS SPECIALTY CARE PROVIDERS

Chalmers P. Wylie VAOPC, 2489 Loggers Run Ct, Columbus, OH, 43235
melissa.christ@va.gov

Purpose: Vitamin D is essential to maximize skeletal health. There are growing concerns that much of the population is deficient in this nutrient. Vitamin D deficiency can lead to osteoporosis, osteomalacia, and increased risk of falls and fractures due to muscle weakness. Vitamin D deficiency is defined as 25-hydroxyvitamin D levels less than 20 ng/ml; however, different regulatory bodies disagree on the definition of vitamin D sufficiency. This lack of consensus has led to suboptimal management of patients with vitamin D deficiency. Evidence suggests some patients with vitamin D deficiency may not receive the correct vitamin D formulation, as well as adequate monitoring. The objective of this study is to evaluate whether vitamin D is being dosed and monitored appropriately in patients with vitamin D deficiency being followed by primary care compared to specialty care providers. At the conclusion of this study, prescriber practices relative to current guidelines may identify educational opportunities to improve the management of patients with vitamin D deficiency.

Methods: This retrospective chart review of veterans with vitamin D deficiency will be conducted at the Chalmers P. Wylie Veterans Affairs Ambulatory Care Center in Columbus, Ohio. Information will be obtained by analysis of laboratory values and progress notes available in the Veterans Affairs computerized records system. Veterans aged 18 years and older with vitamin D deficiency receiving a prescription for ergocalciferol 50,000 IU initiated between January 1, 2009 and June 30, 2011 will be randomly selected from a computer database-generated list. Patients will be excluded from the study if they received ergocalciferol prior to January 1, 2009 or if actively receiving chemotherapy. Patient charts will be reviewed for 25-hydroxyvitamin D levels, risk factors for vitamin D deficiency, and prescribing providers.

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

Learning Objectives:
Discuss vitamin D status based on 25-hydroxyvitamin D levels. Select the correct vitamin D formulation and dose based on 25-hydroxyvitamin D levels.

Self Assessment Questions:
Which 25-hydroxyvitamin D level is indicative of vitamin D insufficiency based on the Endocrine Society Clinical Practice Guidelines?
If a 50 year old female patient has a baseline 25-hydroxyvitamin D level of 15 ng/ml, what vitamin D formulation and dose should the patient receive?


EFFECT OF DAILY GLUCOMANNAN IN OVERWEIGHT PATIENTS

Katherine M Cochran,* PharmD; Steven R Smith, MS, RPh, BCACP; Ashley M Parrott, PharmD; Louito C Edje, MD; Lindsey J Bostelman, MD; David R Knieriem, MD

Toledo Hospital/Toledo Children’s Hospital, 2051 W. Central Ave., Toledo, OH, 43606

katherine.cochran@promedica.org

Purpose: The purpose of this single-center, 12-week, randomized, double-blind, placebo-controlled trial was to evaluate the efficacy of glucomannan fiber supplementation for weight loss.

Methods: Patients >18 years old with a BMI ≥25 kg/m2 were randomized to receive either glucomannan 575 mg or placebo, 2 capsules three times daily 30-minutes before meals. Patients who attempted weight loss through a diet or exercise program within a month before enrollment or those on medications known to cause changes in weight were excluded. Patients with a history of heart failure, inflammatory or irritable bowel disease, structural abnormalities of the esophagus or gut, or gastrointestinal surgery for weight reduction were also excluded. Study subjects were instructed not to change their diet or exercise habits. At baseline, a brief diet and exercise history was obtained and weight and height were recorded. Subjects were given 4 weeks of therapy. After the first 2 weeks of therapy, study subjects were called to assess safety and tolerability. At 4-week intervals subjects were weighed, adverse effects were evaluated and pill counts were performed. The primary outcome is change in weight after 12 weeks of therapy and will be evaluated using a t-test for independent samples (α=0.05). A 5% change in weight will be considered clinically significant. Assuming a 25% dropout rate, 20 patients per treatment group will be required to meet 80% power. An intention-to-treat analysis will be performed for all patients receiving at least one dose of therapy. The last observation will be carried forward for all patients who completed at least one month of the study.

Results: Forty patients were enrolled in the trial. Results from this study will be presented at the Great Lakes Pharmacy Resident Conference in April 2012.

Learning Objectives:
Recall the proposed mechanisms by which glucomannan is thought to produce weight loss.
Describe the role of glucomannan for weight loss.

Self Assessment Questions:
Which of the following is a proposed mechanisms by which glucomannan is thought to produce weight loss?
Which of the following is true regarding the current literature for glucomannan in weight loss?

The purpose of this study was to evaluate the efficacy of glucomannan fiber supplementation for weight loss.


UTILIZATION AND EVALUATION OF A MAINTENANCE WARFARIN-DOSING TOOL BY AN INPATIENT, PHARMACIST-LED ANTICOAGULATION CONSULT SERVICE

Jordan J. Counts, PharmD*; Mark Friedman, PharmD; Karen Knoell, PharmD

Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 43214

jcounts2@ohiohealth.com

Purpose: To incorporate the principles of weekly dose adjustments, used by outpatient anticoagulation clinics, to develop and evaluate a warfarin-dosing tool for maintenance therapy available to pharmacists participating in an inpatient pharmacist Coumadin consult service. The aim is to ensure a more standardized maintenance warfarin-dosing regimen.

Methods: A retrospective chart review was performed for patients who were managed by the inpatient, pharmacy Coumadin consult service. Patients were selected for inclusion if they were on warfarin therapy prior to admission to the hospital. Pharmacists had use of the implemented warfarin-dosing tool when evaluating potential options for a daily warfarin dose. Ultimate selection of the daily warfarin dose was at the clinical discretion of the pharmacists, regardless of the dose recommended by the dosing tool. The warfarin-dosing tool evaluated warfarin doses based on the absolute value of the daily INR, the rate of change in the INR from the previous day, and the presence of new drug interactions. Pharmacists documented whether or not they utilized the tool-recommended dose. Patient data was collected and included for statistical analysis from the time they met inclusion criteria until discharge, therapy interruption, or therapy discontinuation, whichever occurred first.

Results/Conclusions: Data collection is ongoing. Data will be statistically analyzed via t-test to compare the percentage of INR values within therapeutic range for patients with warfarin maintenance therapy prior to and after implementation of a warfarin-dosing tool. Secondary outcomes will also be analyzed through a t-test statistical analysis.

Objectives:
Identify the reasons for the development of a maintenance warfarin-dosing tool for inpatient pharmacists participating in a warfarin consult service.
Describe the criteria for assessing pharmacists agreement with dose recommendation provided by the maintenance warfarin-dosing tool.

Learning Objectives:
Identify the reasons for the development of a maintenance warfarin-dosing tool for inpatient pharmacists participating in a warfarin consult service.
Describe the criteria for assessing pharmacists agreement with dose recommendation provided by the maintenance warfarin-dosing tool.

Self Assessment Questions:
What three broad concepts were used to justify the development of the maintenance warfarin-dosing tool?
Pharmacists documented utilization of the warfarin-dosing tool if they wrote an order for a dose within:
EVALUATION OF THE INCIDENCE OF BLOODSTREAM INFECTIONS IN PULMONARY ARTERIAL HYPERTENSION PATIENTS RECEIVING INTRAVENOUS PROSTACYCLIN TREATMENT

Mark A. Crist, PharmD*; Karri A. Bauer, PharmD, BCPS; Namita Sood, MD, FCCP; Jose A. Bazan, DO; Laura A. Duvall, PharmD, BCPS
The Ohio State University Medical Center, 410 West 10th Ave, Room 368 Doan Hall, Columbus, OH 43210
mark.crist@osumc.edu

Purpose: Pulmonary Arterial Hypertension (PAH) is a serious lung disease characterized by increased pulmonary artery pressure and pulmonary vascular resistance. Intravenous (IV) prostacyclin therapy has been shown to improve survival. Epoprostenol and treprostinil are the IV prostacyclin medications currently available. Both agents require continuous administration via central venous catheter (CVC).

Studies demonstrate the incidence of catheter associated bloodstream infections (CABSI) in PAH patients treated with prostacyclin therapy to be 0.26 and 0.55 cases per 1000 treatment days. The rate of CABSI and the prevalence of Gram negative organisms were higher in patients treated with treprostinil therapy.

The primary objective of this study is to determine the incidence of CABSI in PAH patients receiving prostacyclin therapy. Secondary objectives include identification of risk factors and 28-day mortality.

Methods: This retrospective, single-center study evaluated PAH patients receiving either epoprostenol or treprostinil from January 1, 1996 to August 31, 2011. Patients less than 18 years or greater than 89 years of age, prisoners, and those who received both epoprostenol and treprostinil therapy were excluded.

Data collected includes: age, gender, prostacyclin medication, cause of PAH, time from PAH diagnosis, immunosuppressive conditions, use of immunosuppressive drugs, type of CVC, time from catheter placement to positive blood culture, time from initiation of prostacyclin therapy to positive blood culture, organism and susceptibilities, antibiotic therapy, time from infection to appropriate antibiotic therapy, duration of bacteremia, infectious complications, type of new catheter placed, relapse, reinfection, ICU admission, length of stay (LOS), infection-related LOS, and 28-day mortality.

Chi Squared and Fishers exact and Wilcoxon rank sum tests will be used to analyze data. Univariate and multivariate hazard models will be performed to determine risk factors associated with the development of infection.

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

Learning Objectives:
- Describe the prevalence of catheter associated bloodstream infections (CABSI) in Pulmonary Arterial Hypertension (PAH) patients treated with prostacyclin therapy
- Recognize risk factors associated with the development of CABSI in PAH patients treated with prostacyclin therapy

Self Assessment Questions:
1. Which of the following statements is TRUE regarding the prevalence of CABSI in PAH patients treated with prostacyclin therapy?
2. Which of the following has been identified in previous studies as a risk factor associated with the development of CABSI in PAH

DETERMINATION OF FACTORS ASSOCIATED WITH BLEEDING IN PATIENTS RECEIVING ALTEPLASE FOR PULMONARY EMBOLISM: A FOCUS ON BODY WEIGHT

Garrett M. Curtis, Pharm.D.; Simon W. Lam, Pharm.D., BCPS; Anita Reddy, M.D., FCCP; Seth Bauer, Pharm.D., BCPS
Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, OH 44115
curtisg@ccf.org

Purpose:
Patients who present with massive or submassive pulmonary embolism (PE) may require immediate intervention using thrombolytic agents. Previous trials have indicated an increased rate of PE resolution and improved hemodynamics for patients receiving thrombolytics plus heparin versus heparin alone. In a recent study, alteplase 50 mg infused over 2 hours showed similar efficacy to the FDA-approved dose of 100 mg infused over 2 hours. Overall bleeding was numerically higher in the 100mg group, but this was not significantly different. Subgroup analyses based on body weight noted similar efficacy between doses, but a significantly lower bleeding rate in patients weighing less than 65 kg who received the 50 mg dose. Since the 50 mg dose is not used routinely in clinical practice, this study aims to evaluate the effect of body weight on the incidence of bleeding in patients given alteplase 100 mg over 2 hours for PE.

Methods:
This non-interventional, retrospective, case-control chart review evaluated the effect of body weight on the incidence of bleeding within 72 hours of alteplase administration in patients who receive alteplase 100 mg for PE. Case patients included those experiencing bleeding while control patients are those who did not bleed. Secondary objectives include evaluation of the influence of known risk factors for bleeding after alteplase administration for the treatment of PE. All patients at least 18 years of age who received alteplase 100 mg over 2 hours for a confirmed diagnosis of PE were included. Exclusion criteria include administration of alteplase for indications other than PE or use of alternative dosing regimens. Collected data describes patient demographics, indication for alteplase, laboratory data, imaging data indicating bleeding, concomitant therapies including heparin, and risk factors for bleeding.

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

Learning Objectives:
- Explain the pathophysiology and clinical impact of a pulmonary embolism
- Discuss the methodology and results of the presented study

Self Assessment Questions:
Which of the following indications for thrombolytics in PE are recommended by the CHEST guidelines?
Which of the following is an absolute contraindication to thrombolytics?
Candidate for pain control with a continuous infusion opioid? Unable to take oral medications. Which patient is the best in an actively dying patient?

Opioids alleviate which one of the following common symptoms compared to an IV push bolus opioid:

Describe when a continuous infusion opioid is indicated.

Discuss when an opioid is indicated for an actively dying patient.

Subsequently, a guideline for parenteral opioid use in end-of-life care was developed by the Department of Pharmacy and the OSUMC Center for Palliative Care. The guideline was established in May 2011 and is intended to assist practitioners in the optimal prescribing of opioid infusions as part of end-of-life care.

The current study is an experimental, retrospective cohort, single-center, nonrandomized study evaluating a prescribing-related medication error at OSUMC. Two cohorts were evaluated, one before and one after establishment of the guideline.

Patients admitted to OSUMC, ordered DNR status, and ordered a morphine or hydromorphone infusion during the period of June 1, 2009 through September 30, 2009 or June 1, 2011 through September 30, 2011 were included. The total number of DNR patients during these time periods was noted. The primary outcome measure is the percentage of initial morphine or hydromorphone infusion orders with open-ended titration parameters. Secondary outcomes are percentage of morphine or hydromorphone infusion patients who had a corresponding PRN opioid order for breakthrough pain, time between DNR order placement and morphine or hydromorphone infusion order placement, and percentage of all patients with a DNR order who were prescribed a morphine or hydromorphone infusion.

The data was collected and evaluation has commenced. Outcome measures will be investigated by comparison of the two cohorts. Preliminary results indicate a decrease in 2011 for the total number of opioid infusions and the percentage with prescribing errors.

Learning Objectives:
Discuss when an opioid is indicated for an actively dying patient.
Describe when a continuous infusion opioid is indicated compared to an IV push bolus opioid.

Self Assessment Questions:
Opioids alleviate which one of the following common symptoms in an actively dying patient?
All of the following hospital inpatients have recently become unable to take oral medications. Which patient is the best candidate for pain control with a continuous infusion opioid?

EVALUATION OF THE TREATMENT OF VANCOMYCIN RESISTANT ENTEROCOCCAL (VRE) BACTEREMIA: A COMPARISON OF LINEZOLID VERSUS HIGH DOSE DAPTOMYCIN
Katie L. DeVaull, Pharm.D.*; Erica E. Reed, Pharm.D., BCPS; Mark Lustberg, MD; Kari A. Bauer, Pharm.D., BCPS
The Ohio State University Medical Center, 410 W. 10th Avenue, Room 368 Doan Hall, Columbus, OH, 43210
Katie.DeVaull@osumc.edu

Background:
Enterococci are a common cause of nosocomial bloodstream infections (BSI) with Enterococcus faecalis (E. faecalis) and Enterococcus faecium (E. faecium) the most prevalent. Vancomycin is frequently used to treat Enterococci BSIs. Unfortunately, resistance to vancomycin is increasing. This leads to challenges in optimal treatment of vancomycin-resistant Enterococcus (VRE) BSIs. For these reasons, linezolid and daptomycin are commonly used in the treatment of VRE BSIs.

Linezolid is active against VRE, but demonstrates bacteriostatic activity. Daptomycin is also active against VRE, and demonstrates bactericidal activity which may offer advantages over linezolid. Enterococci have a thicker cell wall compared to other Gram positive organisms which may hinder the ability of antibiotics that work intracellularly to reach the target for activity. Studies have demonstrated clinical and microbiological success with linezolid and daptomycin (6 mg/kg) in the treatment of VRE BSI. However, there may be a clinical or microbiological benefit in using high doses of daptomycin (≥8 mg/kg) in the treatment of VRE BSIs.

Purpose:
The primary objective of this study is to determine the time to microbiologic clearance in patients with VRE BSI treated with linezolid compared to high dose daptomycin (≥8 mg/kg). Secondary objectives include: hospital length of stay (LOS), infection-related LOS, relapse, 14 day mortality, and overall mortality.

Methods:
This is a retrospective study of adult inpatients with a positive blood culture for VRE who received >48 hours of linezolid (standard dose) or daptomycin (≥8 mg/kg) between January 1, 2008 and December 31, 2010. Data collection includes: age, gender, hospital service, Charlson comorbidity index, APACHE II score, receipt of prior antibiotic therapy, prior hospitalization, culture and susceptibilities, antibiotic therapy and duration, source of infection, time to source removal, surgical intervention, and discharge disposition.

Results/Conclusions:
Data collection and analysis are currently being conducted; results and conclusions will be presented at the conference.

Learning Objectives:
Review current treatment options for vancomycin resistant Enterococcal (VRE) bacteremia.
Discuss clinical outcomes of patients with VRE bloodstream infections (BSI) treated with linezolid and daptomycin.

Self Assessment Questions:
Which risk factor is most highly correlated with VRE?
Given a patient with VRE, which species often demonstrates resistance to vancomycin?
ASSESSING PHARMACISTS CONFIDENCE IN COUNSELING PATIENTS WITH MENTAL ILLNESS

Jamie L. Drees, PharmD*, Gayle L. Kamm, PharmD, BCPS
University of Toledo Medical Center, 3000 Arlington Ave, MS 1060, Toledo, OH 43146
jamie.drees@utoledo.edu

Background: Pharmacist interaction with physicians has been shown to optimize the treatment of their patients by improving their adherence and attitudes toward antidepressant and antipsychotic medications used to treat psychiatric conditions. Despite these results, it has been shown that few patients are counseled on these medications. It has been documented that antipsychotic medications as a therapeutic class is in the top five for medication spending in the United States in 2010. Although psychotropic medications are widely prescribed and dispensed, the number of hours devoted to psychiatric disorders in pharmacy school curricula throughout the United States is relatively small. There are little data to show that pharmacists are confident and knowledgeable in counseling patients on psychotropic medications.

Purpose: This study will be assessing the confidence and knowledge of practicing pharmacists in counseling patients with mental illness on psychotropic medications. Overall, this information will be analyzed to determine the need for curricular changes in colleges of pharmacy in order to better prepare pharmacists for educating those who suffer from mental illness.

Methods: An online survey will be sent to licensed pharmacists who have an active email address registered with the Ohio State Board of Pharmacy. To increase response rate in the target population, an email reminder and survey request will be sent out at week one, two, and three from the original email request. The survey will be a questionnaire to evaluate antipsychotic therapeutic knowledge and confidence in communicating this knowledge to patients suffering from a mental illness. Respondents will also be asked to provide demographic information including gender, years in practice, state where degree was obtained, current practice setting, degrees and/or further educational training.

Conclusions: Study is still under investigation with results and conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:
- Report current trends in counseling on prescription medications by pharmacy personnel
- Discuss the reason for counseling patients on psychotropic medications

Self Assessment Questions:
- Which therapeutic class is most often counseled on in the outpatient setting?
- Which of the following classes of psychotropic medications is the most prescribed in the United States?

ANTIBIOTIC USE FOR BACTERIA ON URINALYSIS IN PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT

Kelsey M. Duplaga, PharmD*, Amy Rybarczyk, PharmD, BCPS, Jacob Zimmerman, PharmD, Kathryn Heimann, PharmD, Ronda Ambroziak, PharmD
Akron General Medical Center, 400 Wabash, Akron, OH 44307
kelsey.duplaga@akrongeneral.org

Purpose: Inappropriate antibiotic treatment can lead to bacterial resistance, adverse effects, and increased healthcare costs. Antibiotics for asymptomatic bacteriuria are not indicated in a majority of patients, yet many receive treatment. The objective of this study is to determine the proportion of patients presenting to the emergency department (ED) with bacteria on urinalysis without clinical signs or symptoms of a urinary tract infection (UTI) who receive antibiotic treatment.

Methods: This retrospective review was approved by the Institutional Review Board. ED records were used to identify patients presenting to the ED from January 1, 2005 to November 1, 2011 with a diagnosis of chest pain and a completed urinalysis. Patients 18 years or older with bacteria on urinalysis were included. The following patients were excluded: confirmed pregnancy, immunocompromised, documented signs or symptoms of a UTI, or UTI was not listed as an indication for antibiotics. Demographics, the presence of certain comorbidities, urinalysis findings, urine culture results, and antibiotic data were collected. Patients without criteria for symptomatic UTI were divided into two groups: those treated and those not treated for bacteria on urinalysis. The primary outcome is the proportion of patients with bacteria on urinalysis without criteria for symptomatic UTI that were treated with antibiotics. Secondary outcomes include the risk of receiving antibiotic treatment in the presence of certain comorbidities or other positive findings on urinalysis, the percentage of completed urine cultures in treated patients, patients treated with specific antibiotics, treated patients with an organism resistant to the chosen antibiotic, and the duration and the total cost for antibiotics. Descriptive statistics will be used. This information will be used to identify patients inappropriately treated for bacteria on urinalysis, triggers for ordering antibiotics, and the additional cost of treatment to the healthcare system.

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

Learning Objectives:
- Identify the indications for treatment of asymptomatic bacteriuria.
- Discuss triggers for ordering antibiotics for bacteria on urinalysis in patients without signs or symptoms of a UTI.

Self Assessment Questions:
- Which of the following patients should receive antibiotics for asymptomatic bacteriuria?
- A definitive indication for antibiotic treatment for UTI is:
Efficacy and Safety of Tenecteplase for the Treatment of Peripheral Occlusion

Katherine R. Fitz*, PharmD, Mark Friedman, PharmD
Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 43214
KFitzz2@OhioHealth.com

Background/Purpose:
Two fibrinolytics have been commonly used in OhioHealth hospitals, alteplase and reteplase. Alteplase is used system-wide for peripheral procedures and ischemic stroke; reteplase has been used in the outlying hospitals for the treatment of MI and by cardiologists at Riverside for peripheral occlusions. Following the interruption of reteplase manufacturing, interventional cardiologists at Riverside have requested the addition of tenecteplase to formulary. Tenecteplase has a longer half-life, increased clot sensitivity and improved resistance to plasminogen activator inhibitor when compared to alteplase. The Assent-2 trial demonstrated less nonintracranial major bleeding and requirement for blood transfusions with tenecteplase compared to alteplase in patients with MI. Clinical outcomes of tenecteplase to treat patients with peripheral occlusions have been described but comparative outcomes with alteplase for this indication are not available. The purpose of this study was to evaluate the safety and efficacy of tenecteplase for treatment of peripheral occlusion as compared to reteplase.

Methods:
This retrospective study was submitted for review by the Institutional Review Board (IRB). All hospitalized patients initiated on the reteplase between July 2010 and December 2010 were compared with all hospitalized patients initiated on the tenecteplase between July 2011 and December 2011. Data collected included: demographic information (age, sex, weight), dose of thrombolytic (units of reteplase or mg of tenecteplase), duration of thrombolytic therapy (hours), indication for thrombolytic therapy, signs and symptoms of bleeding as classified by the TIMI bleeding criteria, outcome of intervention, and concurrent antiplatelet or anticoagulants administered. Patients where the thrombolytic was used for an indication other than peripheral occlusion were excluded. Continuous variables were compared with an independent t-test. Categorical data were compared with the Fishers test. The a priori level of significance was 0.05.

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

Learning Objectives:
Define the process used by Riverside Methodist Hospital to utilize tenecteplase for treatment of peripheral occlusions.
Describe the impact of tenecteplase on clinical outcomes in patients treated with this agent for treatment of peripheral occlusion.

Self Assessment Questions:
According to the TIMI bleeding criteria, a minor bleeding event is classified as?
Which of the following statements comparing alteplase and tenecteplase is true?

IMPACT OF AN AUTOMATIC REFILL SYSTEM ON MEDICATION POSSESSION RATIOS IN THE COMMUNITY PHARMACY SETTING

Jennifer R. Frerick, PharmD.*, Tara R. Green, PharmD.
The Ohio State University College of Pharmacy, 7608 Mill Bench Ct, Apt D, Dublin, OH, 43016
frerick.4@osu.edu

Medication adherence is directly associated with improved clinical outcomes. Therefore, it is crucial to ensure that pharmacists encourage patients to remain adherent through available channels. Enrollment of patients in an automatic refill system aims to improve medication adherence by making it easier for patients to fill their medications on time. One useful way to measure this impact is through the medication possession ratio (MPR) which is defined as the ratio of the number of days between the last refill and the next expected refill to the number of days between the last refill and the next actual fill. Retrospective data will be collected for a random sample of patients enrolled in the automatic refill system at a community pharmacy chain. MPRs will be calculated for six months before and after enrollment to assess the impact of the automatic refill system. Specific disease states for comparison include hypertension, dyslipidemia, diabetes, depression, asthma/COPD, and gastroesophageal reflux disease. Demographic data of patients including age, gender, insurance coverage, number of chronic medications, and method of refill notification will also be collected and analyzed. Data collection will take place in January and February of 2012. Results will provide information to identify potential areas for improvement in counseling and patient care programs that may enhance adherence and patient outcomes.

Learning Objectives:
Define the medication possession ratio and its importance in assessing adherence.
List patient barriers to medication adherence.

Self Assessment Questions:
How is the MPR calculated?
Which of the following is a potential barrier to medication adherence?
DEVELOPMENT OF A BUSINESS PLAN BASED ON IDENTIFIED NEEDS FOR A MULTIDISCIPLINARY OUTPATIENT ONCOLOGY SYMPTOM MANAGEMENT CLINIC
Kelly Gaertner*, PharmD, Teresa Meier, PharmD, BCOP
Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 43214
KGAERTN2@ohiohealth.com

Background
Cancer patients are afflicted with a wide variety of symptoms as a result of their disease, treatment, or both. With experience in planning, implementing, and evaluating a therapeutic plan, a pharmacist has much to offer in collaboration with other healthcare professionals to provide optimal symptom management for oncology patients. Reported benefits of pharmacist involvement in ambulatory care settings include improved therapeutic outcomes, increased patient satisfaction, and cost savings. Practical benefits of a symptom management clinic are improved patient satisfaction with the care received and quality of life.

Purpose
The primary objective of this study is to identify if both a need, and an interest, exist for a multidisciplinary outpatient oncology symptom management clinic. A secondary objective will be to develop recommendations for the implementation of such a clinic at Riverside Methodist Hospital.

Methods
Upon approval from the Institutional Review Board (IRB), patients at each of the outpatient clinics and the infusion center will be offered an anonymous survey. Physicians will be surveyed anonymously via the use of an internet survey tool. Once the specific needs of oncology patients at this institution are identified, a plan can be developed to best address these needs.

Results/Conclusions
Data collection is ongoing. Results and analysis will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the most common symptoms reported by outpatient oncology patients.
Discuss the reported benefits of a multidisciplinary outpatient oncology symptom management clinic.

Self Assessment Questions:
Based on published results of surveys of outpatient oncology patients, what is the most common symptom reported by these patients?
A reported outcome of pharmacist involvement in ambulatory care settings is:

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NEONATAL OUTCOMES FOLLOWING IN UTERO EXPOSURE TO BUPRENORPHINE/NALOXONE OR METHADONE
Kristen M Gawronski, PharmD*; Debra K Gardner, PharmD; Peter J Giannone, MD; Mona R Prasad, DO; K. Joy Lehman, PharmD, BCPS
The Ohio State University Medical Center, Room 368 Doan Hall, 410 W. 10th Ave, Columbus, OH, 43016
kristen.gawronski@osumc.edu

Opioid addiction is an increasingly common problem during pregnancy. Methadone has long been considered the primary treatment for opioid dependence during this time. However, exposure to methadone is associated with neonatal abstinence syndrome (NAS), characterized by central nervous system hyperirritability, autonomic nervous system dysfunction, and gastrointestinal complications. Neonates with NAS often require prolonged opioid treatment, as well as extended hospitalizations and increased medication-associated costs. Recently, there have been reports describing milder NAS in neonates with exposure to buprenorphine.

The MOTHER project found that buprenorphine-exposed infants required significantly less morphine compared to those exposed to methadone. There was also a statistically significant decrease in duration of NAS therapy and hospital length of stay (LOS). While these results suggest that exposure to buprenorphine may lead to improved outcomes, there is no data available on the use of buprenorphine/naloxone (Suboxone). At this center, it is standard practice to prescribe either methadone or buprenorphine/naloxone to opioid-dependent women during pregnancy.

The current study is a single-center, retrospective study evaluating NAS outcomes in infants exposed to buprenorphine/naloxone or methadone in utero. All pregnant women 18 years of age or older, who were on methadone ≤ 150 mg daily or buprenorphine/naloxone ≤ 24 mg daily for the treatment of opioid dependence, and delivered babies at OSUMC between January 1, 2010 and October 14, 2011 are eligible for study inclusion. Women who received a methadone taper prior to delivery, daily methadone doses > 150 mg or buprenorphine/naloxone doses > 24 mg, those who received buprenorphine (Subutex) alone, or methadone for chronic pain will be excluded. The primary outcome is total amount of oral morphine equivalents administered. Secondary outcomes include number of neonates requiring treatment, peak NAS score, length of treatment, and LOS.

Data collection and evaluation are currently ongoing and results will be presented at the conference.

Learning Objectives:
Define neonatal abstinence syndrome.
Identify potential neonatal benefits of buprenorphine/naloxone use for opiate addiction in pregnancy.

Self Assessment Questions:
Which of the following medications is commonly used to treat neonatal abstinence syndrome?
Which of the following is a neonatal benefit of buprenorphine/naloxone for opioid dependence compared to methadone?
Which below can be affected by pharmacist involvement in pain management?

Self Assessment Questions:
- Which of the following are implications of under treated pain?
- Which below can be affected by pharmacist involvement in pain management?

EFFECTS OF A PHARMACIST-INITIATED OUTREACH PROGRAM ON CONTROLLER MEDICATION USE AND ASTHMA CONTROL IN NON-ADHERENT ASTHMAS

Kelly A Gibas*, PharmD, Mary Ann Dzurec, PharmD, Paul R Bandfield, PharmD, Amy M Kramer, PharmD

Kaiser Permanente Health Plan of Ohio, 12301 Snow Road, Parma, OH, 44130

Kelly.A.Gibas@kp.org

Background:
Short-acting-beta2-agonists (SABAs) are generally very effective at treating asthma attacks by relaxing bronchial smooth muscle. Overuse of SABAs is associated with increased risk of adverse effects and the development of tolerance leading to less effective responsiveness during an exacerbation. Appropriate use of controller medications such as inhaled corticosteroids (ICS) should decrease SABA utilization and improve asthma control in persistent asthmatics. Patients receiving intensive counseling on appropriate asthma treatment may be more likely to use an ICS. Pharmacists can play a key role in providing this educational intervention to patients.

Purpose:
To evaluate the impact of a new program in which primary care clinical pharmacists (PCCP) in an ambulatory care setting outreach to non-adherent patients with persistent asthma.

Methods:
This IRB-approved retrospective study includes non-COPD patients aged five to sixty-four with a diagnosis of persistent asthma who received PCCP outreach triggered by an electronic refill authorization request for albuterol. To qualify for outreach subsequent chart review had to indicate at least one of the following: overutilization of albuterol; lack of/non-adherence to an ICS; same-day/ER visit for asthma exacerbation in the past three months; or oral steroid prescription for asthma exacerbation filled in the past three months. To determine the effectiveness of this new outreach program, SABA and ICS utilization three months before and after PCCP outreach will be evaluated. Improvement in asthma control will be assessed by two methods: comparing quantity of oral steroid prescriptions utilized for acute asthma exacerbation three months before and after outreach and change in Asthma Control Test (ACT) scores between initial outreach and follow-up approximately one month later. Patient satisfaction will be assessed using a five-point Likert scale survey which will be mailed to all patients.

Results/Conclusions:
Data collection is on-going; results and conclusions to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
- Indicate appropriate first-line treatment options in a patient with persistent asthma.
- Identify the risks associated with short-acting-beta2-agonist (SABA) overutilization.

Self Assessment Questions:
- First-line treatment for a patient with persistent asthma includes which of the following?
- Frequent use of short-acting-beta2-agonists (SABA) over time can result in which of the following?
EVALUATION OF PHARMACY FACULTY KNOWLEDGE AND PERCEPTIONS OF THE PATIENT-CENTERED MEDICAL HOME (PCMH) WITHIN PHARMACY EDUCATION

Anisha B. Grover, PharmD*, Bella H. Mehta, PharmD, Jennifer L. Rodis, PharmD, BCPS, Kristin A. Casper, PharmD, Whitney A. Shaffer, PharmD, CDE, Randy K. Wexler, MD, MPH
The Ohio State University College of Pharmacy, 500 West 12th Avenue, Columbus, OH, 43210
grover.80@osu.edu

OBJECTIVES/PURPOSE: The Patient Protection and Affordable Care Act of 2010 emphasizes the need for a reorganized primary care system and supports patient centered medical home (PCMH) as a primary care initiative. Future pharmacists have an important opportunity to advance practice by participating in PCMH team care, and pharmacy education has a central responsibility in preparing pharmacists to effectively contribute in this setting. This project aims to 1) assess pharmacy faculty knowledge about key PCMH principles, 2) evaluate pharmacy faculty perception of inclusion of PCMH information in didactic and/or experiential pharmacy curriculum, and 3) evaluate pharmacy faculty perception of where and how information about PCMH should be taught.

METHODS: A roster of current pharmacy faculty will be obtained from the American Association of Colleges of Pharmacy (AACP) and used to create a database of potential participants. A customizable survey program will be used to develop and implement an anonymous, online survey. The survey will be pilot tested by non-AACP members that are involved in teaching at The Ohio State University College of Pharmacy and modified as needed. The survey will then be sent out to all AACP faculty members. Faculty will rate their familiarity with key PCMH principles. Participants will indicate whether or not PCMH concepts should be included in pharmacy education and if so, where in the curriculum, required or elective, and how much time should be dedicated to this topic. Demographic information will be collected. The survey will remain open for one month and two reminder emails will be sent during the midpoint and final week of the data collection period. Descriptive statistics will be used to report responses. RESULTS: Reported outcomes will include descriptive data relating to study objectives. CONCLUSIONS: Characterization of pharmacy faculty knowledge and perceptions of PCMH will identify potential opportunities for pharmacy education.

Learning Objectives:
Define the Patient-Centered Medical Home (PCMH), according to the National Committee for Quality Assurance (NCQA). Identify the Joint Principles for the Medical Education of Physicians as Preparation for Practice in the Patient-Centered Medical Home (PCMH).

Self Assessment Questions:
The National Committee for Quality Assurance (NCQA) defines the Patient-Centered Medical Home (PCMH), as a redesigned primary healthcare setting that _____:

1. The Joint Principles for the Medical Education of Physicians as Preparation for Practice in PCMH were developed collectively in February 2007 by a group of physician organizations. Which of the fo

IMPECT OF PHARMACIST INTEGRATION IN A PEDIATRIC PRIMARY CARE CLINIC ON VACCINATION ERRORS: A RETROSPECTIVE REVIEW

Anna Haas-Gehres*, Pharm.D., Sonya Sebastian, Pharm.D., Kristen Lamberjack, Pharm.D.
Nationwide Children's Hospital, 700 Children's Drive, Columbus, OH, 43205
anna.haasgehes@nationwidechildrens.org

Background:
Current immunization recommendations for pediatric populations involve complex and dynamic schedules. To practitioners of all levels, the complexity of these schedules presents a barrier to appropriate use of vaccinations.

Purpose:
The objective of this study is to measure the impact of pharmacist integration in an urban, pediatric resident primary care clinic on vaccination error rates.

Methods:
This retrospective chart review study has been approved by the Institutional Review Board. The health systems electronic medical record will be used to identify charts for review at two similar clinics within the health system. A full-time pharmacist is integrated into the clinic in the intervention group. There is no pharmacist present at the comparison clinic. Both clinics are staffed by pediatric resident and attending physicians. Visits included in the review will be patient visits for individuals ≤18 years of age during the months of April, May, and June 2011. Patient visits will be excluded for individuals with documented vaccination refusal or no vaccination history. A vaccination error will be defined as follows: doses administered before minimum recommended age, doses administered within the minimum recommended spacing from a previous dose, doses administered unnecessarily, live vaccination administered too close to a previous live vaccine, and doses invalid for combinations of these reasons. Data will be recorded without identifiers and maintained confidentially. Chart reviews will be completed by a member of the research team using a chart review rubric designed to identify the above listed vaccination errors. The vaccination error rate will be compared between the two clinics to determine the impact of pharmacist integration into a pediatric primary care clinic on vaccination errors.

Results/Conclusion: The research is in the data collection phase. Final results with conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Review the importance of vaccination schedules
Discuss the implications of reduction in vaccination errors

Self Assessment Questions:
Which of the following scenarios could decrease vaccine effectiveness?
Which of the following are benefits to reducing vaccination errors?
Background:
Electrolyte disturbances are a frequently encountered lab abnormality in critically ill patients that can result in serious complications, prolonged hospitalizations, and increased mortality. Implementation of protocols and order sets in intensive care units (ICUs) provides standardization of care, reduces workload, and improves outcomes. Limited data exists regarding efficacy of electrolyte guidelines in ICUs.

Purpose:
To evaluate the efficacy and safety of recently implemented electrolyte replacement guidelines in the ICU.

Methods:
This retrospective cohort study evaluated patients admitted to the ICUs that had electrolyte levels indicated for replacement. Pre-guideline patients were selected for ICU stays from November 1, 2010 thru December 31, 2010 and post-guideline patients for ICU stays from November 1, 2011 thru December 31, 2011. Low electrolytes indicated for replacement were defined as serum potassium (<3.9 mmol/L), phosphate (<3 mg/dL), calcium (<8.6 mg/dL), or magnesium (<2 mg/dL). Patients were excluded for age<18 years old, CrCl<30 ml/min, renal replacement therapy, pregnancy, extended ICU stay (>14 days), receiving total parenteral nutrition (TPN), patients without an electrolyte panel within 24 hours of a replacement dose, receiving IV loop diuretic bolus or drips, and short bowel syndrome. The primary objective of this study was to assess the efficacy of the electrolyte guideline, defined as percent of electrolytes within goal range 2 to 24 hours post replacement. The secondary objectives of this study were to determine the safety of the guideline (replaced electrolyte > high end of normal), number of doses per patient, and percentage of indicated replacement doses given. P-value <0.05 was considered significant.

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

Learning Objectives:
Review the literature regarding electrolyte abnormalities in critically ill patients.
Discuss potential benefits and disadvantages of electrolyte replacement guidelines in the ICU.

Self Assessment Questions:
Which of the following is a clinical symptom of hypokalemia?
Hypomagnesemia is present in upto this percent of ICU patients?

RETROSPECTIVE EVALUATION OF AN ELECTROLYTE REPLACEMENT GUIDELINE IN THE INTENSIVE CARE UNITS
Jeremy, S. Hilty*, PharmD,PhD; Victoria A. Tate, PharmD, BCPS
Cincinnati Veteran Affairs Medical Center,3200 Vine Street,(Pharmacy: 119),Cincinnati,OH,45220
jeremy.hilty@va.gov

PERCEIVED BENEFIT OF OVERALL HEALTH AND WELLNESS THROUGH THE DISSEMINATION OF NUTRITIONAL INFORMATION FOR UNIVERSITY-PROVIDED DINING SERVICES
Ericka R. Hoffine*, Michael J. Rush, Karen L. Kier
Ohio Northern University/OUN HealthWise,525 S. Main St.,Ada,OH,45810
e-hoffine@onu.edu

Abstract/Overview: The U.S. is currently experiencing an “obesity epidemic” with approximately 33% of Americans considered to be obese (BMI >30) today, and a predicted increase to 50% by 2030.2 The consequences of this epidemic are vast varying from the economic burden on the national healthcare system, to dangers to the individual regarding sickness and likelihood of developing morbidities.3 The Surgeon General recommends the CARE (Communication Action Research & Evaluation) approach to taking action in fighting this epidemic. The communication element, may be the simplest and least invasive way to improve current habits and nutrition in individuals. Improving health communication and health literacy among Americans may have positive effects on their decision-making and consequently their overall health.

The purpose of this study is to determine the level and perceived value of health literacy among college students.

Methodology: All participants were given a questionnaire that included a sample nutrition label and questions pertaining to it, to assess the participants baseline comprehension. Additionally, the questionnaire addressed participants attitudes and opinions regarding the usefulness of nutritional information and perceived benefit of its availability for university-provided dining services. A survey was given to all first year pharmacy and a separate survey to all fifth year pharmacy students. The surveys were similar, however, tailored to meet the needs of the given population. The surveys addressed attitudes, and behaviors regarding: appetite, eating habits, activity level, sleep patterns, and stress level. The surveys also inquired about the participants perception of his/her own weight and diet, relative to the general population.

To further explore the knowledge, attitudes, and ideas, a focus group of 10-12 first year students and 10-12 fifth year students was assembled. Using the Delphi method, topics discussed during the focus group session were based on results of the initial questionnaire and survey.

Learning Objectives:
Define health literacy and health communication
Identify differences between first- and fifth-year students regarding the importance of the availability of nutrition information

Self Assessment Questions:
Health literacy can be defined as:
Regarding availability of nutrition information for university-provided dining services
ASSESSMENT OF THE EFFECTS OF ADHERENCE INTERVENTIONS ON LABORATORY TEST ACQUISITION RATE

Alexander Hoffman, Pharm.D.*; Shannon Just, Pharm.D.; Paul Bandfield, Pharm.D., Amy Kramer, Pharm.D.

Kaiser Permanente Health Plan of Ohio, 12301 Snow Road, Clinical Pharmacy Dept, Parma, OH, 44130
alexander.r.hoffman@kp.org

Background: Research investigating the use of adherence interventions like phone calls and letters has been shown to increase patient attendance rate at scheduled appointment times but little research has been done to determine if these same interventions can increase attendance rate at unscheduled but required yearly laboratory testing. In an effort to increase adherence to laboratory draw attendance, the Kaiser Permanente Medication Management Clinic (MMC) instituted a range of adherence interventions: automated phone calls with a reminder message from the patients primary care physician, automated phone calls with a reminder message from the pharmacists at the MMC, letters, and digital messages through the KP.org secure online interface.

Objective: To evaluate the Kaiser Permanente Medication Management Clinics intervention strategy and determine which applied interventions increased adherence most.

Methodology: A non-interventional, retrospective chart review of interventions performed on patients who annually require lab testing for their ACE-Inhibitors (ACE-I), angiotensin receptor blockers (ARBs), or diuretic medications. Primary endpoint is rate of their acquisition within one month of intervention. Secondary endpoint is cost per intervention. All patients at Kaiser Permanente on an ACE-I, ARB, or diuretic medication who have not had an annual serum creatinine and potassium in 2011 are included in this study. Data describing patient demographics, type of intervention, and labwork draw date will be collected. An alpha of less than 0.05 will be considered statistically significant. The chi-squared test will be used to analyze categorical data.

Results and Conclusions: To be presented at Great Lakes Residency Conference 2012.

Learning Objectives:
- Explain the basic design of this study and how the results may affect the practices of Kaiser Permanente Ohio.
- List the four patient interventions analyzed in this study.

Self Assessment Questions:
1. Which of the following statements are true?
2. Which of the following patient interventions were included in the analysis for this study?

EVALUATION OF THE IMPLEMENTATION OF A STRESS ULCER PROPHYLAXIS (SUP) GUIDELINE IN A NEUROSCIENCE INTENSIVE CARE UNIT (NICU)

Jennifer M. Hogg PharmD*, Kiranpal Sangha PharmD., Shaun P. Keegan PharmD
UC Health-University Hospital, 234 Goodman St., Cincinnati, OH, 45219-2316
Jennifer.Hogg@UCHealth.com

Statement of purpose:
Critically ill patients are at an increased risk for stress ulcers. After major physiological stress such as brain injury, endoscopic evidence of mucosal lesions can appear within 24 hours. GI stress ulceration is multi-factorial and represents an imbalance between protective and destructive factors acting on the gastric mucosa. Acid suppressing medications can decrease the incidence of stress ulcers. However, current literature associates medications used for stress ulcer prophylaxis (SUP), such as H2 blockers and proton pump inhibitors with an increased risk of hospital-acquired pneumonia and Clostridium difficile infection. The purpose of our study is to determine the incidence of SUP before and after the initiation of a SUP guideline in the Neuroscience Intensive Care Unit (NICU); determine the incidence of GI bleed, hospital-acquired pneumonia and Clostridium difficile colitis before and after SUP guideline implementation; evaluate the number of patients who were inappropriately treated with SUP before and evaluate the cost of SUP before and after guideline implementation.

Statement of methods:
This is a single center retrospective study at UC Health - University hospital. Patients will be evaluated for inclusion if they were admitted to the NICU for greater than 72 hours from January 2009 through May 2009. In addition, the first 200 patients admitted after the implementation of the SUP guideline from January 2010 through May 2010 will be evaluated. This allows for a 6-month implementation period of the SUP guideline. Demographic information (age, sex, race, past medical history, APACHE II score) will be collected. As well SUP medication dose, duration, indication for use, number of ICU and total hospital days.

Statement of results:
Results are in progress and will be presented at the Great Lakes Residency Conference.

Learning Objectives:
Define Stress Related Mucosal Disease (SRMD) and Stress Related Injury (SRI).
Outline and identify the pathophysiology/pathogenesis of the disease state.

Self Assessment Questions:
1. Which of the following is incorrectly defined?
2. What % of patients are at risk for experiencing clinically significant bleeding with in the first 24 to 48 hours of ICU admission?
THE IMPACT OF A MANDATORY COUNSELING PROGRAM IN A COMMUNITY PHARMACY
Amy N. Honebrink, PharmD*, Stacey M. Frede, PharmD, CDE; Pamela C. Heaton PhD, RPh; Shelly M. Rosser PharmD
University of Cincinnati/Kroger Pharmacy, Wherry 301B, 3225 Eden Ave, Cincinnati, OH, 45267
honebrinkamy@gmail.com

Purpose: The purpose of this study was to develop, implement, and evaluate a change in computer software designed to increase counseling provided to patients. The objectives were to increase counseling rates for new therapy prescriptions, improve the pharmacy workflow, and increase patient satisfaction with the counseling encounter.

Methods: Counseling is offered to patients regularly, however, current counseling rates have not been meeting the needs of our patients. Therefore, this project has been implemented at two Kroger pharmacies located in Cincinnati, Ohio, to increase the frequency of pharmacist/intern initiated counseling. Pre-intervention data was collected during a two month period to determine counseling rates of new therapy prescriptions that were manually generated counseling notes created by a pharmacist, prescription ready-rates, and wait times. Additionally, a patient survey instrument, utilizing a Likert scale (1=strongly disagree, 5=strongly agree), was administered to general pharmacy patients 18 years of age or older to assess patient satisfaction with the service received. Pharmacy staff received training after the pre-intervention data was collected. Training included a review of optimal counseling techniques and education on the computer software change to come, the primary intervention. In order to increase patient counseling rates, the computer dispensing software system had a new feature implemented that automatically generated a computerized prompt to counsel on every new therapy prescription. Only pharmacists/interns were able to acknowledge the prompt and provide counseling before the prescription was dispensed to the patient. Pharmacists/interns who provided counseling then documented if counseling was provided or refused by the patient, and the content of counseling provided. Subsequently, identical post-intervention data was collected during a 2-month period.

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

Learning Objectives:
- Review the professional and legal responsibilities pharmacists have regarding counseling.
- Discuss current counseling rates and how to overcome barriers in order to increase the frequency of counseling.

Self Assessment Questions:
- Counseling has been deemed so important that ____ states have legally required oral counseling to occur when prescriptions are dispensed. According to Kimberlin et al., what has shown to increase the rate of counseling?

EVALUATING THE ROLE OF STATINS IN THE PREVENTION OF CONTRAST-INDUCED NEPHROPATHY
Matthew J. Hoover, PharmD*, Vincent F. Mauro, PharmD, FCCP, Todd E. Gundrum, PharmD, BCPS, Mariann D. Churchwell, PharmD, BCPS
University of Toledo Medical Center, 3000 Arlington Ave, Mail Stop 1060, Toledo, OH, 43614
matthew.hoover@utoledo.edu

Purpose: Contrast-induced nephropathy (CIN) is a well-known complication of using iodinated contrast media. Studies have evaluated a wide range of pharmacologic interventions to prevent CIN, including statins. Statins may have the ability to increase nitrous oxide production, provide beneficial effects on endothelial function, and scavenge free oxygen radicals. These pleiotropic effects may lend to their role in the prevention of CIN. Three recently published meta-analyses on the subject of statins for prevention of CIN have all come to a similar conclusion; that the role of statins is still unclear and further studies are needed. This study assesses whether statins prevent CIN in patients at our institution.

Methodology: Electronic medical records of patients who received contrast media and had a procedure code indicating a cardiac catheterization at the University of Toledo Medical Center between January 2009 and August 2011 will be retrospectively reviewed. Patients baseline demographics, risk factors for CIN, specific statin used, nephrotoxic drugs, and measures used to prevent CIN will be obtained. Any patients over the age of 18 who received contrast media at the time of catheterization, had a baseline serum creatinine concentration obtained within 24 hours prior to receiving contrast media, serum creatinine concentrations for at least 48 hours after exposure to the contrast media, and a record of outpatient prescription medications will be included in the study. Patients who have end-stage renal disease requiring dialysis will be excluded from the study. The primary outcome, contrast-induced nephropathy, will be defined as an increase in serum creatinine > 0.5 mg/dL or 25% from baseline within 48 hours following exposure to contrast media. Based on the definition, patients will be classified as having CIN or not having CIN.

Results and conclusions: Data collection is in process. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
- Explain the rationale behind using statins in the prevention of contrast-induced nephropathy.
- List risk factors for contrast-induced nephropathy.

Self Assessment Questions:
- Which of the following is a pleiotropic effect associated with statins?
- Which of the following patients have a modifiable risk factor for contrast-induced nephropathy?
Purpose: The Infectious Diseases Society of America (IDSA) guidelines recommend against using vancomycin for methicillin resistant Staphylococcus aureus (MRSA) isolates with a vancomycin MIC greater than or equal to 2 mcg/mL due to the low likelihood of achieving a target AUC/MIC of greater than or equal to 400. Vancomycin is commonly used for treatment of pulmonary exacerbations in cystic fibrosis (CF) patients with sputum cultures positive for MRSA regardless of MIC value. Vancomycin doses are adjusted at our center to achieve a goal trough of 15 to 20 mcg/mL regardless of MRSA MIC, however, little is known if IDSA guidelines translate to CF patients colonized with MRSA in whom reduction of bacterial load is the target as opposed to eradication. The objective of this study is to compare clinical efficacy of vancomycin regimens among CF patients with isolates having MICs greater than or equal to 2 mcg/mL and MICs less than 2 mcg/mL.

Methods: This Institutional Review Board-approved single center retrospective study will evaluate all CF patients who received vancomycin for treatment of pulmonary exacerbations in cystic fibrosis between October 1, 2009 to September 30, 2011. Inclusion criteria: patients 6 years of age and older with one or more positive culture(s) for MRSA from the sputum or bronchoalveolar lavage, reported vancomycin MIC value on MRSA culture, receipt of dual IV antipseudomonal antibiotics, vancomycin for at least 7 days while inpatient, and at least one evaluable vancomycin trough concentration. Exclusion criteria: patients who are unable to perform pulmonary function tests. The primary endpoint will be clinical efficacy as determined by return to baseline FEV1, defined as best FEV1 in the preceding 12 months.

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

Learning Objectives:
- Explain the pharmacodynamic rationale of vancomycin dosing and therapeutic drug monitoring
- Identify therapeutic goals of antibiotic therapy for pulmonary exacerbations in cystic fibrosis patients

Self Assessment Questions:
- What is the best predictor of vancomycin effectiveness?
- Colonization with which of the following organisms in addition to MRSA would impact the rate of return to baseline FEV1 in cystic fibrosis pulmonary exacerbations?

THE IMPACT OF A PAY-FOR-PERFORMANCE-FOR-PATIENTS (P4P4P) MODEL FOR DIABETES IN A GROCERY STORE SETTING

Bonnie C. Hui-Callahan*, PharmD, Stacey M. Frede, PharmD, CDE, Heidi R. Luder, PharmD
University of Cincinnati/Kroger Pharmacy, 3225 Eden Ave #136HBV, Cincinnati, OH, 452670001
bonnie.c.hui@gmail.com

Purpose: To (1) determine whether patients with diabetes who utilize a financial incentive program in a grocery chain pharmacy will have increased rates of self-reported healthy behaviors; (2) measure the economic impact of the incentive program on the grocery store; and (3) assess the clinical impact of the incentive program.

Methods:
Studies demonstrate the P4P4P model has successfully increased healthy behaviors in beneficiaries of large employer groups and health care institutions. It is not yet known, however, whether this model can be applied to patients with diabetes in a grocery chain pharmacy setting. This prospective study took place at one location of a large grocery chain pharmacy in Cincinnati, Ohio. Patients with diabetes on at least one diabetes medication were eligible to enroll. Twenty-five patients were recruited in December 2011 and the program started in January 2012. Patients received five dollars for each weeklong behavior log completed and reviewed with the pharmacist. The pharmacist counseled on ways to improve healthy behaviors. One-time rewards were also given for meeting ADA standards of care. Patients could receive up to $250 total over the three-month study period. A baseline survey was given to determine frequency of healthy behaviors performed prior to the start of the rewards program. Patients will complete a post-study survey to determine there was an increase in healthy behaviors. Patients baseline A1C will be compared with A1C at the end of the study period. The economic impact will be measured by increase in store revenue. Grocery store spend for patients will be tracked during the study period and compared with total spend during the same time period in the previous year.

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

Learning Objectives:
- Explain the purpose of the P4P4P model.
- Describe how the P4P4P model can be implemented within a grocery chain pharmacy setting.

Self Assessment Questions:
P4P4P is a model aimed to:
- In this study, the P4P4P model was implemented in a grocery chain pharmacy by:
SIROLIMUS USE IN OBESE KIDNEY TRANSPLANT PATIENTS DOES NOT IMPACT WOUND HEALING COMPLICATIONS
Amanda L. Hulbert, PharmD, BCPS; April J. DeLaunty, PharmD, BCPS; Amer Rajab, MD, PhD; Rachel Forbes, MD; Holli A. Winters, PharmD, BCPS
The Ohio State University Medical Center, 368 Doan Hall, 410 W. 10th Ave, Columbus, OH, 43210
amanda.hulbert@osumc.edu

Background: Wound healing is a known complication associated with sirolimus (SRL) therapy in kidney transplant recipients (KTR). Several studies have demonstrated that obesity, defined as a body mass index (BMI) of >30 kg/m², is a risk factor for the development of wound healing complications (WHC) in patients receiving SRL therapy; however, the incidence has not been defined.

Purpose: To evaluate the incidence of WHC within 6 months of transplant in patients with a BMI >30 kg/m² at the time of transplant who received SRL-containing regimens as compared to SRL-free regimens.

Methods: This is a single-center, retrospective cohort study of KTR on SRL versus SRL-free maintenance immunosuppression (IS) regimens transplanted between January 2002 and April 2011. Primary adult KTR with BMI of >30 kg/m² at the time of transplant were eligible for inclusion. Patients were excluded if they were on steroids prior to transplant, expired within 4 weeks from transplant, or received steroids for the treatment of acute rejection. Patients were categorized as SRL-free if they received <7 days of SRL during their transplant admission and were not discharged on SRL.

Results: A total of 317 KTR, 246 in the SRL group and 71 in the SRL-free group, were eligible for inclusion. There was no difference in the primary outcome of WHC in the SRL group as compared to SRL-free group (32.1% vs 29.6%, P=0.107). There was no difference in WHC between the SRL group and SRL-free group among patients in obesity Class I (27.3% vs 15.1%, P=0.064), Class II (36.6% vs 34.8%, P=0.195), or Class III (48.0% vs 53.3%, P=0.234). There was no difference in the incidence of lymphoceles between groups (SRL 5.3% vs SRL-free 1.4%, P=0.112).

Conclusion: SRL does not negatively impact WHC in obese KTR and can be used as a component of maintenance IS regimens immediately after transplant.

Learning Objectives:
- Describe the risk factors for the development of wound healing complications in kidney transplant recipients.
- Define the safety of sirolimus as a component of maintenance IS regimens in obese kidney transplant recipients.

Self Assessment Questions:
Sirolimus is a(n):
- Which of the indications for transplant has been reported as a risk factor for wound healing complications?

EVALUATION OF CONCENTRATED U-500 INSULIN USE IN THE INPATIENT SETTING
Nicole R Hume, PharmD*; Lorrie L Burns, PharmD; Kelly J Besco, PharmD, FISMP
Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH, 432143998
nhume2@ohiohealth.com

Background: Insulin therapy is the mainstay of glycemic control in the hospital. However, insulin therapy carries a major risk for hypoglycemia. Insulin regular U-500 (500 units/mL) poses an additional risk, should a medication error occur, as it provides a 5-fold higher dose compared to the standard U-100 (100 units/mL) concentration. Utilization of insulin regular U-500 has traditionally been rare; however, more patients are being initiated on the product as incidence of insulin resistance with type II diabetes mellitus increases. Currently, insulin regular U-500 is a non-formulary medication at this institution. Physicians, pharmacists and nurses are often unfamiliar with how to safely manage the utilization of the product. Due to the safety risk of the product and increased number of patients coming into the hospital on this medication, our institution is proactively designing procedures to ensure safe use of the medication prior to formulary addition.

Purpose:
The purpose of this investigation is to evaluate the safety and efficacy of insulin regular U-500 for glycemic control in hospitalized patients before and after institutional formulary addition.

Methods:
This study will retrospectively evaluate patients prescribed insulin regular U-500 in the inpatient setting. The primary outcome will assess percentage of glucose readings at goal. Secondary outcomes include number of hypoglycemic and hyperglycemic episodes, number of pharmacist interventions, and reported medication errors. Continuing education will be provided to staff members about safety precautions associated with the use of insulin regular U-500. An assessment will be completed to evaluate the knowledge base of hospital staff regarding insulin regular U-500 before and after the education program.

Results/Conclusions:
Forthcoming

Learning Objectives:
- Review safety risks involving use of concentrated insulin regular U-500
- Describe pharmacological differences between standard concentration regular insulin (100 units/mL) and insulin regular U-500 (500 units/mL)

Self Assessment Questions:
Which of the following procedures can reduce the risk of errors involving insulin regular U-500
- Compared to standard concentration regular insulin (100 units/mL), insulin regular U-500 (500 units/mL) has a
ANTIMICROBIAL USAGE FOLLOWING A THREE MONTH HIATUS FROM A PHARMACIST-DRIVEN ANTIMICROBIAL STEWARDSHIP PROGRAM

*David M. Jacobs, PharmD; Diane M. Cappelletty, PharmD
University of Toledo Medical Center, 3000 Arlington Ave., Toledo, OH 43614
david.jacobs@utoledo.edu

Purpose: A major health problem that has substantially impacted patient treatment and outcomes is the worldwide emergence of antimicrobial resistance. Antimicrobial stewardship programs have been utilized in order to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use such as toxicity, selection of pathogenic organisms, and the emergence of resistance. The purpose of this study is to assess antibiotic usage during a three month hiatus from a pharmacist-driven antimicrobial stewardship program.

Methods: An institutional pharmacy report was generated in order to identify patients who received at least one of the specified antimicrobials and were screened to determine if they met inclusion criteria for chart review. A pre-data set was collected retrospectively (November 2010 - January 2011) and will represent the time antimicrobial stewardship was being performed by an infectious disease trained clinical pharmacist. A post-data set was collected retrospectively as well (November 2011 - January 2012) and will represent the period in which the stewardship position was vacant. Patients ≥ 18 years old, who have received either piperacillin/tazobactam, linezolid, micafungin, or imipenem/cilastin for at least 72 hours will be included. In the pre-data set patients will be included if the patient had an intervention made by the antimicrobial stewardship pharmacist. Data collected includes dose of antibiotic, duration of therapy, type of infection, microbiological results, de-escalation therapy and whether the patient was located in an intensive care unit at the start of therapy. The primary outcome will be the change in antibiotic usage over a three month period following the departure of an antimicrobial stewardship pharmacist. Secondary outcomes include the occurrence of C. difficile within the hospital and average duration of antimicrobial use following negative culture results.

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

Learning Objectives:
- Identify the two core strategies suggested to help curb the spread of resistance.
- Name the antimicrobials that were targeted by the antibiotic steward.

Self Assessment Questions:
- Which of the following is an active core antimicrobial stewardship strategy?
- Which anti-infective was regularly assessed by the antimicrobial stewardship pharmacist?

TIMING OF NUTRITION SUPPORT AND COMPLICATIONS IN PATIENTS UNDERGOING ESOPHAGECTOMY

Samuel Jacobson*, PharmD; Anthony Gerlach, PharmD, BCPS, FCCM
The Ohio State University Medical Center, 410 W 10th Avenue, Columbus, OH, 43210
samuel.jacobson@osumc.edu

Purpose: Esophagectomy is a complex operation involving the abdomen, neck, and chest necessitating prolonged nothing by mouth (NPO) status to allow healing of the newly formed anastomosis. Complications such as anastomotic leak and wound dehiscence are common in patients post esophagectomy and are associated with increased length of stay morbidity and mortality. Poor nutritional status impacts wound healing after surgery and is associated with increased morbidity and mortality. The aim of this investigation is to assess if delaying nutrition support after esophageal surgery increases the incidence of complications such as anastomotic leaks. Previous studies have investigated the significance of specialized postoperative nutrition in many surgical procedures, but not after esophagectomy yielding conflicting results.

Methods: This is a retrospective chart review conducted on patients who underwent esophagectomy during admission at the Ohio State University Medical Center from 5/1/1996 through 12/31/2010. Exclusion criteria included patients less than 18 years of age, age greater than 89, pregnant females, and prisoners. Data collected includes demographics, indication for surgery, type of surgery (transhiatal, Ivor Lewis, or minimally invasive), use and timing of nutrition support, laboratory values, complications (anastomotic leak, wound dehiscence) and ICU and hospital length of stay (LOS). Patients enrolled in the study were evaluated for preoperative anthropomorphic criteria including weight loss of 10% and percent of ideal body weight. The primary endpoint of this study is to assess the timing of nutrition support after surgery and the incidence of complications such as anastomotic leaks and wound dehiscence. Statistical analysis was performed by Students T test for continuous parametric data, Mann Whitney U test for ordinal or nonparametric data, and Fishers exact test for nominal data.

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

Learning Objectives:
- Define the impact of timing of nutrition support on the incidence of complications in patients undergoing esophagectomy.
- Identify comorbid conditions that impair wound healing after surgery.

Self Assessment Questions:
- Which of the following is a common complication in patients after esophagectomy?
- Which of the following is the best marker for nutritional status?
EVALUATION OF PROCALCITONIN USE FOR ANTIBIOTIC DISCONTINUATION IN MEDICAL INTENSIVE CARE PATIENTS AT A COMMUNITY TEACHING HOSPITAL

Sara E. Jordan*, PharmD, Lauren M. Flannery, PharmD, BCPS, Jamie Jenkins, PhD, MD, Phillip C. Hawley, MD, Kianar Devulapally, MD, Bradley R. Harrold, MD, Shiva D. Rahmanian, MD, Lauren DiBenedetto, Janelle Hartman, Vivek Trivedi
Grant Medical Center,111 S. Grant Ave.,columbus,OH,43215 sjordan3@ohiohealth.com

Background:
Procalcitonin (PCT), the prohormone of calcitonin, has been increasingly studied in various practice settings over the past decade as a biomarker of bacterial infection. The apparent correlation of serum PCT levels with infection onset, severity, and resolution after appropriate treatment has sparked interest in the utility of PCT-guided treatment algorithms in determining appropriate antibiotic usage.

Purpose:
To retrospectively assess the safety and efficacy of PCT use for antibiotic discontinuation compared to standard care without regard to PCT in medical intensive care patients at a community teaching hospital.

Methods:
This retrospective observational study was approved by the health-systems IRB and included all intensive care patients seen by the pulmonary/critical care service at Grant Medical Center from March 2010 through September 2011. Patients were excluded if they were being treated for endocarditis, osteomyelitis, tuberculosis, persistent bacteremia, and Legionnaires disease as these conditions require prolonged antibiotic courses. Remaining patients were then divided into one of three study arms: those in which PCT levels were not drawn, those in which PCT use to determine antibiotic duration did not reflect current recommendations, and those in which PCT was used to determine antibiotic duration per current recommendations. Primary outcomes were 28-day mortality and days of antibiotic therapy. Secondary outcomes included days of mechanical ventilation, ICU and hospital length of stay (LOS), incidence of C. difficile-associated diarrhea (CDAD), incidence of subsequent infection caused by multi-drug resistant (MDR) organisms during hospital stay, readmission within 28 days after discharge, and total medication charges for admission. Additional subgroup and sensitivity analyses were also performed this study determined the sensitivity, specificity, positive predicative value (PPV) and negative predictive value (NPV) of our PCT assay for bacterial infection.

Results/Conclusions:
964 patients have been identified as meeting inclusion criteria. Data collection is underway and further results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:
Describe procalcitonin’s potential role in determining antibiotic duration.
Identify currently-recommended procalcitonin cut-off values.

Self Assessment Questions:
An elevated procalcitonin (PCT) in an infected patient generally decreases precipitously after:
Most current procalcitonin (PCT) assay manufacturer guidelines and applicable literature would recommend initiating or continuing antibiotic therapy in a patient with a PCT of:

ASSESSMENT OF THE WILLINGNESS AND BARRIERS OF MEDICATION THERAPY MANAGEMENT (MTM) FOCUSED ON PAIN MANAGEMENT AND MENTAL HEALTH

Megan E. Keller*, PharmD., David R. Bright, PharmD., BCACP, Donald L. Sullivan, R.Ph., Ph.D., Doug C. Cornelius, R.Ph., Ohio Northern University,525 S. Main Street,Ada,OH,45810 m-keller@onu.edu

Purpose: Few studies have assessed the pharmacists role in MTM specifically involving pain management and depression. The objective of this study is to determine the willingness and barriers of community pharmacists to provide pain and mental health MTM services.

Methods: An anonymous, self-administered survey was distributed electronically to 350 licensed pharmacists in the Kroger Columbus Division. The survey consisted of a 60 question, Likert-type scale, where strongly disagree was assigned a value of one and strongly agree a value of seven. Constructs measured include: MTM interest, comfort with MTM, confidence with appropriate medication use and adjustment, educational needs, training required, time constraints, and workload. Demographic data was also collected.

Preliminary Results/Conclusions: A total of 185 (52.9%) pharmacists completed the survey. Pharmacists agreed that patients would benefit from MTM focused on pain (5.6 1.39 [mean SD]) and/or depression (5.85 1.21) management, and agreed pharmacists can make positive interventions (pain: 5.78 1.4; depression: 5.9 1.2). Pharmacists surveyed felt more confident to provide MTM for diabetes (5.97 1.36) compared to pain (4.97 1.62) and depression (4.89 1.58) management. In regards to pain and depression management, pharmacists surveyed were more comfortable with adverse events (pain: 5.95 1.03; depression: 5.72 1.13) versus mechanisms of action (pain: 5.17 1.29; depression: 5.44 1.23) and altering therapy (pain: 5.27 1.39; depression: 5.17 1.38). Pharmacists strongly agreed they would benefit from additional training regarding pain (6.17 2.1) and depression (6.25 1.13) MTM. Continuing education (51.6%) was the most preferred method of additional training. In regards to workload, respondents moderately disagreed that their current MTM load was too much (3.79 1.56), and neither agreed nor disagreed that other responsibilities MTM was too much extra work for them (4.54 1.77).

Learning Objectives:
Identify barriers to providing MTM focused on pain and depression management.
Recognize the educational needs and preferred methods of training for pharmacists in the MTM setting.

Self Assessment Questions:
From the survey results, which of the following is not specifically listed as a barrier to providing MTM?
Survey respondents reported feeling adequately trained with which of the following disease states?
INCIDENCE OF ACUTE RENAL DYSFUNCTION IN ACUTE LEUKEMIA PATIENTS WHO RECEIVE CONCOMITANT VANCOMYCIN AND PIPERACILLIN/TAZOBACTAM

*Julie M. Kennerly, PharmD; Jessica P. Duda, PharmD, BCOP; Juliana V. F. Roddy, PharmD, BCOP; Lisa M. Savage, PharmD, BCOP; Jeremy J. Taylor, PharmD, BCPS
The Ohio State University Medical Center, 368 Doan Hall, 410 West 10th Ave, Columbus, OH, 43210
julie.kennerly@osumc.edu

Purpose: Current literature reports the incidence of vancomycin-induced renal toxicity to range from 2.3% to 12%, and the incidence of increased serum creatinine and acute renal failure with piperacillin/tazobactam to be 1.8% and less than 1%, respectively. On the acute leukemia service at the Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (The James), providers have perceived an increase in the number of patients who develop acute renal dysfunction following concomitant therapy with these medications. While this appears to be supported by anecdotal evidence, additional studies are needed to better estimate the incidence of acute renal dysfunction. The primary aim of this study is to estimate the incidence of acute renal dysfunction in patients with acute myeloid leukemia (AML) or acute lymphocytic leukemia (ALL), who are receiving concomitant therapy with vancomycin and piperacillin/tazobactam.

Methods: This is a retrospective chart review of AML/ALL patients admitted to the acute leukemia service at The James from July 1, 2009 to June 30, 2011, that are receiving both vancomycin and piperacillin/tazobactam within a 24 hour time period. Acute renal dysfunction is defined using the Risk category of the RIFLE criteria. The incidence of acute renal dysfunction will be estimated, along with its associated 95% confidence interval, using exact binomial methods. Logistic regression will be used to determine the impact of specific patient demographics or clinical characteristics (including additional nephrotoxic medications or intravenous contrast) that are associated with the incidence of renal dysfunction in this population.

Results/Conclusions: Data collection is on-going. Results and analysis will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
- Define the RIFLE criteria for evaluating acute renal dysfunction.
- Identify medications that are commonly associated with acute renal dysfunction.

Self Assessment Questions:
- If a patient has a baseline serum creatinine of 1.0 and upon administration of concomitant therapy with vancomycin and piperacillin/tazobactam experiences a rise in serum creatinine to 1.7, they fail. Which of the following medications has been associated with drug-induced acute renal dysfunction?

COMPARISON OF THIAZIDE DIURETICS IN COMBINATION WITH FUROSEMIDE AMONG HOSPITALIZED PATIENTS WITH HEART FAILURE

Kevin T. Kissling, Pharm.D*; Kerry K. Pickworth, Pharm.D, FCCP
The Ohio State University Medical Center, 410 W. 10th St, Doan Hall 368, Columbus, OH, 43210
kevin.kissling@osumc.edu

Background: The American College of Cardiology Foundation/American Heart Association, and the Heart Failure Society of America uniformly recommend patients admitted for heart failure with evidence of fluid overload be treated with intravenous loop diuretics. Despite optimization of loop diuretic regimens, some patients may still have persistent volume overload and be termed diuretic resistant. To overcome this, the addition of a thiazide diuretic, such as intravenous chlorothiazide (CTZ), is recommended. Data regarding the use of thiazide-type diuretics to augment diuresis in patients with heart failure and diuretic resistance are limited. Both CTZ and hydrochlorothiazide (HCTZ) have been investigated independently and been shown to be efficacious; however, no comparative trials exist.

Purpose:
- To determine the relative effect of intravenous CTZ and oral HCTZ in augmenting diuresis among patients hospitalized with heart failure who are resistant to loop diuretic therapy.

Methods:
The current study is a retrospective analysis of inpatients at The Ohio State University Medical Centers (OSUMC) Ross Heart Hospital receiving combination therapy with intravenous furosemide and either intravenous CTZ or oral HCTZ between September 1, 2010 and August 31, 2011. Patients receiving intravenous furosemide at a total daily dose of at least 160 mg, by intermittent bolus or continuous infusion, for at least 24 hours prior to the addition of either two target interventions will be eligible for inclusion. Exclusion criteria include treatment with a thiazide-type diuretic prior to admission, receipt of diuretics outside those being investigated, and use of other volume contracting measures, pharmacologic or otherwise, including vasopressin antagonists, hemodialysis, or ultrafiltration. The primary outcome measure will be the change in 24-hour urine output following the first administration of either target intervention. Secondary outcomes will include change in weight loss, incidence of adverse events, and quality measures.

Results/Conclusions:
- Results and conclusions to be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
- State the current recommendations for combination diuretic therapy in patients hospitalized with heart failure who are resistant to loop diuretic treatment.
- Recognize the mechanism of action of, and adverse events associated with, "sequential nephron blockade".

Self Assessment Questions:
- Which of the following mechanisms of loop diuretic resistance may the addition of a thiazide-type diuretic overcome?
- Which of the following is the most common adverse event associated with the use of thiazide-loop diuretic combination therapy?
Background: Appropriate selection of antimicrobials is extremely important to limit the emergence of antimicrobial resistant pathogens, decrease the incidence of Clostridium difficile infections, and decrease healthcare costs. Antimicrobial stewardship programs have been developed in order to optimize antimicrobial usage, improve clinical outcomes, and decrease healthcare costs. The current antimicrobial stewardship program at University of Toledo Medical Center has been in existence since November 2010. The surgery services consistently have low acceptance of antimicrobial stewardship recommendations.

Purpose:
The objective of this study is to evaluate the change in acceptance rates of antimicrobial stewardship recommendations before and after implementation of a pilot program.

This pre and post intervention study, approved by the Institutional Review Board, included patients ≥ 18 years old, admitted to the SICU, had the SICU or trauma service as the primary service, and had received antimicrobials for at least 72 hours. An "Antimicrobial Stewardship Recommendation Form" must have been completed and placed in the patients chart. Patients who received antimicrobials for surgical prophylaxis or had a primary service other than the SICU or trauma service were excluded. The following data was collected: age, sex, comorbidities, APACHE II score, type of surgery, ICU and hospital days, antimicrobials used, recommendation made, recommendation rationale, recommendation acceptance/rejection, days of therapy, and occurrence of C. difficile. In the post-intervention group the rationale for any rejected recommendations were collected. Direct antimicrobial and indirect cost based on length of stay were calculated.

Results:
This study is still under investigation with final results & conclusions to be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify processes by which information can be streamlined in order to promote antimicrobial stewardship recommendations
Discuss the benefits of antimicrobial stewardship programs in intensive care units

Self Assessment Questions:
Which of the following processes can be used in order to promote appropriate antimicrobial use?
Which of the following is a benefit seen after initiation of an antimicrobial stewardship program?
EVALUATION OF VITAMIN B12 DEFICIENCY ASSOCIATED WITH LONG TERM USE OF METFORMIN IN A VETERAN POPULATION

Saji Kurian, Pharm.D* ; Jo-Ann L. Caudill, RPh.
Cincinnati Veteran Affairs Medical Center, Cincinnati VA Medical Center (ML 119), 3200 Vine Street, Cincinnati, OH, 45220
saji.kurian@va.gov

Purpose: Metformin is considered one of the first treatment choices for type II diabetes. Studies have shown that long term use of metformin is associated with vitamin B12 deficiency in up to 30% of patients. The deficiency of vitamin B12 causes neurological and hematological abnormalities. There is no established guidelines for monitoring patients on metformin for vitamin B12 deficiency. Even though mean corpuscular volume (MCV) sensitivity is low, an elevated MCV does justify the measurement of serum B12 level to evaluate patients for deficiency. The primary objective of this retrospective study is to evaluate if patients on metformin for more than three years are appropriately monitored for B12 deficiency. Additionally, the study looks at what is the average time frame for drawing an MCV level, if MCV greater than > 98 fl, was a vitamin B12 level drawn or evaluated and are these patients appropriately treated if they have deficiency.

Methods: This Institutional Review Board approved protocol is awaiting approval from the Cincinnati Veterans Affairs Medical Centers (VAMC) Research and Development Committee to start data collection. In this retrospective chart review, all patients in the Cincinnati VA medical center on metformin for more than 3 years starting from January 2005 through December 2008 will be included. Patients are excluded if they have crohns disease, ileal resection, postgastrectomy, pernicious anemia, transcobalamin-II deficiency, history of alcohol abuse, receiving multivitamin with mineral, other known causes for anemia, chart lacks sufficient data, or if they have baseline vitamin B12 deficiency. A randomized sample size of 189 will give an estimate of the proportion of patients adequately monitored for B12 deficiency with a 95% confidence level.

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

Learning Objectives:
Discuss the importance of monitoring diabetic patients for vitamin B12 deficiency associated with long term metformin use
Review the lab tests useful in evaluating patients for vitamin B12 deficiency.

Self Assessment Questions:
Treatment of diabetic patients with metformin is associated with
Which of the following lab test(s) is/are useful in evaluating a patient for vitamin B12 deficiency.

THE PREVALENCE OF ACUTE KIDNEY INJURY IN PEDIATRIC PATIENTS RECEIVING AMINOGLYCOSIDE THERAPY ALONE OR IN COMBINATION WITH VANCOMYCIN

Dennis P LaChance*, BS PharmD, Cynthia Barclay, PharmD, Joshua Courter, PharmD, Stuart Goldstein, MD
Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, MLC 15010, Cincinnati, OH, 45229-3026
dennis.lachance@cchmc.org

Purpose: The purpose of this study is to determine the association between aminoglycosides (AGs) and the incidence of acute kidney injury (AKI) in pediatric patients with or without concurrent vancomycin therapy.

Methods: A retrospective chart review of non-critically ill pediatric patients at Cincinnati Childrens Hospital Medical Center (CCHMC) who received greater than or equal to 3 days of aminoglycoside therapy was completed. Patients with a history of dialysis or current documented urinary tract infection (UTI) were excluded. Data collected includes: demographic data, AG measures (indication, type received, therapy dates, dosing frequency, timing, peak/trough levels), diagnosis, service, concurrent nephrotoxic medications, and serum creatinine (sCr) values. A modified pediatric Risk, Injury, Failure, and End-stage Kidney (pRIFLE) classification was calculated from the collected data and used to determine RIFLE class max.

Preliminary Results/Conclusions: A total of 141 patients received at least 3 days of AG therapy for a total of 176 courses. Of these courses, 86 courses received concurrent administration of vancomycin (49%) and 90 courses received AG therapy alone (51%). Of those receiving concurrent vancomycin and AG therapy, AKI occurred in 24 courses (28%). Of those receiving AG alone, AKI occurred in 34 courses (38%). Additional results and conclusions will be presented at the 27th Annual Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Define and discuss acute kidney injury (AKI) as it pertains to the pediatric population
Review the role of aminoglycosides, vancomycin and other potentially nephrotoxic medications in their contribution to AKI in pediatric patients

Self Assessment Questions:
Which of the following statements is correct regarding the RIFLE Criteria for classifying acute kidney injury (AKI)?
Which of the following drugs has been identified in literature as a co-contributor to kidney injury when taken concomitantly with aminoglycosides?
Purpose: Patients at risk for alcohol withdrawal syndrome (AWS) admitted to Grant Medical Center (GMC) are often placed on an alcohol withdrawal protocol utilizing the revised Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) scale. The CIWA-Ar scale is used to assess the need for treatment and to guide medication dosing utilizing symptom-triggered management. Previous inappropriate use of symptom-triggered therapy for alcohol withdrawal has been documented in the literature, showing that patients can sometimes be put on an alcohol withdrawal protocol despite a lack of documentation regarding the patients risk for AWS. The objective of this study is to review the incidence of documented indication for alcohol withdrawal and the ability to answer questions on the CIWA-Ar scale for patients placed on the alcohol withdrawal protocol at GMC. Appropriate utilization of this protocol based on hospital guidelines will also be evaluated.

Methods: A retrospective review will be performed on patients that had a CIWA Symptom-Triggered Alcohol Detoxification Protocol ordered during their admission from August 1 to October 31, 2011 at GMC. Exclusion criteria include patients < 18 years old. The following data will be collected: patient age, gender, ethnicity, provider diagnosis, apparent indication for CIWA-protocol initiation, past medical history, social history, blood alcohol level upon admission (if available), type of benzodiazepine ordered per protocol, benzodiazepine dosage administered per protocol, patients ability to answer questions on CIWA-Ar scale, number of days on protocol, number of hours on protocol with CIWA score > 8, number of days on protocol with CIWA Score < 8 for at least 24 hours (not including initial 24-hour period of CIWA score < 8), concurrent use of CIWA-protocol while on IV infusion of benzodiazepine/dexmedetomidine/ or propofol, and documented over-sedation while on protocol.

Results/Conclusions: Data collection/analysis is ongoing and will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
- Review the current pharmacological options for the prevention of alcohol withdrawal
- Identify consequences related to inappropriate utilization of an alcohol withdrawal protocol using the CIWA-Ar scale

Self Assessment Questions:
- Which type of medication has been shown in the literature to improve symptoms of alcohol withdrawal as well as reduce the frequency of delirium tremens and seizures as monotherapy?
- Which of the following statements is correct in regards to the frequency of delirium tremens and seizures as monotherapy?
IMPLEMENTATION OF A HYBRID BATCHING/JUST-IN-TIME DELIVERY SYSTEM FOR INTRAVENOUS ADMIXTURES, AND THE EFFECT ON WASTED INVENTORY
*Drew Luder PharmD, Michele Holley MS PharmD
Riverside Methodist Hospital,3535 Olentangy River Rd,Columbus,OH,43214
Dluder2@ohiohealth.com

Purpose: Based on internal data, the proportion of intravenous medications wasted through missing, extra, and returned doses, is sub-optimal, and has been traced back through apparent cause analysis to delivery processes. An internal study performed in Autumn of 2011 revealed that 8% of intravenous medications filled from the central pharmacy are ultimately unused and are never returned to circulation for reuse. Additionally, nearly 10% of all scheduled doses have multiple products delivered for each dose. A just-in-time inventory delivery system has been shown to reduce these outcomes in areas outside of pharmacy by allowing for last-minute adjustments to items that are cancelled, rescheduled, or relocated. However, in the pharmacy setting, the batching method has become the choice method of inventory and delivery due to the process efficiencies granted by compounding all like-admixtures at the same time. In this study, a hybrid of the two models was created and studied for effects on wasted inventory.

Methods: The current system utilized at this tertiary care hospital was the batching method. This system was kept intact to maintain the benefits of batching. Additionally, an organizational system was created that categorized each batched product into a scheduled delivery time 2 hours before the administration time. In order to test the results of this implementation, intravenous admixture doses will be randomly selected throughout the month of February. Inclusion criteria for these admixtures consist of intravenous medications that were ordered on a scheduled basis and were filled from the central pharmacy. Exclusion criteria include one-time doses, PRN medications, and medications dispensed to ancillary locations. These doses will be analyzed using an internal tracking system and electronic medical record to measure doses that were sent and unused, additional doses sent, and doses returned.

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

Learning Objectives:
Identify the benefits of a just-in-time delivery system
Review the benefits of maintaining a batching system for intravenous admixtures

Self Assessment Questions:
What is one benefit of a just-in-time delivery system as it applies to intravenous admixture deliveries?
What is one benefit of creating batches of intravenous admixtures for compounding?

DRUG SHORTAGES: MANAGEMENT AND RESPONSE IN HEALTH-SYSTEM PHARMACY
Deron T. Lundy, PharmD*, Jennifer L. Rodis, PharmD, BCPS, Rodney G. Wirsching, PharmD, FASHP, Milap C. Nahata, MS, PharmD
Grant Medical Center,111 S. Grant Ave,Columbus,OH,43123
dlundy2@ohiohealth.com

Purpose: The importance of managing drug shortages has increased over the past decade as the number of drug shortages has also increased. As a result, there is an increased burden on health-systems, and changes to clinical practice and inventory management have been necessary. The purpose of this study is to evaluate the level of multidisciplinary and executive involvement in drug shortage management, adherence to shortage management guidelines, and hospitals perceived success at managing shortages.

Methods: Prior to commencement, this study will be approved by the OhioHealth and the Ohio State University Institutional Review Boards. A survey was developed and will be sent electronically to directors of pharmacy at health-systems identified in the publicly available American Society of Health-System Pharmacists (ASHP) online residency directory. This survey primary focus will be on the level of multi-disciplinary and executive involvement in shortage mitigation, adherence to ASHP guidelines on drug shortage management, and an assessment of perceived success of institutions ability to manage drug shortages. Additionally, demographic information will be collected about type of medical center, number of staffed beds, pharmacist and technician FTEs, whether the site is part of a larger health-system, geographic region, and position of respondent to survey.

Results: Pending study completion.

Learning Objectives:
Describe the institutional factors that relate to drug shortage management.
Discuss the methods and factors that are related to perceived success at shortage management.

Self Assessment Questions:
Which of the following statements is correct?
Which of the following statements is correct?
A RETROSPECTIVE EVALUATION OF PHARMACIST
MANAGED VANCOMYCIN DOSING AND MONITORING

Jennifer Luxenburg PharmD*, Sharanie Sims PharmD, BCPS,
Mandy Roesel PharmD, BCPS, Amy Hirsch PharmD, BCPS,
Chris Lacey PharmD, BCPS, Usha Stiefel MD
Louis Stokes Cleveland VAMC, 10701 East Blvd., Cleveland, OH 44106
jennifer.luxenburg@va.gov

Purpose: Vancomycin requires patient specific dosing and monitoring. Doses are frequently determined incorrectly and monitoring is performed inappropriately leading to misinterpretation of levels. The dosing of vancomycin should be based on the patient’s actual body weight with a dosing frequency based on renal function. Appropriate monitoring of trough concentrations should be individualized to the patient, infection, and co-morbidities. Research has shown that pharmacist run therapeutic drug monitoring has lead to more accurate dosing and better outcomes. Dosing and monitoring guidelines have been developed at the Louis Stokes Cleveland Veterans Affairs Medical Center. These new guidelines are utilized by a newly implemented pharmacist managed vancomycin consult service.

Objective: To evaluate a newly implemented pharmacist managed vancomycin dosing and monitoring service.

Methodology: A retrospective chart review will evaluate vancomycin therapy managed by pharmacy (post - protocol group) compared to patients who received vancomycin prior to implementation of the pharmacy vancomycin service (pre - protocol group). The primary endpoint is percent of appropriately collected levels within goal range. Secondary endpoints include number of levels drawn, number of inappropriate levels, inappropriately held doses, dosage changes, critical trough values, out of range trough values, and cost associated with levels. Included patients must have received at least three days of vancomycin therapy and at least one trough level with therapy managed on the medicine wards. Patients were excluded if on hemodialysis, had infectious diseases consults, or pharmacy note in their charts addressing vancomycin therapy. Patients in the pre - protocol group received therapy from October 3, 2010 through February 28, 2011, and post - protocol group from October 3, 2011 through February 28, 2012.

Results/conclusions: Results pending, will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Review vancomycin pharmacokinetics and pharmacodynamics (PK/PD) and current dosing recommendations
Discuss advantages of pharmacist involvement in vancomycin dosing and monitoring

Self Assessment Questions:
Which pharmacokinetic parameter is the best predictor of vancomycin efficacy?
Dosing of vancomycin should be based on which of the following?

EVALUATION OF THE EFFECTIVENESS OF PHARMACISTS INTERVENTIONS IN REGARDS TO EMERGENCY DEPARTMENT VISITATION RATES

Jon Manocchio*, Pharm D, Michael Leifheit, Pharm D, BCPS
Blanchard Valley Hospital, 1900 S. Main St., Findlay, OH 45840
jmanocchio@bvhealthsystem.org

Background
Current trends in the healthcare profession encourage the pharmacist to play a more influential role in the direct care of patients. As such, pharmacists are becoming more visible in the outpatient clinic setting in order to answer questions in regards to medication therapy. By having a pharmacist present to discuss appropriate medication use, administration, and compliance, exacerbations of disease states would be limited and thereby reducing emergency department visits. Other studies have noted that pharmacists interventions improved symptom management as well as reduced healthcare costs in the outpatient clinic setting. This study will be beneficial in that it will evaluate the direct correlation between pharmacists interventions and resultant number of emergency department visits.

Objective
To provide thorough patient counseling in regards to medication type, medication administration, and medication compliance to a low income population as part of an existing structured MTM program at an outpatient clinic to reduce visits to the emergency department that are directly related to medication misuse.

Methods
Initially, a low income population who receive some form of a structured MTM at an outpatient clinic will be evaluated for previous emergency department visits prior to intensive pharmacist interventions. Then, within this same population, the pharmacist will perform more thorough direct patient counseling in a variety of ways, such as: patient discussion, visual aids for medication administration, follow-up discussions, and evaluations for compliance. After the intervention period, emergency department visits will be evaluated again to determine if any of these visits were a direct cause of medication mismanagement or lack of compliance. The pre-intervention rates will then be compared to post-intervention rates, with a hypothesis anticipating the post-intervention rates to be significantly less than pre-intervention rates. IRB approval will be obtained from both Blanchard Valley Hospital and the University of Findlay.

Results
In progress

Learning Objectives:
Review issues that can lead to poor medication compliance
Identify the benefits of more thorough patient counseling in the outpatient setting

Self Assessment Questions:
Approximately, how many patients take their medications as prescribed?
What are the two most common preventable reasons that patients visit the emergency room?
**ASTHMA MANAGEMENT IN A CHILDRENS HOSPITAL EMERGENCY DEPARTMENT (ED): IMPACT OF CLINICAL PHARMACY SERVICES ON RECURRENCE OF EXACERBATIONS**

*Jenny M. Mason, PharmD, Kimberly J. Novak, PharmD, BCPS
Nationwide Children's Hospital, 2306 Waterpointe Ct., Columbus, OH 43209
jenny.mason@nationwidechildrens.org

Purpose: Asthma is the most prevalent chronic condition affecting children, one of the most common reasons for hospitalization, and accounts for 1.5 to 2 million ED visits yearly. Up to 20% result in hospitalization and up to 30% of patients will relapse within several weeks. During 2010 there were 2,550 ED asthma visits, 25% resulting in hospital admission at our institution.

The 2007 National Heart, Lung, and Blood Institute asthma guidelines recommend asthma education and controller medications for all patients with persistent asthma including those discharged from the ED. Inhaled corticosteroids (ICS) are the most effective controller medication; however, they are underprescribed in the ED setting. Initiating maintenance therapy during an ED visit can prevent treatment delay and reduce exacerbations. Clinical pharmacists can have an impact in ED asthma care by recommending controller medications and providing asthma education. This study aims to evaluate the 60-day recurrence rate of asthma exacerbations after patients have received clinical pharmacy services during an ED visit.

Methods: A quality improvement project will be conducted with patients 2 to 18 years of age with a primary diagnosis of asthma during an ED visit. A clinical pharmacist will assess asthma severity and provide recommendations for ICS and asthma education. Implementation of recommendations will be at the discretion of the physician. Following this project, a retrospective chart review will be conducted. Patient demographics, asthma severity, previous asthma regimen, ED visit prescribed asthma regimen, number of asthma exacerbations in the previous 12 months, and 60-day asthma readmission rate will be collected. Follow-up appointments, prescriber adherence to the guidelines, and primary care use will also be documented. A comparative group of asthma patients not receiving clinical pharmacy services will be evaluated similarly.

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

**Learning Objectives:**
- Describe the prevalence of asthma-related ED visits
- Explain the impact pharmacists can have on asthma-related care during an ED visit

**Self Assessment Questions:**
- What is the most effective controller medication for asthma management?
- Which has been shown to reduce further hospitalizations?

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**EVALUATING THE IMPACT OF PHARMACIST-DEVELOPED INTERACTIVE TECHNOLOGY ON HEALTH CARE WORKERS KNOWLEDGE OF SEASONAL INFLUENZA**

Lindsay R Massey, PharmD*; Trisha A Jordan, PharmD, MS; Kristin B Casper, PharmD; Milap C Nahata, MS, PharmD
The Ohio State University Medical Center, 368 Doan Hall, 410 W 10th Avenue, Columbus, OH 43210
Lindsay.Massey@osumc.edu

Purpose: Influenza vaccination rates among healthcare workers remain low for various reasons including lack of knowledge regarding the benefits of annual vaccination. Pharmacists play a significant role in meeting public health needs for seasonal influenza vaccination by acting as vaccine educators, advocates, and immunizers.

This study is an expansion of an existing Pharmacy-Based Influenza Vaccination Program with the addition of pharmacist-developed interactive technology (i.e. iPad application) to augment traditional educational efforts. Traditional educational efforts are defined as paper handouts and verbal communication. In a fast-paced environment, healthcare workers are reluctant to engage in traditional educational efforts making them less effective. It is hypothesized that an interactive seasonal influenza iPad application will improve healthcare workers knowledge to a greater extent than traditional pharmacist educational efforts alone. The primary objective of this study is to evaluate the impact of a pharmacist-developed iPad application on healthcare workers knowledge of seasonal influenza. Secondary objectives include an evaluation of the impact of a seasonal influenza iPad application on vaccination, exemption, and compliance rates.

Methods: Pharmacist immunizers provided on-site influenza vaccinations during scheduled "Flu Blitzes" in target departments within The Ohio State University Medical Center. During Flu Blitzes, healthcare workers had the opportunity to interact with a pharmacist-developed seasonal influenza iPad application. Two control departments that did not receive interactive education served as comparator groups. An electronic survey measured healthcare workers knowledge of seasonal influenza in target and control departments at baseline and post-intervention. Mean knowledge scores will be calculated and vaccination, exemption, and compliance rates will be compared between target and control departments.

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

**Learning Objectives:**
- Identify the factors to consider when developing an educational iPad application.
- Recognize the benefits of using interactive technology to educate healthcare workers.

**Self Assessment Questions:**
- Approximately how long does it take to build up protection to influenza after receiving the seasonal influenza vaccine?
- What factors should be considered when selecting departments for implementation of pharmacy-based vaccination services?
EVALUATION OF THE IMPACT OF RESTRICTING PIOGLITAZONE TO NON-FORMULARY USE ON GLYCEMIC CONTROL
Kelly M McCormick, PharmD*; Suzanna W Shieh, PharmD, CACP; Thomas Grubaugh, RPh, CACP
Chalmers P. Wylie VAOPC, 420 North James Road, Columbus, OH, 43219
kelly.mccormick4@va.gov

Purpose:
The primary objective of this study is to assess the impact of restricting pioglitazone to non-formulary use on glycemic control (HgbA1c) in veterans with type 2 diabetes mellitus. Secondary objectives include evaluation of the prevalence of side effects, overall cost of therapy per patient, and the time to initiation of insulin. Side effects examined include the incidence of microvascular complications (retinopathy, microalbuminuria, increased serum creatinine, and decreased creatinine clearance), macrovascular complications (stroke, myocardial infarction), bladder cancer, bone fractures, hypoglycemia, increased liver function tests, weight gain, edema, and new onset or exacerbation of congestive heart failure.

Methods:
This retrospective review of veterans with type 2 diabetes will be conducted at the Chalmers P. Wylie Veterans Affairs Ambulatory Care Center in Columbus, Ohio. Patients discontinuing use of pioglitazone following a non-formulary request denial during or following July 2010 will be selected from a pharmacy computer database-generated list of patients. Eligible patients will be 18 years of age or older and will have an active prescription for pioglitazone prior to July 2010 with a denial for continued use via the non-formulary request process during or after July 2010. Patients must also have baseline weight, LFTs, and A1c within six months prior to and one year after the medication request was submitted. Patients will be excluded if they are determined to be non-compliant, based on a medication possession ratio of 0.8 for the six months prior to the non-formulary request, or if they carry a diagnosis of type 1 diabetes.

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

Learning Objectives:
- Identify the most common side effects associated with use of pioglitazone.
- List the potential complications associated with poorly controlled diabetes mellitus.

Self Assessment Questions:
- Pioglitazone is most commonly associated with which of the following side effects?
- Identify the complication associated with uncontrolled diabetes from the list below.

THE RELATIONSHIP BETWEEN LOW VITAMIN D LEVELS AND DEPRESSION
Brian J. McNeeley, PharmD*; Jessica K. Cather, PharmD, BCPS, BCPP; Susan M. Fosnight, RPh, CGP, BCPS; Dorcas Letting-Mangira, Pharm.D
Summa Health System, 525 East Market St, Akron, OH, 44309
mcneeleyb@summahealth.org

Background
Low vitamin D levels are a widespread problem. It has long been realized that vitamin D plays a role in the regulation of calcium and phosphate metabolism, but vitamin D has recently been shown to be involved in other areas including cardiovascular disease, diabetes, and cancer. Receptors have also been found in the human brain. Results from recent studies have led to the theory that vitamin D plays a part in cognitive function, neuronal development, and mental health. Depression is a leading cause of disability. Not only is it a widespread issue, but high treatment failure rates lead to hospitalizations and readmissions. Although a few studies have shown an association between vitamin D levels and overall mood, many of these only included special populations or excluded many patients at the greatest risk of depression. In addition, these studies have not looked at readmission rates in correlation to vitamin D levels.

Objective
To study the relationship between serum vitamin D levels and depression in hospitalized patients.

Methodology
A retrospective chart review to compare the rates of depression in adult patients with a documented vitamin D level between August 2010 and January 2011. Patients admitted to Akron City or St. Thomas hospitals with a documented vitamin D serum result were included. The primary endpoint of presence of depression was analyzed by factors including admission or transfer to a psychiatric unit for treatment for depression, and by the admission question “are you sad or depressed?” Readmission rates were a secondary endpoint. Vitamin D status was analyzed as categorical data, defined as sufficient (≥30ng/ml), insufficient (29-20 ng/ml), and deficient (<20ng/ml).

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

Learning Objectives:
Outline the varying roles of vitamin D in the body.
Discuss the link between low vitamin D levels and acute depression.

Self Assessment Questions:
Vitamin D has been found to play a part in:
- 1. What level of serum vitamin D 25-OH is considered sufficient?
MEDICATION EVENT HUDDLES: EFFECT OF AN ELECTRONIC DATABASE ON INTERVENTION FOLLOW-UP IN A PEDIATRIC HOSPITAL

Jenna Merandi*, Pharm.D., Shelly Morvay, Pharm.D., Dorcas Lewe, RN, Barb Stewart, RN, Char Catt, RN, MS, Jay Mirtallo, RPh, MS, Karl Kappeler, RPh, MS, Nationwide Children's Hospital,87 Park Front Court,Columbus,OH,43215 jenna.merandi@nationwidechildrens.org

Purpose: To determine the impact of an electronic database on the percent of interventions completed following medication event huddles.

Methods: An audit was conducted at a free-standing academic pediatric hospital using retrospective data from the medication event huddle database. Intervention follow-up from medication event huddles was assessed between the time periods of March 1, 2010, through July 1, 2011. Data collection included the original event report summary, names of medications, staff members involved, location of the event, date of occurrence, type of intervention, and the time to completion of each intervention following a medication event huddle. Data were entered into Microsoft Excel spreadsheet to allow for descriptive statistical analysis. An electronic database was created to eliminate the use of multiple systems for huddle management, allow for documentation of medication event huddles, and generate automatic reminders to individuals involved in the huddle/intervention follow-up. The primary outcome assessed was the percent change in completion of intervention follow-up after implementation of an electronic database. Secondary outcomes included categorization of interventions from the medication event huddles.

Results: The baseline results of this study indicate only 31% of interventions from medication event huddles are documented as being completed. The percentage of interventions completed or in progress, but not documented as such is unknown. Process changes, education, and order improvements are the most frequent categories of huddle interventions. Implementation of a user friendly electronic database could facilitate documentation and management of interventions and ultimately increase patient safety. Database build to be complete by March 1, 2012.

Learning Objectives:
Describe a medication event huddle
Identify the benefits of implementing an electronic database to manage medication event huddles

Self Assessment Questions:
Which of the following take(s) place at a medication event huddle?
Which of the following are benefits of implementing an electronic database to manage medication event huddles?

EFFECT OF INTRAVENOUS VS. SUBCUTANEOUS PHYTONADIONE IN PATIENTS IN NEED OF EMERGENT WARFARIN REVERSAL

Brandon L. Mottice, Pharm.D., Mate Soric, Pharm.D., BCPS University Hospitals Geauga Medical Center,13207 Ravenna Rd.,Chardon,OH,44024 brandon.mottice@uhhospitals.org

Background: Current Chest guidelines recommend intravenous phytonadione for the reversal of warfarin in the emergent setting. Compared to subcutaneous administration, delivery of phytonadione via the intravenous route is more predictable, rapid and effective. In addition, higher doses of phytonadione are often required for rapid reversal when administered subcutaneously, possibly leading to extended resistance to subsequent anticoagulation upon restarting warfarin.

Purpose: To compare the length of stay in patients who were treated with intravenous or subcutaneous phytonadione for emergent warfarin reversal with bleeding.

Methods: After Institutional Review Board approval, a retrospective chart review will evaluate hospitalized patients treated with intravenous versus subcutaneous phytonadione for emergent warfarin reversal within the University Hospital Health System. All patients will be 18 years or older and on warfarin therapy. The patient must have an INR between 4.5 and 10 upon admission to the emergency department. The patient must also be restarted on warfarin therapy upon hospital discharge. Exclusion criteria include: patients given IM or oral phytonadione, patients given phytonadione by more than one route, patients given FFP or any other blood products containing clotting factors, patients with active or severe liver disease, and patients on other forms of anticoagulation. The primary endpoint is length of stay. Secondary endpoints are cumulative dose of phytonadione required to achieve an INR of ≤1.5, time taken to achieve INR of ≤1.5, time from first phytonadione dose to restart of warfarin therapy, and the difference between initial and subsequent INRs measured at <12 hours, 12 to 24 hours, >24 to 36 hours, >36 to 48 hours.

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

Learning Objectives:
Recognize the different effects of subcutaneous and intravenous phytonadione on warfarin reversal.
Review the current Chest Guidelines for phytonadione administration recommendations for emergent warfarin reversal.

Self Assessment Questions:
Which of the following statements is correct?
Which of the following is the preferred route of phytonadione administration for emergent warfarin reversal?
COMPARISON OF LINEZOLID AND DAPTOMYCIN FOR THE TREATMENT OF VANCOMYCIN-RESISTANT ENTEROCOCCUS BLOODSTREAM INFECTION: A RETROSPECTIVE COHORT STUDY

Justin A. Muir, Pharm.D.*; Eric W. Mueller, Pharm.D.; Neil E. Ernst, Pharm.D.
UC Health-University Hospital, 234 Goodman St. ML 0791, Cincinnati, OH 45219
justin.muir@uchealth.com

Background/Purpose:
Enterococci are common causes of nosocomial infections in the United States, especially in critically ill patients. Limited options are available for the treatment of vancomycin-resistant enterococci (VRE), but linezolid and daptomycin are commonly used. These agents have different pharmacokinetic and pharmacodynamic properties that may be relevant when treating bacteremia in critically ill patients with sepsis and organ dysfunction. The purpose of this study is to compare clinical outcomes between linezolid and daptomycin for the treatment of VRE bacteremia in critically ill patients.

Methods:
This is a single-center, retrospective, cohort study which will enroll critically ill patients aged 18 years and older with a positive blood culture for VRE who were treated with linezolid or daptomycin. The primary outcome will be median time to resolution of bacteremia, defined as the time (in hours) from initiation of appropriate antibiotic therapy to first negative blood culture. Other clinical outcomes associated with therapy will be compared, including mortality rate, proportion of patients with clinical and microbiological cure, and median time to resolution of sepsis and shock.

Other aims of the study are to identify risk factors for persistent bacteremia, to analyze outcomes associated with non-FDA-approved doses of daptomycin, and to report adverse events associated with VRE therapy. Variables that will be included in the univariate analysis include age, sex, body weight, positive fluid balance, VRE species, kidney disease, hypoalbuminemia, shock, mechanical ventilation, polymicrobial bloodstream infection, endocarditis, and catheter-related infection.

A sample size of 64 was calculated to provide a power of 80% at an alpha of 0.05 to detect a difference in median duration of bacteremia of 12 h (with a SD of 24 h) or 36 h (with a SD of 72 h). We plan to include up to 200 patients.

Results/Conclusions:
Results and conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:
List treatment options for serious vancomycin-resistant enterococcal infections
Describe alterations in pharmacokinetic parameters commonly seen in critically ill patients

Self Assessment Questions:
What class of antibiotics do enterococci carry innate resistance to?
Which of the following describe the pharmacokinetics of daptomycin?

EVALUATION OF CUSTOMIZED MEDICATION ALERTS FOR WARFARIN ON PRESCRIBER ACTIONS IN A PEDIATRIC INSTITUTION

Kyle M Mulloy, Pharm.D.*, Stacy M Ramga, PharmD., Karl H Kappeler, RPh, MS, FASHP
Nationwide Children’s Hospital, 514 Northview Drive, Bexley, OH 43209
kyle.mulloy@nationwidechildrens.org

Purpose: Many computerized physician order entry (CPOE) programs include clinical decision support (CDS) components designed to help prescribers choose the correct dose for patient care needs. CDS has the ability to reduce medication errors and improve patient safety. Medication dosing alerts are a common method of notifying prescribers of potential errors during the order entry process. The intent of dosing alerts is to improve patient safety and outcomes. However, an extremely high number of alerts can lead to alert fatigue, causing prescribers to override alerts before evaluating them. Dosing alerts are overridden by clinicians in teaching hospitals and primary care clinics the majority of the time. CDS programs often use standard safety alerts, but these may not be appropriate for use in specialized populations. The objective of this study is to evaluate if prescribing practices are altered after warfarin safety alerts are customized for a pediatric population.

Based on these results, it will be determined if the customized alerts are more appropriate than the standard alerts installed in the CPOE program. Developing customized alerts should lead to decreased number of alerts and increased number of useful alerts. An appropriate alerting system should enhance prescribing practices, leading to reduced medication errors and improved patient outcomes.

Methods: All warfarin doses at a pediatric institution will be reviewed during the months of December through February for three consecutive years. During the three year period, standard warfarin medication alerts were customized for a pediatric population. Warfarin dose alerts will be tallied and all prescriber actions after the alerts fired will be analyzed. Clinician response to alerts (ie. discontinuing an order, overriding an alert, etc.) will also be reviewed for trends.

Results: To be presented
Conclusions: To be presented

Learning Objectives:
Describe the negative effects that result from alert fatigue.
Review a customized medication dosing alert change and its effects on prescriber actions.

Self Assessment Questions:
Too many medication safety alerts can result in which of the following?
Improving the alerting system can be done in which of the following ways?
EVALUATION OF OPIOID ANALGESIC USAGE IN POSTOPERATIVE CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS: PRE AND POST IMPLEMENTATION OF COMPUTERIZED PHYSICIAN ORDER ENTRY
Matthew S. Nagar, PharmD*; Frank S. Rigelsky, PharmD, BCPS; Randall J. Voytilla, PharmD, Ph.D, BCPS; Mary E. Temple, B.S., PharmD, BCPS
Hillcrest Hospital- A Cleveland Clinic Hospital, 6780 Mayfield Rd, Mayfield Heights, OH 44124
nagarm@ccf.org

Background: In the surgical setting, coronary artery bypass grafting (CABG) has become one of the most common cardiothoracic interventions today. Approximately two thirds of patients who have undergone CABG report moderate to severe pain following surgery. In many patients, postoperative pain following surgery remains one of the most feared events during their hospital stay. Appropriately treating postoperative pain in this patient population is of high priority to reduce further complications after surgical intervention. The institution implemented Computerized Physician Order Entry with pre-specified order sets for postoperative pain management in April 2011.

Purpose: To evaluate opioid analgesic usage in postoperative cardiothoracic surgery patients both before and after the implementation of CPOE. The average pre-dose and post-dose pain scores will compared as endpoints as well as the incidence of adverse drug reactions.

Methods: A retrospective chart review was completed for patients who underwent coronary artery bypass graft surgery in the first and third quarter of 2011 in a 500-bed tertiary care medical facility. Patients must have undergone coronary artery bypass graft surgery and received opioid analgesic medications in the postoperative period. The data collection period for each patient began in the postoperative period after the close of surgery and continued for 72 hours. Patients were excluded if the were enrolled in other clinical trials within the institution and intubated for a period of 24 hours or greater after surgery. Nursing documentation of patient reported pain scores before and after analgesic medication administration will serve as the basis for data collection.

Results: Data collection is currently ongoing. Results and conclusions will be presented during the 2012 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
- Review the importance of adequate pain management in the postoperative period for Coronary Artery Bypass Graft (CABG) patients.
- Identify trends of analgesic usage in postoperative CABG patients, allowing for changes to postoperative pain management order sets.

Self Assessment Questions:
- Approximately how many patients who have undergone CABG surgery report moderate to severe pain following surgery?
- What is the most common type of pain reported after CABG surgery?

USING AN OLD DRUG TO TREAT NEW BUGS: FOSFOMYCIN FOR THE TREATMENT OF URINARY TRACT INFECTIONS CAUSED BY MULTIDRUG-RESISTANT ORGANISMS
Ryan W. Naseman, PharmD*; Karri A. Bauer, PharmD, BCPS; Mark E. Lustberg, MD, PhD
The Ohio State University Medical Center, 368 Doan Hall, 410 W. 10th Ave, Columbus, OH 43210
Ryan.Naseman@osumc.edu

Purpose: In an era of escalating antibiotic resistance and lack of new discovery, emphasis should be given not only to the development of new drugs, but also to the re-evaluation of older and forgotten drugs. Urinary tract infections (UTIs) are the most common hospital-associated infections. Resistance to common organisms associated with UTIs including vancomycin-resistant Enterococcus faecalis and faecium (VRE), extended-spectrum -lactamase (ESBL)- and carbapenemase-producing E. coli and Klebsiella pneumoniae are growing problems. The lack of new antibiotics and increasing resistance presents a treatment challenge. Fosfomycin, an older antibiotic, represents a potential option for the treatment of patients with UTIs caused by multidrug-resistant (MDR) organisms. Fosfomycin was added to The Ohio State University Medical Centers (OSUMC) formulary in July 2011 for the treatment of UTIs caused by VRE, ESBL-and carbapenemase-producing organisms. Fosfomycin is a cell wall synthesis inhibitor that displays broad-spectrum activity. Fosfomycin is available in an oral formulation, obtains adequate urine concentrations and maintains levels 36 hours post dose. The use of fosfomycin avoids intravenous antibiotics and potentially associated infectious and cost complications.

Methods: This is a retrospective study of all adult inpatients with a positive urine culture for VRE, ESBL-or carbapenemase-producing organism who received at least 24 hours of fosfomycin between July 1, 2011 and December 31, 2011. Clinical outcomes to be evaluated include length of stay, relapse, reinfection and hospital mortality.

Results: Conclusions: Data collection and analysis are currently being conducted; results and conclusions will be presented at the conference.

Learning Objectives:
- Describe current limitations associated with the treatment of UTIs caused by MDR organisms.
- Identify appropriate utilization of the fosfomycin for the treatment of UTIs.

Self Assessment Questions:
- Which of the following is considered an antibiotic of choice for ESBL-producing organisms?
- Which of the following is a benefit of fosfomycin use?
EVALUATION OF HIGH DOSE SIMVASTATIN RELATED
MYOPATHY IN CINCINNATI VETERANS AFFAIRS MEDICAL
CENTER (CVAMC) POPULATION

Joori C. Noh, PharmD*, Susan C. Drees, PharmD, BCPS
Cincinnati Veteran Affairs Medical Center, 3200 Vine Street, Cincinnati, OH, 45211
joori.noh@va.gov

Purpose:
Food and Drug Administration (FDA) recently announced new restrictions and dose limitations for simvastatin due to increased risk of myopathy. The recommendations were based on the results of the Study of the Effectiveness of Additional Reductions in Cholesterol and Homocysteine (SEARCH) trial, which showed higher rate of myopathy in patients receiving 80mg of simvastatin compared to patients receiving 20mg. The purpose of this study is to evaluate the significance of the FDA simvastatin recommendations in CVAMC population and to determine if the results of SEARCH trial can be extrapolated to CVAMC patients.

Methods:
This study will be conducted as a retrospective, case control study by performing a chart review of CVAMC patients who were prescribed simvastatin from 1/1/07 to 5/31/11. Patients considered for inclusion are ≥ 18 years of age who were prescribed simvastatin during the period above. Patients will be excluded if they developed adverse drug events other than myopathy. Approximately 150 patients will be included to show a significant difference based on a power analysis (80%). Patients who have documented observed myopathy on simvastatin (with or without concomitant use of interacting medications) will be enrolled as cases. Controls will be randomly identified by using the same cohort of patients that the cases were identified from, but those without myopathy. Controls will be matched to cases based on age, gender, simvastatin dose and interacting medication(s). Each case will be matched with controls at a ratio of 1 to 2 to reach the desired sample size. The primary outcome is the proportion of patients on simvastatin 80mg or simvastatin with interacting medication(s) who developed myopathy. The anticipated benefit is to provide more definitive guidance when prescribing simvastatin to CVAMC population.

Results/Conclusions:
Data collection and analysis is ongoing. Study results and conclusions will be presented at the GLPRC.

Learning Objectives:
Review the FDA dosing limitations and prescribing guidance on simvastatin.
Discuss the impact of simvastatin dosing and drug interactions on patient safety.

Self Assessment Questions:
What is the dose limitation on simvastatin if patient is concomitantly taking amiodarone?
What is the name of the study/trial that resulted in changes to the simvastatin drug labeling?

RETROSPECTIVE SAFETY REVIEW OF PATIENTS RECEIVING THERAPEUTIC DOSES OF ALTEPLASE

K. Michael O'Connor, PharmD*; Michele R. Michaels, PharmD; Mary Beth Shirk, PharmD
The Ohio State University Medical Center, 410 West Tenth Avenue, 368 Doan Hall, Columbus, OH, 43210
Michael.O'Connor@osumc.edu

Purpose: Patients receiving therapeutic doses of alteplase are at an increased risk for adverse outcomes. Signals from our local event reporting system prompted a review of the patient care processes associated with this patient population. The objective of this study is to evaluate safety measures taken in patients receiving therapeutic doses of alteplase.

Methods: This is a retrospective analysis of medical records of all patients who received therapeutic doses of alteplase at, or prior to transferring to, our medical center. Patients that received alteplase between July 1, 2010 and September 30, 2011 were included. Patients receiving less than 20 mg of alteplase, incarcerated patients, and patients less than 18 years of age were excluded. Patients were identified using a query of the health systems centralized data repository, the Department of Pharmacy's electronic medication order processing system, and the internal event reporting system. Search terms included: discharge ICD-9 codes for stroke (434.91) and acute pulmonary embolism (415.19) (data repository) and alteplase (order processing and event reporting systems). Four different electronic documentation systems were used in various patient care areas during the study period. Handoff and interdisciplinary communication will be evaluated via documentation. Additionally, the following safety measures will be assessed post alteplase administration: provision of patient education, bleeding and fall risk assessment, and the avoidance of concurrent administration of medications which increase the risk for bleeding. Data will be recorded for 72 hours following alteplase administration. Descriptive statistics will be used to analyze and report the results of this study.

Results/Conclusions: Seventy six patients were identified to be screened against inclusion and exclusion criteria. Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:
Describe the importance of communication between providers during handoffs for patients receiving alteplase.
List the patient care activities which should take place after alteplase administration.

Self Assessment Questions:
Communication during handoffs after alteplase administration is important because:
Which of the following should take place following alteplase administration?
SAFETY, EFFICACY, AND COST OF PHARMACODYNAMIC DOSE OPTIMIZATION OF BETA-LACTAM ANTIBIOTICS

Nicholas J. Panno III, PharmD; Tamara L. Trienski, PharmD; Anthony K. Leung, MD; Dorcas Letting-Mangira, PharmD; Timothy R. Pasquale, PharmD
Summa Health System, 525 East Market St., P.O. Box 2090, Akron, OH 44309-1619
pannon@summahealth.org

Background: Beta-lactam antibiotics play a prominent role in current infectious disease therapy. However, increasing resistance among gram-negative pathogens and slow development of new antimicrobial agents has led to an emphasis on optimizing the use of current agents. Beta-lactam antibiotics exert time dependant antimicrobial properties, which are optimized when administered by extended infusion. Literature has shown outcome benefit of extended infusion of beta-lactams compared with intermittent infusion. In 2007, Summa Health System initiated extended infusion of piperacillin/tazobactam 3.375 g IV over 4 hours every 8 hours and doripenem 500 mg IV over 4 hours every 8 hours as the preferred method of administration in critically ill patients. Summa Health System then sought to investigate and define optimal use of antimicrobials effective against Pseudomonas aeruginosa. In 2010, isolates were collected from within the institution and analyzed through The Center of Anti-Infective Research and Development in Hartford, Connecticut. A pharmacodynamic dose optimization protocol (PDOP) was developed from this data, with the goal of optimizing the dosing of piperacillin/tazobactam, doripenem, and cefepime based on specific organism minimum inhibitory concentration. There are no outcomes data regarding this protocol.

Objective: To determine the efficacy, safety, and cost of the PDOP compared to an empiric extended infusion protocol for piperacillin/tazobactam, cefepime, and doripenem.

Methods: A retrospective cohort analysis of medical records was conducted on patients who received any study antibiotics between October 2009 and October 2011. Patients admitted prior to the start of the PDOP were assigned to the extended infusion group, while patients admitted after the initiation of the PDOP were assigned to the PDOP group.

Results: Data collection is currently ongoing. Results will be presented at the Great Lakes Residency Showcase in April 2012.

Conclusions: Conclusions will be presented at the Great Lakes Residency Showcase in April 2012.

Learning Objectives:
Describe the rationale behind extended infusion beta-lactam antibiotics
Identify the kinetic parameter of beta-lactams that is associated with the success of their pharmacodynamic profile

Self Assessment Questions:
Extended infusion times for beta-lactam antibiotics have been found to produce which of the following outcomes when compared with standard intermediate infusions?
What pharmacokinetic parameter should be considered when trying to maximize probability of success with beta-lactam antibiotics?

RISK OF VENOUS THROMBOEMBOLISM IN WOMEN USING HORMONAL CONTRACEPTIVES

Ashley M Parrott,* PharmD; Steven R Smith, MS, RPh, BCACP; Allison L. Dollman, MD; Jennifer J. Weber, MD
Toledo Hospital/Toledo Children’s Hospital, 2051 West Central Ave, Toledo, OH 43606
ashley.parrott@promedica.org

Purpose:
This retrospective data review was designed to determine whether contraceptives, particularly combination contraceptives containing drospirenone, are associated with an increased risk of developing a venous thromboembolism.

Methods:
Information was collected from medical and prescription claims at Paramount Health Care. Females with Paramount commercial or managed Medicaid insurance in Ohio and Michigan who received a contraceptive between July 1, 2008 and June 30, 2011 were identified. Contraceptives evaluated included oral, patch, and ring formulations as well as the medroxyprogesterone depot injection. Women with a history of cancer, a known hypercoagulable state, or systemic lupus erythematosus were excluded. Women without a history of venous thromboembolism (VTE) or a hypercoaguable state receiving a prescription for enoxaparin or warfarin were excluded. The primary outcome was the occurrence of venous thromboembolism. This study will attempt to quantify the differences in the incidence of VTE between various contraceptives. Descriptive statistics, including raw proportions and contingency tables will be used to identify associations. Odds of developing VTE will be computed for each contraceptive and odds ratios will be used to compare different contraceptives.

Conclusions:
There are no preliminary conclusions at this time. Study results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference regional meeting in April 2012.

Learning Objectives:
Describe the controversy associated with third-generation progestins.
Discuss the recent FDA released information regarding drospirenone-containing contraceptives.

Self Assessment Questions:
Traditionally third-generation progestins have been recognized as:
The FDA recently reviewed drospirenone-containing contraceptives. Which of the following is true:
IMPLEMENTING A PHARMACIST-DRIVEN ANTIMICROBIAL STEWARDSHIP PROGRAM AT A TERTIARY TEACHING HOSPITAL

Riverside Methodist Hospital, 4380 Ridgetop Drive, Dayton, OH 45424
k-meara@onu.edu

Purpose
Studies have demonstrated that Antimicrobial Stewardship Programs (ASPs) have been shown to decrease antibiotic resistance, medication errors, and costs while optimizing therapeutic outcomes. In January 2007, the Infectious Disease Society of America (IDSA) published guidelines on Antimicrobial Stewardship that recommend a team that includes an infectious disease physician and pharmacist. Antimicrobial stewardship includes ensuring the appropriate selection, dosing, route, and duration of therapy. Riverside Methodist hospital is a 1,054-bed community teaching hospital that has an Antimicrobial Stewardship Program but currently has no dedicated infectious disease pharmacist. The purpose of this study is to quantify the impact of the addition of a pharmacist to the ASP on inappropriate antimicrobial use, timeliness of administration, number of Clostridium difficile associated diarrhea infections and cost.

Methods
This study is a prospective evaluation of patients, age 18 years or older, who receive antibiotics during the month of February 2012. Exclusion criteria include patients with active infectious disease consults, labor and delivery patients, neonates and the inpatient behavioral health unit. Information to be collected includes: appropriate initial antimicrobial selection, compliance with IDSA treatment guidelines, total antibiotic days of therapy, number of hospital-acquired Clostridium difficile infections, total antimicrobial cost, types of antimicrobial agents used and number of pharmacy recommendations made and accepted.

Results from the prospective analysis will be compared to a retrospective chart review of patients from the daily antimicrobial stewardship report during January 2012. Statistical analysis will be performed to evaluate the data collected.

Results/Conclusions: Results and conclusions will be presented at the conference.

Learning Objectives:
- Discuss the beneficial impact of infectious disease pharmacy interventions at a tertiary teaching hospital
- Discuss the role of an infectious disease pharmacist on clinical and financial outcomes

Self Assessment Questions:
- Based on studies, what percentage of antibiotic use in hospitals is inappropriate?
- Implementation of a pharmacist in an established antimicrobial stewardship program can lead to:

PATIENT-CENTERED CARE AT A GENERAL INTERNAL MEDICINE PATIENT-CENTERED MEDICAL HOME

Shannon D. Peter, PharmD; Kyle Porter, MAS; Stuart J. Beatty, PharmD, BCPS
The Ohio State University College of Pharmacy, 500 W 12th Ave, Columbus, OH, 432101291
Shannon.Peter@osumc.edu

Purpose: To 1) Determine patient perceptions of the degree of patient-centeredness of visits with a pharmacist, internal medicine resident, attending physician, nurse practitioner, social worker, or any combination of the above at a tier 3 General Internal Medicine (GIM) Patient-Centered Medical Home (PCMH) and 2) Examine potential differences of patient-centeredness perceptions based on healthcare provider(s) providing care during each visit.

Methods: A convenience sample will be used to recruit GIM patients age 18 years and older. Data will be collected via a one-time electronic 21-item Consultation Care Measure (CCM) questionnaire at the end of a GIM visit with one or more of the specified healthcare practitioners. Reported data will include a total CCM patient-centeredness score, as well as scores on each of 5 CCM patient-centeredness subscales.

Demographics, the amount of time subjects spent with healthcare providers, the amount of time spent waiting, and the length of time each subject has been followed at the PCMH will also be collected. Comparison data analysis will take place to examine correlations between the above items and subject perceptions.

Results: With at least 50 responses in the pharmacist, attending physician, and diabetes clinic practitioner groups, the study will have 80% power to detect a 10% difference in CCM scores between provider types. At the time of abstract submission, a total of 85 questionnaire responses have been collected.

Conclusions: We postulate that results will be used to guide future initiatives implemented to improve patient-centered care, and will support new team-based healthcare models.

Learning Objectives:
- Discuss positive health outcomes related to physicians taking a patient-centered approach to patient communication
- Describe methods by which healthcare practitioners can successfully measure perceptions of patient-centered care

Self Assessment Questions:
- Which of the following outcomes have been shown to be related to physicians taking a patient-centered approach to patient communication?
- To date, what method has been most successful at measuring perceptions of patient-centered care?
EVALUATION OF AN UPDATED WEIGHT-BASED HEPARIN DOSING PROTOCOL
Brad R Petersen PharmD*, David M Robinson PharmD, Jay M Lynch PharmD, & Natalie A Gardner PharmD
Grant Medical Center, 111 South Grant Avenue, Columbus, OH, 43215
BPETERS2@ohiohealth.com

Purpose: Heparin is a high risk medication that is often used to prevent and treat venous thromboemboli. The objective of this study is to compare the effectiveness of an updated weight-based heparin infusion protocol at achieving goal aPTTs efficiently.

Methods: At a 640 licensed-bed community hospital, eight months of weight-based heparin infusion patients will be evaluated to determine the effectiveness of updating an institutional weight-based heparin dosing protocol. Protocol updates include more weight precise bolus dosing, more aggressive initial bolus doses, reduced infusion hold times for supratherapeutic aPTTs and more frequent aPTT monitoring for heparin initiation/rate adjustment. Protocol efficiency will be evaluated based on time to therapeutic aPTT as well as quantity of aPTTs until patient is within therapeutic range. Compliance to the heparin protocol as well as average number of aPTTs per day will also be assessed. Four full months of patients on a weight-based heparin protocol will be compared to four full months of patients on a revised protocol. Approximately two months will elapse between patient populations to allow for health care practitioners to adjust to protocol changes. Prior to data collection, approval from the Grant Medical Center/Doctors Hospital Institutional Review Board will be attained. During data collection all patient identifiers will be removed to protect patient privacy. Inclusion criteria will be all Grant Medical Center patients initiated on a heparin drip using the corresponding weight-based heparin protocol. Patients will be excluded if less than 18 years old, admitted for less than 24 hours, or started on a heparin drip for stroke or chronic renal replacement therapy. Patients diagnosis/indication, actual body weight, age, initial/final infusion rate, platelet counts, aPTTs, possible interacting medications, and adverse events (clot formation/embolization, bleeding, and heparin induced thrombocytopenia) will be collected.

Learning Objectives:
Discuss heparin infusions and clinical repercussions associated with incorrectly dosing patients
Report outcomes associated with a change in an institutions heparin weight-based dosing protocol

Self Assessment Questions:
What is the average half-life of heparin?
Which of the following combinations are most important for determining a patients heparin dose?

ANALYSIS OF TYPE 2 DIABETIC PATIENT PERCEIVED BARRIERS TO MEDICATION ADHERENCE: A PATIENT SURVEY
Erin A Petersen PharmD*; Mary Ann Tucker PharmD, BCPS; M. Nicole Komara Brown PharmD; Karen L Kier PhD, MSc, BCPS
Blanchard Valley Medical Association/Ohio Northern University, 200 W. Pearl Street, Findlay, OH, 45840
erhodes@onu.edu

Purpose: Over twenty-five million people are currently living with diabetes mellitus, and it is the seventh leading cause of death in the United States. Studies have found that 15-35% of diabetic patients are nonadherent with their antihyperglycemics. Nonadherence has been found to increase hemoglobin A1C, all cause hospitalizations, and mortality in diabetic patients. This study hopes to discover the greatest patient perceived barrier to taking each class of antihyperglycemics so health care professionals can help patients overcome barriers.

Methods: This study was approved by the Ohio Northern University Institutional Review Board. English speaking Type 2 Diabetic patients 18 years and older, who presented to Blanchard Valley Medical Associates, were asked to complete a voluntary survey from November 1- December 31, 2011. Once informed consent was obtained, the written survey was administered to the patients or caregivers. The survey contained the modified Morisky scale, a validated scale for patient adherence, followed by a questionnaire regarding diabetic medications by class and patient perceived hindrances to taking that medication class daily. Adherence barriers were divided into adverse effects, cost, complexity of regimen, difficulty with injections, and "other". Patient A1C, gender, age, physician, and years with diabetes were also collected. 120 patients needed to complete this survey to reach a power of 80% with an alpha of 0.05. The data will be statistically analyzed to determine if there is a prevalent hindrance for each medication class as well as adherence barriers related to patient demographics.

Results: 295 patients successfully completed the survey. Statistical analysis is still underway with final results and conclusions to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the reasons for diabetic patient medication nonadherence.
Review specific patient perceived adherence hindrances for each class of antihyperglycemics.

Self Assessment Questions:
Which of the following was found to be the largest barrier to medication adherence overall?
Which of the following was found to be the largest adherence barrier for metformin?
USE OF INTRAVENOUS ACETAMINOPHEN AT A LARGE ACADEMIC MEDICAL CENTER

"Benjamin B. Philip, PharmD; Bruce A. Doepker, PharmD, BCPS; Kristin I. Brower, PharmD, BCPS; Ellen A. Keating, PharmD, MS; Julianna V.F. Roddy, PharmD, BCOP

The Ohio State University Medical Center, Room 368 Doan Hall, 410 W. 10th Avenue, Columbus, OH, 43210
benjamin.philip@osumc.edu

Background:
Acetaminophen is a centrally acting non-opioid analgesic and antipyretic. Although acetaminophen has been available in the US since the early 1950s, it is only within the past decade that an intravenous formulation has been available. Originally marketed in the United Kingdom, intravenous acetaminophen (APAP IV) was FDA approved in the United States in November 2011 for the management of mild to moderate pain, management of moderate to severe pain in combination with opiates, and fever reduction. The Ohio State University Medical Center (OSUMC) Pharmacy and Therapeutics Committee (PTC) approved APAP IV for addition to the Formulary in July 2011. Due to the significantly increased cost of the IV formulation, APAP IV is restricted at OSUMC to patients that are NPO or unable to tolerate enteral administration with an automatic stop after 48 hours to prompt reassessment for the continued need for therapy.

Purpose:
The purpose of this study is to evaluate the use of APAP IV to determine usage patterns and identify compliance with the PTC restrictions.

Methods:
This is a single-center, retrospective, cohort study evaluating the use of APAP IV. The sample population includes all patients admitted to the OSUMC between July 1, 2011 and December 31, 2011 who were prescribed and administered APAP IV. Data collected includes treatment indication, doses administered, total daily dose of acetaminophen from all sources, concurrent pain medications, baseline hepatic and renal function, contraindications, history of ethanol use, and hepatic impairment or chronic liver disease. The study evaluates whether the patient was NPO or unable to tolerate enteral administration. Concurrent pain medications were recorded to evaluate potential opiate sparing properties.

Results/Conclusion:
Preliminary results have shown an increased utilization of APAP IV over the course of the study period with pre/post-operative pain management as the primary indication for use.

Learning Objectives:
Discuss the role of APAP IV in the inpatient hospital setting and the need for restrictions.
Identify adherence to PTC established restrictions at OSUMC.

Self Assessment Questions:
Which of the following is an FDA approved indication for intravenous acetaminophen?
What is the current FDA maximum daily dose of acetaminophen in healthy adults?

WARFARIN DISCHARGE COUNSELING PILOT EVALUATION

Anna Powichrowski, Pharm.D.*; Katie Greenlee, Pharm.D., BCPS; Jeff Ketz, Pharm.D., BCPS; Cari Cristiani, Pharm.D., BCPS; Christine Ahrens, Pharm.D., BCPS; Mike Militello, Pharm.D., BCPS

Cleveland Clinic Foundation, 2111 Acacia Park Dr. Apt 311N, Lyndhurst, OH, 44124 powicha@ccf.org

Background: The National Quality Forum in response to National Patient Safety Goals (NPSG) regarding anticoagulation therapy has mandated an implementation of a formalized anticoagulation management program to reduce potential for patient harm with the use of anticoagulation therapy. The 2011 NPSG guidelines described patient education as a "vital component" and required that organizations provide education to staff, patients and families. The guidelines also recommend that patient/family education includes importance of follow-up in order to monitor patients. To evaluate potential means to meet these goals the Cleveland Clinic Department of Pharmacy has implemented a warfarin discharge counseling pilot.

Methodology: It is a descriptive concurrent study using a phone follow-up survey and quality assurance survey. The primary objective is to determine the percentage of patients attending a post discharge follow-up appointment to monitor warfarin therapy using a phone follow-up survey. The secondary objective is to determine patients level of warfarin understanding after a warfarin counseling session by a pharmacist prior to discharge via a quality assurance survey. All patients 18 years or older discharged to home on warfarin therapy from cardiology floors (J7 -1, -2, -3) will be included. Exclusion criteria includes patients discharged from cardiology floors (J7 -1, -2, -3) on warfarin therapy to nursing facility and patients who are unable to speak and understand English. Also patients who are unable to be reached by pharmacy practice resident will be excluded from the primary outcome analysis. The timeframe for the pilot is November 1 - November 30, 2011. Primary and secondary objectives will be analyzed using descriptive statistics. Fishers exact test or Chi-square will be used when appropriate. An alpha level <0.05 will be deemed statistically significant.

Results and conclusions: Data collection for this research is currently ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Review risk factors of anticoagulation with warfarin
Describe the methods of implementing a warfarin discharge counseling program.

Self Assessment Questions:
All of the following are true regarding anticoagulation therapy with warfarin except:
All of the steps were included in warfarin discharge counseling process except:
IMPLEMENTATION OF A MULTIDISCIPLINARY SEPSIS ALERT TEAM IN A COMMUNITY HOSPITAL

Ryan Clark DO, Matthew J. Kaufflin PharmD, Christopher McIntosh DO, Emily J. Quinto PharmD*, Brian Torski DO
Grandview Medical Center, 405 W. Grand Avenue, Miami, OH, 45342
emily.quinto@gmail.com

Purpose/Background: The Surviving Sepsis Campaign, released guidelines in 2008 outlining recommendations for the management of sepsis and septic shock. Identification and diagnosis of the condition, initial and maintenance fluid resuscitation, antibiotic therapy, and other medication used in the treatment of sepsis are some of the topics covered in the guidelines. Early goal-directed therapy has been found to improve mortality in septic patients. However, meta-analyses have uncovered associations between individual improvements with single interventions, but the implementation of all campaign recommendations has not been investigated. The primary objective of this study is to develop, implement and evaluate a sepsis alert team and bundle care plan for septic patients identified at Grandview Medical Center between February to April 2012 in comparison to previous sepsis treatment practices.

Methods: This study is a before-after design evaluating the implementation of a multidisciplinary sepsis alert team at Grandview Medical Center. A bundled care path including a sepsis screening tool, antibiotic guide, inpatient treatment guide, education of medical staff and a response team will be developed by the sepsis alert team. Patients admitted between January 1, 2011 and November 1, 2011 will be retrospectively looked at through chart review for outcomes. Those patients seen after February 1, 2012 will be responded to by the sepsis alert team. Data will be collected that includes mean arterial pressure (MAP), blood pressure, blood glucose and heart rate, time to first antibiotic, appropriateness of antibiotic, use of vasopressors, inotropes, steroids, time to admittance or transfer to ICU, initial time and amount of fluid resuscitation, use of mechanical ventilation, time to culture, need for dialysis, length of stay and mortality.

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

Learning Objectives:
Recognize the different classifications used to describe patients with sepsis (systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis, and septic shock). Recall the Surviving Sepsis Campaign guidelines to determine treatment options and recommendations for sepsis patients.

Self Assessment Questions:
1. Which of the following describes a patient with severe sepsis?
 Which of the following are indicated in the Surviving Sepsis Campaign Guidelines to yield better survival outcomes?

CHARACTERIZATION OF ADVERSE METABOLIC OUTCOMES OF ANDROGEN DEPRIVATION THERAPY IN PROSTATE CANCER PATIENTS AT METROHEALTH MEDICAL CENTER

Robert D. Raiff, Pharm.D.*, Jan E. Kover, R.Ph., BCOP, Paul F. Hegenroeder, M.D.
MetroHealth Medical Center, 2500 MetroHealth Drive, Cleveland, OH, 44109
rraiff@metrohealth.org

Background: Androgen deprivation therapy (ADT) is a management option for locally advanced to metastatic stages of prostate cancer, and can be accomplished medically through the usage of gonadotropin-releasing hormone (GnRH) receptor agonists. Recent studies have associated GnRH agonist therapy with increases in cholesterol, body fat, and triglycerides, while concomitantly decreasing insulin sensitivity. In October 2010, the FDA required manufacturers to include information in the GnRH agonist package inserts warning of increased risk of obesity, diabetes, and adverse cardiovascular outcomes (heart attack, stroke, sudden death). To this point, retrospective and prospective analyses examining the relationship between GnRH agonists and increased risk of adverse metabolic outcomes have produced conflicting results.

Purpose: The primary objective is to describe the incidence of adverse metabolic outcomes in prostate cancer patients receiving at least six months of GnRH agonist therapy at MetroHealth.

Methods: This Institutional Review Board-approved retrospective, descriptive chart review will be conducted on all adult men with biopsy-proven prostate cancer who received at least six consecutive months of GnRH agonist therapy from 2001-2010. The patients will be identified through the MetroHealth electronic medical record system (EPIC). Dose and duration of GnRH agonist therapy and demographic data will be collected on each patient. The primary endpoints will be incidence of diabetes and composite incidence of adverse cardiovascular events. Patients with a prior history of diabetes will be excluded from the diabetes incidence endpoint. Changes in metabolic parameters such as HbA1c%, lipid panel, BMI, and blood pressure will be recorded over the duration of GnRH agonist treatment. Descriptive statistics will be used to assess the incidence of adverse metabolic outcomes as compared to literature based reported incidence. Data will be stratified based on patient history of cardiovascular disease and smoking.

Results/Conclusions: Results and conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:
Recognize potential alterations in metabolic laboratory values associated with GnRH agonist treatment
Indicate the FDA-reported potential risks associated with GnRH agonist treatment

Self Assessment Questions:
Which lipid panel component experienced the most significant alteration as a result of GnRH agonist therapy?
According to the FDA, which of the following adverse events may be associated with GnRH agonist therapy in prostate cancer patients?
THE EFFECTS OF A PALLIATIVE CARE PROGRAM ON CONTINUING MAINTENANCE MEDICATIONS IN NEAR-END-OF-LIFE ONCOLOGY PATIENTS (HEAL STUDY)

Monica L Randolph*, PharmD, Jane M Pruemer, PharmD, BCOP, FASHP, Melissa M Sons, PharmD Candidate
UC Health-University Hospital, 234 Goodman Street, Cincinnati, OH 45219
monica.randolph@uchealth.com

Background:
Terminally-ill oncology patients, who are enrolled in a palliative care program versus those who are not enrolled, may have maintenance medications discontinued earlier. Continuation of maintenance medications cannot only be costly, but polypharmacy can decrease adherence to the necessary palliative care medication regimen. Quality of life for both patient and family can be greatly affected by a complex medication regimen. There currently is no guideline for physicians when to discontinue maintenance medications.

Purpose:
Evaluate if terminally-ill oncology patients, who are or are not enrolled in a palliative care program, have maintenance medications discontinued earlier and if that may lead to improved quality of life for the patient at end-of-life.

Methods:
This investigator-initiated, single center, retrospective and prospective observational study is being conducted at UC Health-University Hospital in Cincinnati, OH. Thirty adult oncology patients listed as expired are being retrospectively reviewed and compared to 30 consecutive patients who were seen in the UC Health Palliative Care Clinic. A prospective observational study of 60 terminally ill oncology patients in UC Health's Palliative Care Program will be observed until expiration through May 2012. The primary outcome compares the number medications, both total and maintenance, in oncology patients near end-of-life in a palliative care program to a similar group not in a palliative care program. Secondary outcomes include, hospitalizations, adverse outcomes due to discontinuing maintenance medications, and assessment of the effect of being enrolled in a palliative care program on patient quality of life. We plan to develop a guideline for oncologists/palliative care physicians to promote the discontinuation of various maintenance medications.

Results:
Final results and conclusions to be presented at the Great Lakes Residency Conference. Currently data has been collected in 10 patients.

Learning Objectives:
Classify which medications are maintenance versus supportive care medications used to manage terminally-ill oncology patients at the end of life
Identify when maintenance medications can be appropriately discontinued in terminally-ill oncology patients at end of life

Self Assessment Questions:
CG is a 68 YOF with stage IV metastatic colon cancer s/p three cycles of FOLFOX. His medications include: -aspirin 81mg PO daily -oxycodone SR 40mg PO BID -oxycodone IR 15mg PO Q6H prn breakthrough p
CG did not respond to therapy and has now been given 3 months left to live and has decided to not continue with further chemotherapy. Which medications could be discontinued in CG?

A RETROSPECTIVE REVIEW OF THE VALUE OF BOLUS FLUOROURACIL PLUS LEUCOVORIN PRIOR TO CONTINUOUS INFUSION FLUOROURACIL IN PATIENTS WITH METASTATIC COLORECTAL CANCER

Josh Reardon, PharmD; Marlo Blazer, PharmD, BCOP; Amy Lehman, MAS; Niesha Griffin, MS, RPh, FASHP; Tanios Bekaii-Saab, MD
The Ohio State University Medical Center, 410 West 10th Avenue, 368 Doan Hall, Columbus, OH 43210
joshua.reardon@osumc.edu

Background: FOLFOX and FOLFIRI, with or without the addition of bevacizumab, are the standard of care for first line treatment of metastatic colorectal cancer. The backbone of these regimens includes a bolus dose of fluorouracil (5FU) with leucovorin followed by a 46 hour continuous infusion of 5FU. Toxicities seen with these regimens, such as neutropenia, mucositis, diarrhea, and fatigue have been attributed mainly to the bolus 5FU portion of the regimen. Established dose reductions for these toxicities involve the removal of the bolus 5FU and leucovorin from the regimen.

Purpose: This is a retrospective chart review to evaluate if removal of the bolus 5FU and leucovorin due to toxicities has had any impact on the efficacy of the regimen as a whole. The primary endpoint will compare overall survival (OS) between groups that discontinued the bolus 5FU and leucovorin to those that did not. Secondary endpoints will compare progression-free survival (PFS) between groups that discontinued the bolus 5FU and leucovorin to those that did not, as well as compare toxicity profiles between these populations.

Methods: Retrospective data will be collected on patients diagnosed with metastatic colorectal cancer (mCRC) who received first-line treatment with FOLFOX or FOLFIRI based regimens, with or without bevacizumab. The electronic medical record will be reviewed for toxicities that led to discontinuation of the bolus 5FU and leucovorin portion of the regimen. The OS, PFS and toxicity profiles between groups that discontinued the bolus 5FU and leucovorin to those that did not will be compared.

Results/conclusions: Data collection is in progress. Results and conclusions will be presented at the 2012 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss median overall survival for metastatic colorectal cancer patients treated with FOLFOX or FOLFIRI chemotherapy regimens based on the published literature.
Identify dose-limiting toxicities commonly seen with both FOLFOX and FOLFIRI regimens used to treat metastatic colorectal cancer that are attributed to the bolus fluorouracil.

Self Assessment Questions:
1) Based on the literature presented, what is the approximate range of median overall survival for metastatic colorectal cancer patients treated with FOLFOX or FOLFIRI in the first-line setting?
2) Which set of dose-limiting toxicities seen in metastatic colorectal cancer patients treated with FOLFOX or FOLFIRI can be attributed to the bolus fluorouracil?
COST-EFFECTIVENESS OF PLERIXAFOR FOR STEM CELL MOBILIZATION

"Tracy E Reeb, PharmD; Michael J Bradley, PharmD, BCOP
The Jewish Hospital-Mercy Health, 4777 E. Galbraith Rd, Cincinnati, OH, 45236
TEReeb@health-partners.org

Purpose: Mobilization of hematopoietic stem cells (HSCs) from bone marrow is required in order to collect a sufficient number of cells from peripheral blood for autologous HSC transplant. Chemotherapy plus filgrastim (C+F) and plerixafor plus filgrastim (P+F) are two commonly used regimens. C+F is associated with failure rates up to 30% and chemotherapy associated morbidity. P+F is associated with fewer mobilization failures compared to filgrastim alone, is generally well tolerated but is considerably more expensive. More evidence is needed to determine if P+F provides a more cost-effective approach to stem cell mobilization than C+F. The primary objective is to determine the cost-effectiveness of these two regimens and secondary objectives include subgroup analyses of multiple myeloma (MM) and Non-Hodgkins Lymphoma (NHL) patients.

Methods: This is an Institutional Review Board approved retrospective, observational, single-center chart review. The blood and marrow transplant database was used to identify patients with MM or NHL undergoing stem cell mobilization with C+F or P+F. Only first mobilization attempts were included for evaluation. Patients under 18 years of age and those with previous HSC transplants were excluded. Demographics and indices related to mobilization were extracted. Associated costs (wholesale acquisition cost for drugs, Medicare reimbursement rates for procedures, and diagnosis-related group reimbursement for hospitalizations) will be used to calculate total mobilization costs and cost-effectiveness ratios.

Preliminary Results: Final analyses included 105 patients; P+F, n=52 and C+F, n=53. Baseline characteristics were similar except C+F patients were significantly younger (mean age 55.2 versus 62.1 years, p=0.0015), had more patients in a partial remission (44 versus 29 patients, p=0.0024) and fewer in a complete remission (8 versus 23 patients, p=0.0011). C+F patients collected significantly more HSCs (15.7 x 10^6 versus 7.53 x 10^6 HSCs/kg, p=0.0007) in fewer apheresis sessions (21 versus 31 session, p=0.0083). C+F patients required significantly more hospitalizations and transfusions. Failure rates were similar. Pharmacoeconomic analyses are ongoing.

Conclusions: Pending.

Learning Objectives:
Discuss the importance of stem cell mobilization and the drugs used in each mobilization strategy.
Review the economic implications of plerixafor plus filgrastim versus chemotherapy plus filgrastim use.

Self Assessment Questions:
Which of the following medications can be used to mobilize hematopoietic stem cells from bone marrow?
What is a major limitation to the use of plerixafor for stem cell mobilization?
Status epilepticus is a medical emergency which can result in neurologic injury after 30 minutes of seizure activity and is associated with significant morbidity and mortality. Benzodiazepines have established efficacy as first-line therapy in status epilepticus, however, are only successful in 55-65% of patients. Patients who fail benzodiazepine therapy will require additional therapies, for which there is limited information regarding the appropriate selection of a second-line agent.1-4

Evaluation of phenytoin, levetiracetam, and lacosamide use in status epilepticus at the Cleveland Clinic will help identify appropriate second-line therapy.

Methodology:
A non-interventional, retrospective chart review to compare the efficacy of phenytoin, levetiracetam, and lacosamide in terminating seizures within 48 hours of administration. Secondary endpoints include evaluation of time to seizure termination, functional status at discharge and overall survival. All patients of at least 16 years of age with status epilepticus and a definitive time of seizure onset who received a benzodiazepine followed by phenytoin, levetiracetam, or lacosamide were included. Patients who were transferred from an outside facility for which information regarding initial management is unavailable were excluded. Data describing patient demographics, prior seizure history and therapy, presentation and treatment of status epilepticus, and patient outcomes will be collected. Data will be analyzed with descriptive statistics.

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

Learning Objectives:
Recognize the risk factors for poor prognosis in status epilepticus.
Recall the rate of benzodiazepine failure as first-line therapy for status epilepticus.

Self Assessment Questions:
Benzodiazepines fail as first line treatment for status epilepticus in what percent of patients?
Which of the following is a risk factor for poor prognosis in status epilepticus?

Comparision of Phenytoin, Levetiracetam, and Lacosamide Following Benzodiazepine Administration in the Management of Status Epilepticus

Tessa L. Ruble, Christine L. Ahrens, Norman K. So, Mohamed Hegazy, Seth R. Bauer, Simon W. Lam
Cleveland Clinic Foundation, 9500 Euclid Ave, JFN1-442, Cleveland, OH, 44195
overmat@ccf.org

EFFECT OF INSULIN-INDUCED VERSUS SPONTANEOUS HYPOGLYCEMIA ON HOSPITAL MORTALITY IN CRITICALLY ILL PATIENTS

Lina Saliba, PharmD*; Charles H. Cook, MD, FACS, FCCM; Kathleen Dungan, MD; Anthony T. Gerlach, PharmD, BCPS, FCCM; Bruce Doepker, PharmD, BCPS; Kyle Porter, MS; and Claire V. Murphy, PharmD, BCPS
The Ohio State University Medical Center, 410 West 10th Avenue, 368 Doan Hall, Columbus, OH, 43210
lina.saliba@osumc.edu

Based on current evidence, there is no standard target blood glucose (BG) range for glycemic control in the critically ill. However, in order to identify an effective target BG range that optimizes outcomes and can be achieved safely, it must first be determined whether insulin-induced hypoglycemia carries the same risk as spontaneous hypoglycemia. This study aims to determine whether insulin-induced and spontaneous hypoglycemia have a different impact on hospital mortality in the critically ill.

This is a single-center, retrospective cohort study including adult patients admitted to The Ohio State University Medical Center medical or surgical intensive care unit (ICU) between December 1, 2010 and August 31, 2011. Patients were then categorized as either insulin-induced hypoglycemia, spontaneous hypoglycemia, or euglycemia. Hypoglycemia occurring as a consequence of glucose-lowering therapy was considered insulin-induced while all other causes such as hypoglycemia as a manifestation of carbohydrate metabolism abnormalities were characterized as spontaneous. Mild, moderate, and severe hypoglycemia are defined as BG 55-69, 40-55, and <40 mg/dL, respectively. Patients were categorized as euglycemic if they maintained all blood glucose measurements greater than or equal to 70 mg/dL.

The primary analysis will compare the insulin-induced and spontaneous hypoglycemia groups with the primary endpoint of hospital mortality. Multivariate logistic regression analysis will be used to compare the primary endpoint while controlling for other mortality risk factors by adjusting for age, sex, APACHE II score less the age component, admission location and type, and glycemic variability. Secondary analyses of the data will include comparisons of hospital mortality, ICU mortality, ICU and hospital length of stay, and newly initiated dialysis in euglycemic patients compared to each of the two other arms in the study. Hospital mortality between the insulin-induced and spontaneous groups will also be compared with the addition of severity of hypoglycemia as a confounding variable.

Data collection and evaluation are in progress.

Learning Objectives:
Describe the hyperglycemic physiologic stress response in the critically ill
Discuss outcome studies examining hypoglycemia in the critically ill

Self Assessment Questions:
Which of the following is a consequence of hypoglycemia?
In critical illness, there is a downregulation of which of the following?
IMPACT OF PHARMACIST ADDITION TO TRADITIONAL DIABETES EDUCATION TEAM IN A COMMUNITY DIABETES CLINIC

Amy J. Sanchez, PharmD*: Teresa K. Hoffmann, PharmD, BCPS, BCACP, CDE, CLS; Suzanne M. Marques, PharmD, BCPS, CACP
St. Rita's Medical Center, 770 W. High St. Ste 450, Lima, OH, 45801
ajsanchez@health-partners.org

Most current American Diabetes Association (ADA) clinic models include a nurse educator, dietician and medical director. However, the role of a pharmacist as part of this health care team is becoming more definitive and the ability to provide more direct patient care and clinical activities is expanding. The purpose of this study is to assess the impact of pharmacist medication interventions, in addition to standard care, in patients enrolled in an ADA recognized diabetes education clinic.

This study was approved by the Institutional Review Board. Patients enrolled in the diabetes education program of The Health Management Group at St. Ritas Medical Center who meet specific inclusion/exclusion criteria will have clinic visits with the pharmacist to manage their disease state and drug therapy. Patients will be identified based upon inclusion/exclusion criteria by Diabetes Clinic reports. Identified patients will be scheduled for a follow up appointment with a pharmacist. The records and privacy of the patients will be ensured for the patients by HIPAA. Services provided by the pharmacist will range from education and counseling to managing the pharmacotherapy related to diabetes. The study will evaluate obtainment of ADA treatment goals for patients enrolled in an ADA recognized diabetes education clinic. Each patient will serve as their own control. This data will be compared to that of the current clinic model and the results will be analyzed using a paired t-test. Patient satisfaction will also be measured after the appointment with a pharmacist utilizing a patient satisfaction survey which will serve only as descriptive data.

At this time, data collection is not complete and preliminary results and conclusions are not available.

Learning Objectives:
Define the impact of pharmacist-led appointments, in addition to standard care, in patients enrolled in an ADA recognized diabetes education clinic by evaluating the obtainment of ADA treatment goals.
Report patient satisfaction after involvement with pharmacy clinic

Self Assessment Questions:
What does the most current ADA clinic model consist of?
What are the ADA recommended treatment goals?

PHYSICIAN PERCEPTIONS OF THE CURRENT LEVEL OF PHARMACY PRACTICE IN A COMMUNITY TEACHING HOSPITAL

*Christopher P Shelby, PharmD, James E Reissig, PharmD, Jessica L Boss, PharmD, BCPS, Kathleen D Donley, RPh, MBA, Tim R Brown, PharmD, BCACP
Akron General Medical Center, 400 Wabash Avenue, Akron, OH, 44307
christopher.shelby@akrongeneral.org

Purpose:
Current pharmacy practice model initiatives are promoting an increased collaboration between pharmacists and physicians in order to provide safe, effective, efficient, and accountable care. Limited studies have been done to assess physicians expectations of pharmacist roles in collaborative practice. The objective of this study is to determine whether the current level of pharmacy practice within our health system meets our physicians expectations.

Methods:
Prior to commencement, this study was submitted to the Institutional Review Board for approval. A mixed-mode survey was distributed to physicians for self-administration. All resident physicians and physicians with active medical staff privileges at AGMC were included. Those physicians who do not see an average of > 2 patients/month or those physicians without an active email and mailing address were excluded. First contact was through email and a web-based survey. Second contact was through a mailed paper survey identical to the web-based survey. The following data was collected from the survey: current position (i.e. Private practice, hospitalist, etc.), years in practice, practice area, interactions with pharmacists, and perceptions on experiences with and expectations of pharmacists. All data was recorded without specific identifiers and maintained in a password protected file. Data will be analyzed descriptively as a whole and then analyzed comparatively by the independent variables. The primary outcome is to describe the difference between physicians experiences with and expectations of pharmacy practice within our health system meets our physicians expectations.

Results and Conclusions:
Data analysis in progress, results to be presented

Learning Objectives:
Describe the role of the physician in determining pharmacist involvement in an interprofessional care team
Discuss areas where Akron General Medical Center pharmacists are or are not meeting physician expectations of pharmacy services

Self Assessment Questions:
According to the American College of Physician-American Society of Internal Medicine:
Which of the following statements is false? Akron General Medical Center (AGMC) physicians:
PHARMACY RESIDENTS PURSUIT OF ACADEMIC POSITIONS

Tiffany R. Shin, PharmD*; Colleen A. Clark Dula, PharmD; Jennifer L. Rodis, PharmD, BCPS; Bella H. Mehta, PharmD; Maria C. Pruchnicki, PharmD, BCPS, CLS
The Ohio State University College of Pharmacy,500 W 12th Ave.,Columbus, OH, 43210
shin.171@osu.edu

Background: Growth of residency programs and demand for pharmacy practice faculty may make pharmacy residents ideal candidates for faculty recruitment.

Purpose: Determine the percentage of pharmacy residents that accept an academic position at the end of residency, identify factors influencing residents decision to pursue/not pursue a career in academia, and compare perceived characteristics of the ideal position early in residency training versus characteristics of positions accepted upon completion.

Methods: Study includes PGY-1 and PGY-2 pharmacy residents, and consists of an electronic pre-/post-survey with matched responses. Survey invitations were disseminated via residency directors in October 2011; residents who consented to participate in pre-survey and provided an email address will be included in May 2012 follow-up survey. Job preferences, characteristics of the ideal job, interest in academia, and experience in teaching and research were evaluated in pre-survey. End-of-residency survey will focus on job selection, including applied and accepted positions, with specific questions regarding the pursuit of academic positions and characteristics of positions accepted by residents.

Results: A total of 932 pharmacy residents completed the pre-survey (71.5% PGY-1, 26.3% PGY-2, 2.2% combined program). 46.8% of residents agreed they were seriously considering a position in academia, 30.4% were neutral, and 22.9% disagreed. A formal training program in teaching was available to 70.9% of residents, while only 26.3% had a formal training program in precepting and 16.1% in research. The top three settings where residents wanted to work upon completion of residency were inpatient clinical (67%), academia (39%), and ambulatory care (31%). Top characteristics of the ideal job were collaboration with others (62.1%), variety of daily activities (45.2%), and free time for leisure/family (34%).

Conclusions: Post-graduate trainees enter residencies identifying a high interest in faculty positions. Training in teaching is common, however programs may improve resident preparedness by offering formal training in precepting and research.

Learning Objectives:
Discuss the reasons for vacant faculty positions at colleges and schools of pharmacy.
Describe the training that pharmacy residents receive to make them ideal candidates for faculty positions.

Self Assessment Questions:
What was the most common reason faculty positions remained vacant during the 2009 - 2010 Academic year?
According to the initial survey of pharmacy residents, what percent of residents have the opportunity to receive formal training in teaching through their residency program?

VITAMIN D THERAPY FOR ROSUVASTATIN-INDUCED MYALGIAS

Jenna L Slattery, PharmD*, Tonimarie Swartz, PharmD, CLS; Alice Leone, RPh, and Jose Ortiz, MD
Louis Stokes Cleveland VAMC,10701 East Boulevard, Cleveland, OH,44106
jenna.slattery@va.gov

Purpose: Myositis and myalgia are common adverse effects associated with statins and are a major cause for discontinuation of therapy. The mechanism of statin induced muscle injury is not well understood. One hypothesis is that a deficiency in vitamin D levels leads to decreased nuclear vitamin D receptor gene transcription of proteins that prevent subsarcolemmal rupture and are needed for repair of the T-tubular system inside muscle cells. Research has shown that a strong association exists between low serum levels of vitamin D (25(OH)D) and myositis. Upon supplementation in vitamin D deficient patients, improvements can be seen in muscle strength and reduced falls. This is hypothesized to be due to a reduction in type II muscle fiber atrophy from deficiency in vitamin D.

Objective: To assess the ability to tolerate rosuvastatin after adequate vitamin D replacement therapy in patients who had an adverse drug reaction of myalgia with rosuvastatin and were vitamin D deficient.

Methodology: This retrospective chart review will be conducted on patients at Louis Stokes Cleveland VA Medical Center who had a reaction of myalgia, muscle pain, muscle weakness, muscle spasm, cramping, or joint pain identified with the use of rosuvastatin between August 1, 2009 and August 1, 2011. Patients must have received vitamin D therapy with cholecalciferol or ergocalciferol after the baseline 25(OH)D level was drawn. A second 25(OH)D level must be documented as an increase of greater than or equal to 10 ng/mL from the lowest previous 25(OH)D level. After receiving vitamin D supplementation patients must have been reinitiated on rosuvastatin therapy or had an increase in rosuvastatin dose or frequency attempted. Both the primary and secondary outcomes will be assessed by logistic regression analysis using Microsoft Excel software.

Results and conclusions: Results pending.

Learning Objectives:
Discuss the current management of myalgias associated with statin therapy.
Describe the hypothesis for vitamin D supplementation leading to a reduction in statin associated myalgias.

Self Assessment Questions:
A common adverse effect of statin therapy is Vitamin D supplementation in patients with low serum vitamin D levels can lead to
IMPACT OF RENAL FUNCTION ON THE OCCURRENCE OF HYPOCALCEMIA IN PATIENTS WITH BONE METASTASES FROM SOLID TUMORS TREATED WITH DENOSUMAB FOR THE PREVENTION OF SKELETAL-RELATED EVENTS

*Michael Smith, PharmD; Sherry Vogt, PharmD, BCPS; Mike Berger, PharmD, BCOP; Niesha Griffith, RPh, MS, FASHP; J. Paul Monk III, MD; Amy Lehman, MAS
The Ohio State University Medical Center, 410 West 10th Ave, Room 368 Doan Hall, Columbus, OH, 43210
Michael.Smith2@osumc.edu

Purpose: Bone metastases are a frequent complication of solid cancers including breast, prostate, and lung cancers. Control of these complications is clinically important, because they cause skeletal-related events, including pathological fractures that impair quality of life, shorten survival, and increase healthcare costs. Denosumab is a human IgG2 monoclonal antibody that binds human RANKL, which inhibits osteoclast activity. It was approved by the FDA for the prevention of skeletal-related events in patients with bone metastases from solid tumors in November 2010. Hypocalcemia is an adverse effect known to be caused by denosumab, but the risk of hypocalcemia at the recommended dosing schedule of 120 mg every four weeks has not been compared between patients with varying degrees of renal function.

Methods: Retrospective data will be collected for patients with bone metastases from a primary solid tumor who have been treated with at least one dose of denosumab for the prevention of skeletal-related events. All patients receiving the medication for this purpose will be included, regardless of previous bisphosphonate usage or prior skeletal-related events. The study population will be stratified into two groups according to renal function, based upon creatinine clearance of greater than or less than 60 mL/min using the Cockroft-Gault equation. The incidence of hypocalcemia will be compared between the two groups.

Results/conclusions: Results and conclusions are pending and will be presented at a later date.

Learning Objectives:
Identify approved indications and uses for the RANK ligand inhibitor denosumab
Describe denosumab dosing and anticipated adverse effects in the setting of renal dysfunction

Self Assessment Questions:
Denosumab is approved by the FDA for which of the following indications?
According to the medication package insert, when used for the prevention of skeletal-related events associated with bone metastases, which of the following creatinine clearance thresholds is the minim

EFFECT OF A URINARY TRACT INFECTION STEWARDSHIP PROGRAM IN AN EMERGENCY DEPARTMENT

Andrea H. Son, Pharm.D*; Nina Naeger Murphy, Pharm.D.BCPS; Clinton Fox; Michelle Hecker, M.D.
MetroHealth Medical Center, 2500 MetroHealth Drive, Cleveland, OH, 44109
ason@metrohealth.org

Purpose: Urinary tract infections (UTIs) are one of the leading causes of emergency department (ED) visits in the United States. The ED at MetroHealth Medical Center averages 100,000 visits annually during which approximately 120 patients per month are diagnosed with uncomplicated cystitis and uncomplicated pyelonephritis. On December 30, 2010, MetroHealth Medical Center implemented an electronic UTI order set in the ED to increase adherence to the Infectious Diseases Society of America (IDSA) 2010 practice guidelines for antimicrobial treatment of acute uncomplicated cystitis and pyelonephritis in women. Preliminary results showed that the percentage of patients receiving ciprofloxacin decreased from 53 to 20% and adherence to the IDSA guidelines increased from 41 to 75%. However, a number of patients were either found to have an alternative diagnosis or did not meet study criteria for cystitis and pyelonephritis. The primary objectives of this study are to (1) determine if a UTI stewardship intervention will improve the appropriateness of treatment for uncomplicated UTIs and to (2) reduce antimicrobial therapy for conditions not meeting study definitions for uncomplicated cystitis and pyelonephritis. The secondary objective is to assess the compliance rate to the previous ED UTI order set.

Methodology: This study was approved by Institutional Review Board. Study population will include women ages 18 - 65 years. A retrospective chart review will be conducted to collect baseline data during the 4-8 weeks prior to the intervention (100 cases). The intervention will occur over an 8 week time period Post-intervention data will be collected during the 4-8 weeks after the intervention (100 cases). Data collected will include demographic information, laboratory test results, past medical history, documented signs and symptoms, prescribed antibiotic therapy, and adverse events. Appropriateness of UTI testing and treatment will be determined.

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

Learning Objectives:
List the A-1 recommended antibiotic therapies for treatment of acute uncomplicated cystitis and pyelonephritis in women based on Infectious Diseases Society of America (IDSA) 2010 practice guidelines
State the classic signs and symptoms of uncomplicated cystitis and pyelonephritis

Self Assessment Questions:
Which of the following is a first line treatment for uncomplicated cystitis based on the IDSA guidelines?
Which of the following is a classic sign/ symptom of pyelonephritis
ASSOCIATION OF DIABETES MELLITUS & HYPERLIPIDEMIA WITH THE USE OF OLANZAPINE VERSUS HALOPERIDOL
Rachel A. Springer PharmD*, Stanley Erk Ph.D, Stella Nwokoro PharmD
Dayton VA Medical Center, 9595 Saddlebrook Lane, Apt 2C, Miamisburg, OH, 453426137
Rachel.Springer@va.gov

Previous research has documented that in addition to psychiatric barriers, patients diagnosed with schizophrenia are at a higher risk than the general population of developing metabolic abnormalities. Considering the serious metabolic effects of atypical antipsychotics, the current APA/ADA Metabolic Monitoring Guidelines and the implementation of Veterans Integrated Service Network (VISN) 10 monitoring parameters, it is important to evaluate if appropriate monitoring and treatment are being conducted. This study will determine the prevalence of development of diabetes mellitus and hyperlipidemia with the treatment of olanzapine versus haloperidol in schizophrenia patients, and to determine if appropriate metabolic monitoring guidelines are being followed.

A retrospective study will be conducted using the Dayton Veterans Affairs Medical Center database. Patients with a diagnosis of schizophrenia who are prescribed olanzapine or haloperidol from January 1, 2009 to January 1, 2011 will be evaluated for inclusion. Patients were included in the study if they received olanzapine or haloperidol for at least 3 months of treatment during the study period. The date of the first prescription for either medication will be considered the patients baseline date. Patients will be excluded for receiving an atypical antipsychotic prescription prior to study baseline, a diagnosis of diabetes mellitus prior to study baseline, a diagnosis of hyperlipidemia, and receiving less than 3 months of treatment of olanzapine or haloperidol. During the study diabetes and hyperlipidemia will be identified by either diagnosis of International Classification of Diseases or by prescriptions for diabetic and hyperlipidemia medications. Monitoring parameters including hemoglobin A1c and or fasting plasma glucose (FPG) and a fasting lipid panel to be done at baseline and 12 weeks for both disease states. Hemoglobin A1c and or FPG are to be conducted annually.

Learning Objectives:
Define the relationship in the development of diabetes and hyperlipidemia in patients with schizophrenia at the Dayton VA Medical Center.
Identify the results of the study to develop a better monitoring system for patients with schizophrenia.

Self Assessment Questions:
Currently there are metabolic monitoring parameters for patients on atypical antipsychotics set forth by:
Metabolic parameters affected by atypical antipsychotics include the following:

EVALUATION OF QUETIAPINE IN THE TREATMENT OF DELIRIUM IN MECHANICALLY VENTILATED CRITICALLY ILL SURGICAL PATIENTS: A RETROSPECTIVE CASE-CONTROLLED STUDY
Madeline J. Stephens PharmD*, Neil E. Ernst PharmD, Eric W. Mueller PharmD; UC Health - University Hospital, 324 Goodman Ave. ML 0741, Cincinnati, OH, 45208
UC Health-University Hospital, 234 Goodman Street, Cincinnati, OH, 452192316
madeline.stephens@uchealth.com

Purpose:
Delirium in surgical critically ill ventilated patients is an independent risk factor for mortality. Current Society of Critical Care Medicine guidelines recommend using haloperidol for the treatment of delirious ICU patients. Atypical antipsychotics, specifically quetiapine, have fewer side effects compared to haloperidol. Quetiapine has demonstrated efficacy for the treatment of delirium in critically ill patients, but, data are limited by sample size and generalizability. The purpose of this study is to evaluate the effectiveness of quetiapine for the treatment of delirium in mechanically ventilated, critically ill, surgical patients. Specifically, to determine if patients who receive quetiapine spend less time in delirium, more often and more timely resolve delirium, and have fewer daily episodes of delirium than those who do not receive quetiapine.

Methods:
This single-center, retrospective, case-controlled study, includes mechanically ventilated critically ill surgical patients at UC Health - University hospital. Patients were identified using the 2009-2011 Surgical Intensive Care Unit Critical Outcomes patient tracking database. All patients who were mechanically ventilated and delirious were evaluated for inclusion in the study. Once the entire cohort of mechanically ventilated, delirious, critically ill surgical patients was identified, patients were divided into two groups: 1) those treated with quetiapine, and 2) those not treated with quetiapine. The primary outcome was to determine the number of delirium free days in the two groups. Secondary outcomes included: amount per day of anti-delirium pharmacotherapy discontinuation, including ECG changes, movement disorders, or over-sedation. Between 29-64 patients were needed to detect a difference of three delirium free days between the two groups.

Results/Conclusions
Data are currently being reviewed, collected, and analyzed. Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Describe the complications associated with delirium and list the main risk factors for delirium in critically ill patients.
Review anti-psychotic pharmacotherapy treatments in delirious critically ill patients.

Self Assessment Questions:
Of the following, which has been shown to be an independent risk factor for delirium in critically ill patients?
What benefit may quetiapine have compared to other atypical antipsychotic in the treatment of delirium in critically ill patients.

VERSUS HALOPERIDOL
Rachel A. Springer PharmD*, Stanley Erk Ph.D, Stella Nwokoro PharmD
Dayton VA Medical Center, 9595 Saddlebrook Lane, Apt 2C, Miamisburg, OH, 453426137
Rachel.Springer@va.gov

Previous research has documented that in addition to psychiatric barriers, patients diagnosed with schizophrenia are at a higher risk than the general population of developing metabolic abnormalities. Considering the serious metabolic effects of atypical antipsychotics, the current APA/ADA Metabolic Monitoring Guidelines and the implementation of Veterans Integrated Service Network (VISN) 10 monitoring parameters, it is important to evaluate if appropriate monitoring and treatment are being conducted. This study will determine the prevalence of development of diabetes mellitus and hyperlipidemia with the treatment of olanzapine versus haloperidol in schizophrenia patients, and to determine if appropriate metabolic monitoring guidelines are being followed.

A retrospective study will be conducted using the Dayton Veterans Affairs Medical Center database. Patients with a diagnosis of schizophrenia who are prescribed olanzapine or haloperidol from January 1, 2009 to January 1, 2011 will be evaluated for inclusion. Patients were included in the study if they received olanzapine or haloperidol for at least 3 months of treatment during the study period. The date of the first prescription for either medication will be considered the patients baseline date. Patients will be excluded for receiving an atypical antipsychotic prescription prior to study baseline, a diagnosis of diabetes mellitus prior to study baseline, a diagnosis of hyperlipidemia, and receiving less than 3 months of treatment of olanzapine or haloperidol. During the study diabetes and hyperlipidemia will be identified by either diagnosis of International Classification of Diseases or by prescriptions for diabetic and hyperlipidemia medications. Monitoring parameters including hemoglobin A1c and or fasting plasma glucose (FPG) and a fasting lipid panel to be done at baseline and 12 weeks for both disease states. Hemoglobin A1c and or FPG are to be conducted annually.

Learning Objectives:
Define the relationship in the development of diabetes and hyperlipidemia in patients with schizophrenia at the Dayton VA Medical Center.
Identify the results of the study to develop a better monitoring system for patients with schizophrenia.

Self Assessment Questions:
Currently there are metabolic monitoring parameters for patients on atypical antipsychotics set forth by:
Metabolic parameters affected by atypical antipsychotics include the following:

EVALUATION OF QUETIAPINE IN THE TREATMENT OF DELIRIUM IN MECHANICALLY VENTILATED CRITICALLY ILL SURGICAL PATIENTS: A RETROSPECTIVE CASE-CONTROLLED STUDY
Madeline J. Stephens PharmD*, Neil E. Ernst PharmD, Eric W. Mueller PharmD; UC Health - University Hospital, 324 Goodman Ave. ML 0741, Cincinnati, OH, 45208
UC Health-University Hospital, 234 Goodman Street, Cincinnati, OH, 452192316
madeline.stephens@uchealth.com

Purpose:
Delirium in surgical critically ill ventilated patients is an independent risk factor for mortality. Current Society of Critical Care Medicine guidelines recommend using haloperidol for the treatment of delirious ICU patients. Atypical antipsychotics, specifically quetiapine, have fewer side effects compared to haloperidol. Quetiapine has demonstrated efficacy for the treatment of delirium in critically ill patients, but, data are limited by sample size and generalizability. The purpose of this study is to evaluate the effectiveness of quetiapine for the treatment of delirium in mechanically ventilated, critically ill, surgical patients. Specifically, to determine if patients who receive quetiapine spend less time in delirium, more often and more timely resolve delirium, and have fewer daily episodes of delirium than those who do not receive quetiapine.

Methods:
This single-center, retrospective, case-controlled study, includes mechanically ventilated critically ill surgical patients at UC Health - University hospital. Patients were identified using the 2009-2011 Surgical Intensive Care Unit Critical Outcomes patient tracking database. All patients who were mechanically ventilated and delirious were evaluated for inclusion in the study. Once the entire cohort of mechanically ventilated, delirious, critically ill surgical patients was identified, patients were divided into two groups: 1) those treated with quetiapine, and 2) those not treated with quetiapine. The primary outcome was to determine the number of delirium free days in the two groups. Secondary outcomes included: amount per day of anti-delirium pharmacotherapy discontinuation, including ECG changes, movement disorders, or over-sedation. Between 29-64 patients were needed to detect a difference of three delirium free days between the two groups.

Results/Conclusions
Data are currently being reviewed, collected, and analyzed. Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Describe the complications associated with delirium and list the main risk factors for delirium in critically ill patients.
Review anti-psychotic pharmacotherapy treatments in delirious critically ill patients.

Self Assessment Questions:
Of the following, which has been shown to be an independent risk factor for delirium in critically ill patients?
What benefit may quetiapine have compared to other atypical antipsychotic in the treatment of delirium in critically ill patients.
COMPARISON OF PROTHROMBIN COMPLEX CONCENTRATES AND RECOMBINANT ACTIVATED FACTOR VII FOR WARFARIN-ASSOCIATED INTRACRANIAL HEMORRHAGE: A RETROSPECTIVE CASE MATCHED STUDY

Andrew Stivers, PharmD.* Pamela Buschur, PharmD, BCPS, Lorrie Burns, PharmD.
Riverside Methodist Hospital, 4124 Times Square Blvd, Dublin, OH 43016
astiver2@ohiohealth.com

Background:
Warfarin therapy is widely utilized for prevention of thromboembolic events in patients with atrial fibrillation, a history of deep vein thrombosis and pulmonary embolism, and mechanical heart valve replacement. Warfarin-related intracerebral hemorrhage occurs 8-10 times more frequently in patients receiving warfarin and imparts a significant increase in 30-day mortality. Medications utilized to correct the international normalized ratio (INR) have been shown to improve outcomes in this patient population.

Objective:
The purpose of this study is to compare the effectiveness of prothrombin complex concentrates (PCC) and activated factor VII (rFVIIa) at reducing the INR to less than 1.4. Secondary outcomes that will be measured include comparison of mortality, length of stay, evidence of worsening ICH, and improvement in Glasgow Coma Scale score. Additionally, this study will evaluate the effectiveness of the new Prothrombin Complex Concentrates for Warfarin Induced Intracranial Hemorrhage Physician Orders dosing protocol at achieving an INR <1.4.

Methodology:
A retrospective, single-center, case-matched study will be conducted at Riverside Methodist Hospital in Columbus, Ohio. All hospitalized patients initiated on the PCC between July 1, 2011 and December 31, 2011 with a confirmed ICH who were receiving warfarin therapy at the time of the event will be included. Exclusion criteria include individuals less than 18 years of age and pregnant patients. Patients will be case-matched for age, baseline INR, and admission GCS score. Case-matched patients who received recombinant activated factor VII (rFVIIa) for a confirmed ICH who were receiving warfarin therapy at the time of the event will be included as the comparator group. Patients from the rFVIIa comparator group will be included until a 2:1 (rFVIIa:PCC) case-match is complete. Specific case match groups will be defined upon completion of the PCC group data collection.

Results: In progress.

Learning Objectives:
- Review the risks associated with oral anticoagulation.
- Discuss the role of prothrombin complex concentrates and recombinant activated factor VII for management of warfarin-related intracerebral hemorrhage.

Self Assessment Questions:
The risk of warfarin-related intracerebral hemorrhage is increased in:

The 2010 American Stroke Association practice guidelines recommend which of the following management strategies for intracerebral hemorrhage?

MEDICATION ERRORS WITH PARENTERAL NUTRITION: IMPACT OF INGREDIENT SHORTAGES
Michael Storey, PharmD*, Robert Weber, PharmD, MS, BCPS, FASHP, Kelly Besco, PharmD, FISMP, Stuart Beatty, PharmD, BCPS, Kumiko Aizawa, MS, Jay Mirtallo, MS, BCNSP, FASHP
The Ohio State University Medical Center, 99 Price Ave, Columbus, OH 43201
mike.storey@osumc.edu

Background:
Ingredient shortages have a significant impact on parenteral nutrition (PN) safety. Due to a lack of appropriate alternatives for PN therapy, the utilization of unfamiliar products or systems has risen and in some instances has led to harmful medication errors. Shortages have affected nearly every component of PN in recent years. The relationship of PN ingredient shortages to harmful medication errors has not been formally evaluated. This study characterizes PN medication errors and correlates them with recent medication shortages, with a particular interest in preventable events with harm (NCC-MERP Index E-I) that occurred as a result of PN ingredient shortage.

Methods:
Medication errors involving PN that were reported to the national, anonymous reporting MED-MARX database between May 2009 and April 2011 were reviewed. All errors were categorized by ingredient, node, and severity. The categorization of the reported events was validated by an expert panel. A timeline of PN ingredient shortages was collected, and compared with the PN errors to determine if events could have been directly caused by an ingredient shortage. This information was used to determine the prevalence and change in harmful PN events during periods of shortage, determining if a statistically significant difference exists in errors during shortages as compared with a control period (i.e., no shortage).

Results:
Preliminary data analyzed 1441 PN MED-MARX reports, including 20 that caused harm (1.4%); an estimated 105 errors reviewed are associated with drug shortages, with a considerable number of errors attributable to changes in practice associated with intravenous fat emulsions. The most common types of errors were improper dose, omission, and prescribing. Ordering, preparation, and administration nodes were associated with harmful errors. Drug shortages with PN ingredient may create opportunities for error, including the possibility of patient harm.

Learning Objectives:
- Describe the impact that drug shortages can have on the quality of patient care.
- Review the process for medication error reporting for parenteral nutrition.

Self Assessment Questions:
Which of the following ingredients of parenteral nutrition has not experienced a significant shortage since 2009?
The NCC-MERP Index rates the severity of errors on which scale?
ASSOCIATION BETWEEN VANCOMYCIN-RESISTANT ENTEROCOCCUS COLONIZATION AND CLINICALLY SIGNIFICANT VANCOMYCIN-RESISTANT ENTEROCOCCUS INFECTION IN CRITICALLY ILL PATIENTS: A RETROSPECTIVE COHORT STUDY
Sheila C. Takieddine, PharmD*; Neil E. Ernst, PharmD; Maria Guido, PharmD, BCPS; Eric W. Mueller, PharmD, FCCM
UC Health-University Hospital,234 Goodman St.,ML 0740,Cincinnati,OH,45219
Sheila.Takieddine@UCHealth.com

Background
Clinical decisions (e.g., contact isolation; empiric antibiotic therapy) may be based on the rectal colonization status of vancomycin-resistant Enterococcus spp. (VRE) in critically ill patients. Medical (MICU) and surgical (SICU) intensive care unit patients at UC Health-University Hospital in Cincinnati, Ohio who are admitted from an outside institution are routinely screened for rectal VRE colonization. This study will evaluate the association between VRE colonization and clinically significant VRE infection. Results from this study may support the development of guidelines for empiric antibiotic therapy in patients colonized with VRE.

Methods
This is an investigator-initiated, single-center, retrospective study. All adult MICU and SICU patients at University Hospital with a documented rectal screen for VRE between January 2010 and August 2011 will be included.

The primary outcome is the incidence of clinically significant VRE infection in patients colonized versus those not colonized with VRE. Secondary outcomes include predictive utility (sensitivity, specificity, positive and negative predictive values) of colonization for infection, intensive care unit length of stay, hospital length of stay, and rates of mortality between groups. This study also will evaluate the rate of unnecessary VRE-related antibiotic therapy and identify independent risk factors for VRE infection. A sample size of 220 patients will be required to find an absolute difference of 10% of VRE infection between the two groups with a power level of 80% and a one-tailed significance level of 0.05. Hypothesis testing will be done using Fischers exact test, chi square test, Wilcoxin rank-sum or students t-test as appropriate.

Results
Data analysis is currently being conducted, and results are pending.

Learning Objectives:
Identify risk factors for the development of clinically significant VRE infection in patients who are colonized with VRE
Recognize when it is clinically appropriate to empirically treat patients with VRE-active antibiotic therapy when they develop signs and symptoms of infection

Self Assessment Questions:
What is the mechanism of acquired vancomycin resistance in Enterococcus species?
Which antibiotic is appropriate to use for the treatment of a VRE infection?

SMOKING CESSATION PRACTICES OF COMMUNITY AND AMBULATORY CARE PHARMACISTS RELATED TO DECREASED STATE FUNDED RESOURCES
Rachel M. Thomas, Pharm.D.*; Maria C. Fruchnicki, Pharm.D., BCPS, CLS; Tiffany R. Shin, Pharm.D., Christopher G. Green, Pharm.D.
The Ohio State University College of Pharmacy,500 West 12th Ave,Columbus,OH,43210
thomas.2552@osu.edu

Objectives:
Smoking prevalence in Ohio was 20.3% in 2009, slightly above national average. State funding has declined for the Ohio Tobacco Quit Line (OTQL) as of July 2011. Pharmacists are accessible health care providers and with decreased smoking cessation resources, patients may be likely to seek them as providers of smoking cessation education. Our objectives are to determine 1) how community/ambulatory pharmacists provide smoking cessation services and 2) extent of pharmacists prior utilization of OTQL. Secondary objectives are to determine influence of pharmacist clinical training and awareness/perceptions regarding changes in smoking cessation resources. Investigators will assess pharmacists' interest in smoking cessation education.

Methods:
An online survey will be delivered to community/ambulatory care pharmacists using the Dillman Tailored Design Method. Pharmacists licensed and practicing in the state of Ohio with a valid e-mail address on file with the Board of Pharmacy will be included. It will be open from January-February 2012 with two reminder emails for non-respondents. Data collection will include current practice setting, level and type of professional training, use of clinical guidelines, frequency of smoking cessation counseling, utilization of OTQL, and preferences on smoking cessation education. Demographics and perceptions regarding decreased funding for OTQL will be assessed. Questions will include multiple choice, Likert-type, and open-ended responses. Data will be analyzed using descriptive statistics and chi-square and Wilcoxon rank-sum tests for categorical and ordered responses, respectively.

Preliminary Results:
Results will be evaluated to determine how Ohio community/ambulatory care pharmacists provide smoking cessation in their practice. The perceived impact of reduced availability of OTQL will be summarized. Associations between demographics and perceptions regarding OTQL will be compared to smoking cessation practices. Results may identify opportunities for increased pharmacist involvement in smoking cessation and opportunities to enhance services in this area. Potential needs may include expansion of smoking cessation education and resources for pharmacists.

Learning Objectives:
Identify the patient populations that are still eligible to use the Ohio Tobacco Quit Line
Recall the current smoking cessation therapies

Self Assessment Questions:
As of July 1, 2011, which patient population is still eligible to utilize the Ohio Tobacco Quit Line (800-QUIT-NOW)?
Which smoking cessation product requires a prescription?
PHARMACIST IMPACT ON PATIENT CARE AND SATISFACTION AT AN OUTPATIENT INFUSION CENTER

Sara Toflinski*, Pharm.D., PGY1 Pharmacy Practice Resident; Lauryl Kristufek, Pharm.D., BCPS, CACP, Clinical Pharmacy Coordinator
Mercy St. Vincent Medical Center, 110 East Perry, Walbridge, OH 43465-9798
sara_toflinski@mhsnr.org

Purpose:
Interaction with a pharmacist has a positive effect on patient satisfaction and provides improved management of adverse events experienced with chemotherapy. This prospective study will evaluate the impact of a pharmacist as part of an interdisciplinary team at an ambulatory infusion center. The primary objective is to improve patient satisfaction at the outpatient infusion center through medication education and management of adverse reactions.

Methods:
Patients 18 to 90 years old receiving chemotherapy at Mercy St. Charles infusion center from October 1, 2011 to November 30, 2011 were included. Prior to implementation, patients were administered a survey with cover letter for consent. The survey focused on satisfaction with pharmacy services as well as patient rating of nausea and pain using a 5-point Likert-type scale. Upon completion of pre-implementation surveys patients met with a pharmacist to discuss chemotherapy and proper management of adverse events. After meeting with the pharmacist, patients were asked to complete a follow up survey at the next appointment to measure satisfaction, nausea and pain ratings after applying information discussed with the pharmacist.

Results/Conclusion:
Thirty patients completed the pre-intervention survey. Eighty percent had not received counseling from a pharmacist while at the outpatient infusion center and satisfaction averaged 2.99. Pain scores averaged 2.95 and nausea scores averaged 2.7 pre-intervention. Twenty-two patients participated in the follow-up survey, response rate 73.3%. About 78% reported speaking with a pharmacist at the infusion center, satisfaction rated 4.57. On follow up, average pain score was 2.92, a decrease of 7.5%. Average nausea scores decreased to 2.7 on follow up, a decrease of 24.1%. Patient counseling by a pharmacist increased patient satisfaction and decreased nausea and pain ratings significantly. Based on the findings of the study pharmacists should be incorporated into the multidisciplinary team in outpatient infusion centers.

Learning Objectives:
Identify areas for improvement in patient care at ambulatory chemotherapy clinics by incorporating a pharmacist as part of the interdisciplinary team.
Explain how a pharmacist can impact patient satisfaction over the course of chemotherapy treatment.

Self Assessment Questions:
Which of the following is the best way a pharmacist can positively impact management of side effects in chemotherapy patients?
A pharmacist can contribute to patient satisfaction by which of the following

SAFETY OF MONITORING UNFRACTIONATED HEPARIN INFUSIONS IN CRITICALLY ILL PATIENTS USING ANTI-FACTOR XA VERSUS APTT ASSAYS

Abigail L. Tucker* PharmD; Michael W. Cunningham PharmD; Neil E. Ernst PharmD; Eric W. Mueller PharmD;
UC Health-University Hospital, 234 Goodman St, Ml 0740, Cincinnati, OH, 45219
abigail.tucker@uchealth.com

Purpose:
Unfractionated heparin (UFH) is used in a variety of situations for anticoagulation of critically ill patients, including the prevention and treatment of venous thromboembolism. Due to intra-patient variations in clinical response and pharmacokinetics, the management and titration of UFH to therapeutic effect can be difficult, further imbalancing the risk-benefit relationship for this high-alert medication.

Clinical monitoring of the therapeutic effects of heparin is usually performed by either the activated partial thromboplastin time (aPTT) or anti-factor Xa assay. Published studies comparing aPTT and anti-factor Xa assays suggest anti-factor Xa-based protocols may allow faster time to therapeutic anticoagulation and improved maintenance within the therapeutic range. However, no studies to date have specifically compared the safety of these assays for monitoring anticoagulation in critically-ill patients. Since UC Health changed its heparin monitoring protocols from aPTT-based to anti-factor Xa-based in August 2010, the investigators have made several anecdotal observations of discordance between sub-therapeutic and therapeutic anti-factor Xa values paired with very high aPTT values in critically-ill patients who developed major bleeding complications. Due to safety concerns, UC Health has planned a quality assurance project evaluating aPTT and anti-factor Xa monitoring of heparin.

Methods:
This single-center, multi-disciplinary quality assurance project aims to prospectively examine intra-patient variability in matched aPTT and anti-factor Xa levels in 100 consecutive critically-ill and non-critically-ill patients at UC Health University Hospital receiving continuous infusions of UFH. The primary purpose is to examine the incidence of intra-patient discordance and to identify potential predictive measures of that discordance which can be used to develop clinical decision pathways. Secondary clinical outcome measures include incidence of thrombosis as well as significant bleeding.

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

Learning Objectives:
Describe the aPTT and anti-Xa assays commonly used to monitor anticoagulation with unfractionated heparin.
Discuss factors present in critical illness that may interfere with either the aPTT or anti-factor Xa assays for unfractionated heparin monitoring.

Self Assessment Questions:
Which of the following does not interfere with the anti-factor Xa assay?
Antithrombin III deficiency has which of the following effects on the anti-factor Xa assay?
Purpose: The pharmacy profession is evolving from a dispensing oriented model to a patient-centered care model, as a result of the initiative from the American Society of Health-System Pharmacists (ASHP) practice model summit. The Pharmacy Practice Model Initiative (PPMI) is a framework for advancing the health and well-being of patients in hospitals and health systems by developing and disseminating optimal pharmacy services based on the effective use of pharmacists as direct patient care providers. Successful implementation of the PPMI is well documented in academic health care systems, however Hillcrest hospital is a community based non-teaching medical center. The recent implementation of Computerized Physician Order Entry (CPOE) allowed us to evaluate our current order entry and dispensing model and evolve into a nursing unit based order verification model with a focus on patient counseling. To facilitate our PPMI, the staff pharmacists will embark upon a didactic educational program over the next two years. We hypothesize staff pharmacists will demonstrate increased clinical knowledge through didactic education provided by the clinical pharmacy staff. This will allow us to maintain exceptional core measure scores, which will be evaluated as a secondary endpoint.

Methods: This will be a single center, prospective, paired, cross-over study designed to test the change in pharmacist knowledge after didactic education. The primary endpoint will be change in staff pharmacist knowledge, and will be tested by a pre-test and post-test. The primary endpoint will be analyzed by a student paired t-test. To ensure integrity of current core measures, fall outs will be assessed via six sigma u-chart. Data collection time intervals will include three months pre-PPMI and three months post-PPMI.

Results/Conclusions: Data collection and result analysis are currently in progress and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the transition of staff pharmacist roles and responsibilities in regards to nursing unit based order verification model with a focus on patient counseling, and provide background on the management strategy to increase the clinical acumen of the staff pharmacists while maintaining pre-PPMI quality measure scores.
Discuss data regarding the change in staff pharmacist clinical knowledge through didactic education and evaluation with a pre-test and post-test.

Self Assessment Questions:
Where is successful implementation of the Pharmacy Practice Model Initiative (PPMI) documented within literature?
What is the definition of the Pharmacy Practice Model Initiative (PPMI)?
DETERMINATION OF THE TRANSDERMAL ABSORPTION OF CHLORPROMAZINE IN PLURONIC LECITHIN ORGANOGEL (PLO) GEL IN HEALTHY ADULTS

Amanda Suchecki Weiland, PharmD,* Bridget McCrate Protus PharmD, Jason Kimbrel PharmD, Phyllis Grauer, PharmD.
The Ohio State University College of Pharmacy, 500 W. 12th Avenue, Park Hall 157F, Columbus, OH 43210
suchecki.2@osu.edu

Purpose: In recent years, there has been an increase in the use of compounded topical gel formulations to provide an alternative route of administration of medications for symptom management. Transdermal absorption and bioavailability studies of these gel products are lacking. Chlorpromazine is a medication used for the treatment of agitation, delirium and nausea. The objective of this study is to determine the transdermal absorption of chlorpromazine PLO gel in healthy adults.

Methods: This study has been submitted to the Institutional Review Board for approval. Ten healthy adults between 18 and 70 years of age will be recruited. Exclusion criteria include: pregnancy, female participants refusing a urine pregnancy test on study date, individuals allergic to phenothiazines, ethoxy diglycol, lecithin, isopropyl palmitate, Pluronic F-127 gel, or who are currently taking a phenothiazine medication. Each subject will have blood drawn at 0, 1, 2, and 4 hours after chlorpromazine in PLO gel application to the subjects wrist. At each time point, subjects will complete a local and systemic adverse reaction questionnaire. Subjects will be contacted by telephone on the day following chlorpromazine topical gel application for a final assessment of adverse effects. As reported in the literature, the therapeutic concentration of chlorpromazine is approximately 50-300 ng/ml. Primary outcomes include the plasma concentration of drug at each time point. Secondary outcomes include local and systemic adverse reactions.

Results: Analysis of each blood sample will be completed using gas chromatography. The mean plasma concentration (with standard deviation) will be reported at each time point. Conclusion: Determining the absorption of chlorpromazine in PLO gel in healthy adults will help direct pharmacist recommendations for symptom management, thereby improving treatment outcomes and quality of life for patients.

Learning Objectives:
Name the therapeutic concentration range of chlorpromazine.
Describe the most common adverse effects associated with chlorpromazine.

Self Assessment Questions:
The therapeutic concentration range of chlorpromazine is ______ and ______.

The most common adverse effects associated with chlorpromazine are _____ and _____.

EVALUATION OF SCHEDULED IV ACETAMINOPHEN: EFFECT ON OPIOID REQUIREMENTS AND POST-OPERATIVE ANALGESIA IN PEDIATRIC PATIENTS AFTER ANORECTAL MALFORMATION (ARM) REPAIR OR SPINAL FUSION SURGERY

*Heather N. Whitehead, PharmD; Andrea Chamberlain, PharmD, BCPS; Tamara K. Hutson, PharmD; Alexandra Szabova, MD
Cincinnati Children’s Hospital Medical Center, 3333 Burnet Avenue, MLC 15010, Cincinnati, OH 452293026
heather.whitehead@cchmc.org

Background: In 2010, an intravenous formulation of the COX inhibitor, acetaminophen, received FDA approval for the treatment of mild to moderate pain in adults and children 2 years of age and older. Studies in pediatric and adult post-operative patients suggest the use of similar intravenous non-opioid agents such as propacetamol, paracetamol, and ketorolac adjunctively with opioids has the potential to decrease the post-operative use of opioids thus reducing opioid related side effects while improving pain scores.

Purpose: To determine opioid usage in post-operative anorectal malformation (ARM) repair and spinal fusion patients treated with opioids and intravenous acetaminophen or opioids alone. We expect data and results of this study to validate the use of intravenous acetaminophen for post-operative pain, in order to lower opioid use and reduce opioid-related side effects. We also anticipate that data will assist in establishing a time frame in which combination treatment is most beneficial.

Methods: This is a retrospective chart review of pediatric patients who underwent ARM repair or spinal fusion surgery who received intravenous acetaminophen in conjunction with opioids or opioids alone post-operatively at CCHMC. Patients were followed from the end of surgery to 36 hours post-surgery. The primary outcome is to compare equianalgesic dosage of total opioids received 36 hours post-operatively between patients who received opioids and patients who received opioids in combination with around the clock intravenous acetaminophen. Secondary outcomes include comparison of: equianalgesic dosage of total opioids patients received for the time frames of 0 to 12, 12 to 24, and 24 to 36 hours post-operatively, average pain scores, and incidence of adverse effects.

Results/Conclusions: Initial statistical analyses demonstrate a statistically significant reduction in total opioid dosage in patients who were also treated with intravenous acetaminophen. Complete results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Describe common adverse effects associated with opioid patient/parent/nurse-controlled analgesia in the pediatric population.
Explain the concept of multimodal analgesia and its utility in post-operative pain management.

Self Assessment Questions:
Which of the following is a common adverse effect of opioid PCA use in children?
Which of the following best describes the benefit of multimodal analgesia?
SINGLE AGENT THERAPY VERSUS COMBINATION THERAPY FOR THE TREATMENT OF CLOSTRIDIUM DIFFICILE IN CRITICALLY ILL PATIENTS (STOP-CDIFF): A RETROSPECTIVE COHORT STUDY
UC Health-University Hospital, 234 Goodman St., ML: 0740, Cincinnati, OH, 452192316
Jessica.Winter@UCHC.com

Background
Combination therapy (vancomycin plus metronidazole) for treatment of initial, severe Clostridium difficile infection (CDI) is a grade C-III recommendation, inviting clinicians to consider this when managing critically ill patients. Controversy also persists regarding the best single agent for managing CDI in critically ill patients who often have CDI as a complication rather than the primary illness. This study addresses the paucity of evidence-based recommendations specific to the challenges of critically ill patients by evaluating combination therapy and monotherapy for treatment of initial, severe CDI.

Methods
This single-center, retrospective, cohort study includes adult, critically ill patients meeting inclusion and exclusion criteria with CDI defined as a first documented positive c.difficile toxin A assay in combination with the presence of diarrhea. Patients will be divided into three groups: metronidazole monotherapy, vancomycin monotherapy, and combination therapy. Data collection will include pertinent laboratory values, sequential organ failure assessment (SOFA) score at day of CDI diagnosis, lactobacillus and proton-pump inhibitor treatment, immunosuppressant therapy, concurrent antibiotic therapy and duration, and incidence of vancomycin-resistant Enterococcus spp. (VRE) within six months of treatment with vancomycin.

The primary endpoint is clinical cure defined as the resolution of diarrhea by day 10 of treatment. Additional endpoints include recurrence, presence of VRE, prevalence of prolonged CDI therapy, and identification of predictors of CDI response. A subgroup analysis comparing cure rate between patients receiving prolonged treatment and recommended durations of therapy appears to be done.

113 patients are required to provide 80% power to detect an absolute difference of 15% between treatment groups. Statistical analysis will be performed using chi-squared for categorical data and ANOVA or ANOVA on ranks for numerical comparisons between groups. Multivariate logistic regression will be performed to identify independent predictors of therapy response and identify predictors of CDI recurrence.

Results
Results and conclusions to be presented at the Great Lakes Residency Conference.

Learning Objectives:
- Explain the current recommendations for treatment of initial-episode clostridium difficile infection and the evidence used to re-enforce those recommendations.
- Recognize the lack of evidence for treatment of first-episode clostridium difficile infection in critically ill patients.

Self Assessment Questions:
Which of the following statements is true regarding treatment of severe, complicated first-occurrence Clostridium difficile infection in critically ill patients?
Combination therapy is often utilized in critical ill patients due to?

EVALUATION OF OFF-LABEL RECOMBINANT FACTOR VIIa UTILIZATION
Kevin Wohlfarth, PharmD* and Korin Calkins, PharmD
Toledo Hospital/Toledo Children’s Hospital, 2142 N Cove Blvd, Toledo, OH, 43606
kevin.wohlfarth@promedica.org

Background:
Recombinant factor VIIa (rFVIIa) is currently only FDA approved for use in patients with hemophilia A or B with antibody inhibitors or with a congenital factor VII deficiency. However, it has been increasingly utilized off-label for the treatment of severe hemorrhages in patients without a coagulation factor deficiency.

Purpose:
The purpose of this study is to assess compliance with the established prescribing guidelines of rFVIIa for off-label uses at ProMedica Toledo Hospital. Secondary objectives assessed will include safety and efficacy with rFVIIa use, patients clinical outcomes, and a cost evaluation.

Methods:
The study is a retrospective chart review of 157 patients 18 years and older who received rFVIIa for off-label uses at ProMedica Toledo Hospital between January 1, 2004, and September 30, 2011. This study has been approved by the ProMedica Institutional Review Board. Data was collected from the patients electronic medical records. Patients who received rFVIIa off-label and their subsequent indication for treatment were stratified for analysis. Off-label uses of rFVIIa are broken down by: trauma/massive bleeding and transfusion, massive bleeding in cardiothoracic surgical patients without hemophilia, neurosurgical patients, patients requiring warfarin reversal, gastrointestinal bleeding/cirrhosis patients, and other patients. Guidelines have been established and implemented for the facility for each patient population and indication. Data collected includes patient age, patient weight, any comorbidities, indication for rFVIIa, dose given, number of doses, any partially wasted vials, compliance with established guidelines, any complications or adverse drug events, the clinical outcome of the patient, pre and post coagulation parameters, and concomitant hemostatic interventions or therapies. The reviewer assessed prescriber dosing compliance with rFVIIa in association with the established guidelines for the facility and the prescribed indication

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

Learning Objectives:
- Review utilization of recombinant factor VIIa in patients without hemophilia or factor deficiency
- Identify potential adverse outcomes associated with the use of recombinant factor VIIa

Self Assessment Questions:
What is the recommended dose of recombinant factor VIIa for administration per its labeled indications?
How should recombinant factor VIIa be administered?
A STEWARDSHIP APPROACH TO MANAGING COAGULASE-NEGATIVE STAPHYLOCOCCI (CONS) BACTEREMIA USING RAPID POLYMERASE CHAIN REACTION (RPCR) TECHNOLOGY MRSA/SA BC

Jordan R. Wong, PharmD*; Karri A. Bauer, PharmD, BCPS; Jessica E. West, MSPH; Debra A. Goff, PharmD, FCCP
The Ohio State University Medical Center, 410 W. 10th Avenue, Department of Pharmacy, 368 Doan Hall, Columbus, OH, 43212
Jordan.Wong@osumc.edu

Purpose: Coagulase-negative staphylococci (CoNS) are normal skin flora. CoNS often represent contamination, when obtained from a single blood culture in the absence of clinical signs and symptoms. Recently, microbiological efforts have focused on the development and implementation of rapid detection techniques, with rapid polymerase chain reaction (rPCR) being the most sensitive and specific. The Ohio State University Medical Center (OSUMC) uses the rPCR (Xpert MRSA/SA BC) to differentiate Staphylococcus aureus and CoNS. The purpose of this is to evaluate the impact of rPCR with infectious disease pharmacists (ID PharmD) intervention on antistaphylococcal (AS) antibiotic use in patients with a positive blood culture for CoNS.

Methods: This is a pre- and post-intervention study of patients with a positive blood culture for CoNS admitted from January 1 to March 31, 2011 and October 1, 2011 to January 31, 2012. In the pre-intervention group, the physician was notified by the clinical microbiology laboratory of the results of the rPCR with no ID PharmD intervention. In the post-intervention group, the clinical microbiology laboratory contacted both the physician and the ID PharmD with the results for the rPCR. The ID PharmD contacted the physician, communicated the interpretation of the results and discussed antibiotic therapy. The primary outcome is the time to discontinuation of AS therapy in patients with a positive blood culture for CoNS determined to be a contaminant. Secondary outcomes include patient length of stay, infection related length of stay, total hospital costs and infection related costs. Chi-squared or Fisher's exact test will be performed on categorical data, while t-test or Mann-Whitney U test will be performed on continuous data. An IRB was approved by the local review board.

Results/Conclusions: to be presented at the Great Lakes Residency Conference.

Learning Objectives:
- Explain the utility of rapid diagnostic tests for coagulase-negative staphylococci
- Discuss stewardship approach to management of coagulase-negative staphylococci from positive blood cultures

Self Assessment Questions:
- Stewardship intervention on coagulase-negative staphylococci may:
  - Rapid diagnostic tests for coagulase-negative staphylococci can:
EVALUATION OF THE RATES AND CHARACTERISTICS OF ABANDONED PRESCRIPTIONS PRESCRIBED BY FEDERALLY QUALIFIED HEALTH CENTER PROVIDERS AT 340B CONTRACTED COMMUNITY PHARMACIES

Shannon L. Yarosz, PharmD, RPh*; Cathy Kuhn, PharmD, RPh
Ohio State University College of Pharmacy, 500 W. 12th Ave., Columbus, OH 43210 Kroger Patient Care Center, 2000 East Main St., Columbus, OH 43205 yarosz.2@osu.edu
The Ohio State University College of Pharmacy, 500 West 12th Avenue, Columbus, OH, 43210

Purpose: Federally Qualified Health Centers (FQHCs) are eligible to participate in the 340B Drug Pricing Program, which helps provide affordable medications to eligible patients. The program allows FQHCs to contract with local community pharmacies. This opportunity places community pharmacists in a unique position to care for underserved patients, including monitoring medication adherence. Medication adherence plays an important role in patients overall health. Non-adherence, which may be found in the form of prescription abandonment, may lead to increased hospitalizations, health care costs, morbidity and mortality. An abandoned prescription is one that was filled by the pharmacy, but not picked up by a patient. Our focus will be to evaluate and compare the rates and characteristics of abandoned prescriptions prescribed by FQHC providers versus all other non-FQHC providers at select 340B contracted community pharmacies.

Methods: Abandoned prescriptions at four 340B contracted community pharmacies, part of a grocery store-based chain within Ohio, will be identified during the study period. The pharmacy database will be utilized to identify abandoned prescriptions and their characteristics such as whether it was prescribed by a FQHC provider or non-FQHC provider, the amount owed by the patient, and if it is a new or refilled prescription. All prescriptions that are picked up (not abandoned) from the 340B contracted community pharmacies will also be identified and their characteristics will be collected to use as a comparator group. Data will be analyzed once all information is collected.

Preliminary Results: Data collection will occur from February to May 2012. Preliminary results will be presented at the Great Lakes Residency Conference.

Conclusions: Study results will identify potential differences between groups and could provide opportunities to improve prescription abandonment rates in this FQHC patient population.

Learning Objectives:
- Identify barriers that contribute to prescription abandonment in a 340B patient population
- Discuss potential methods to improve prescription abandonment in a 340B patient population to increase medication adherence

Self Assessment Questions:
- Barriers that contribute to prescription abandonment in a 340B patient population may include which of the following?
- What may be a potential method(s) to improve prescription abandonment in a 340B patient with financial hardships?
EVALUATION OF A PHARMACIST-INITIATED CLINICAL PHARMACOKINETIC SERVICE TO DOSE VANCOMYCIN AT THE CINCINNATI VA MEDICAL CENTER (CVAMC)

Bonnie Y. Yeung*, Pharm.D.; Ndidiamaka G. Moka, Pharm.D., BCPS; and Jason D. Hiett, Pharm.D., BCPS
Cincinnati Veteran Affairs Medical Center, 3200 Vine St, Cincinnati, OH 45220-2213
bonnie.yeung@va.gov

Purpose:
To evaluate the impact of a pharmacist-initiated Clinical Pharmacokinetic Service (CPS) on vancomycin dosing in a veteran population. The CPS was implemented in June 2011 to create a consistent method for dosing certain intravenous antibiotics and optimize therapy. The study will evaluate if the newly implemented service improved the timeliness in achieving therapeutic vancomycin levels at the CVAMC. Secondary endpoints will include percentage of patients with a therapeutic level during the course of therapy, occurrence of nephrotoxicity, median days to a therapeutic trough and the number of patients with trough levels below 10 mg/L.

Methods:
The proposed study is a retrospective chart review, quality improvement study performed at the CVAMC. A computer program will identify patients started on vancomycin treatment for more than 48 hours at the CVAMC from August 1, 2010 to November 1, 2010 and from August 1, 2011 to November 1, 2011. The study will exclude patients on hemodialysis, receiving vancomycin for prophylaxis, on vancomycin therapy prior to admission, did not have a vancomycin trough drawn during the course of the treatment and did not have a true trough drawn. A power analysis was conducted to determine the sample size of the study. In order to achieve 80% power, with a margin of error of 5%, and an assumed difference between the two groups based on studies of 25%, an estimated 70 patients will need to be included in each group. The patients age, weight, height, sex, and serum creatinine will be collected. The indication for use, vancomycin administration times, vancomycin trough goals, the vancomycin dose and interval received, and the date data was documented will be recorded. All patients will be de-identified and individually assigned subject study numbers. Data collection with be maintained confidentially.

RESULTS/CONCLUSIONS:
Data collection and analysis are currently being conducted.

Learning Objectives:
- Review the ASHP/IDSA/SIDP Vancomycin consensus review and how it impacted the development of the Clinical Pharmacokinetic Service.
- Discuss the goals of the Clinical Pharmacokinetic Service on vancomycin dosing and the impact on patient outcomes.

Self Assessment Questions:
- Based on the ASHP/IDSA/SIDP Vancomycin consensus review, a patient should be identified as having vancomycin-induced nephrotoxicity if:
- Based on the ASHP/IDSA/SIDP Vancomycin consensus review, a higher serum vancomycin trough should be targeted (15-20 mg/L) for which infection(s):