IMPACT OF RESTARTING WARFARIN IN HOSPITALIZED PATIENTS FOLLOWING USE OF PHYTONADIONE

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PURPOSE: Phytonadione use in reversing warfarin effects in patients undergoing invasive procedures can prolong the achievement of a therapeutic international normalized ratio (INR) upon being restarted. The primary objective of this study is to determine the time needed for hospitalized patients given phytonadione prior to cardiac catheterization to re-achieve a therapeutic INR upon restarting warfarin. Secondary objectives include identifying risk of bleeding and thrombotic events from antithrombotic therapy.

METHODS: This is a retrospective chart review of patients at the University of Toledo Medical Center from March 2008 to February 2009. Patients included in the study were 18 years of age and older, on warfarin with a therapeutic INR prior to hospital admission, received 5 mg or more of phytonadione regardless of route of administration, underwent a cardiac catheterization procedure during the same hospital stay, and restarted on warfarin prior to hospital discharge. Patients who were pregnant, under 18 years of age, or had cognitive impairment were excluded. Data collection for patients who meet the inclusion criteria include demographics (age, gender, weight), warfarin indication and dosage history, home and hospital medications, times and dates of INR readings, phytonadione and fresh frozen plasma administration, and cardiac catheterizations.

RESULTS: Data collection and statistical analysis will be completed by April 2009. Final results with conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To review current guidelines for INR reversal with phytonadione and fresh frozen plasma.

Identify the appropriateness of phytonadione use in patients undergoing a cardiac procedure.

Self Assessment Questions:

At what INR readings are five milligram doses or more of phytonadione indicated?

How quickly can warfarin be restarted in a patient that just had a cardiac catheterization procedure?

ASSESSMENT OF INPATIENT MANAGEMENT OF BLOOD GLUCOSE CONTROL IN GESTATIONAL DIABETES PATIENTS

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Purpose:
Gestational diabetes mellitus (GDM) is one of the major complications of pregnancy. The purpose of this study is to assess inpatient management of blood glucose control in subjects with GDM to create an insulin algorithm to help guide in the management of GDM.

Methods:
This is a retrospective chart review utilizing medical records from the University of Illinois Medical Center at Chicago (UIMCC) of subjects with a diagnosis of pre-GDM and/or GDM. A list of electronic medical records between 8/1/06 to 8/1/08 will be generated from Hospital IT using ICD-9 code 648.8. The inclusion criteria includes: female subjects between the ages of 18 to 50 years old, subjects with documented pre-GDM and/or GDM, and subjects who were inpatients at UIMCC between 8/1/06 to 8/1/08. Subjects diagnosed with diabetes ketoacidosis at anytime during the hospital course, subjects with documented vascular disease (defined as retinopathy, nephropathy, heart disease, and/or renal transplant), and subjects on insulin pumps and/or oral diabetes medications will be excluded from the study because their insulin requirements may differ. From the selected records, approximately 500 records will be randomized for chart review using the Random Integer Generator program. Five hundred records were estimated to be necessary to allow for increased variability with data collection. Each chart will be reviewed to determine documented blood glucose levels and insulin requirements for the selected subjects. Appropriate statistical analysis will be performed using average blood glucose readings and total daily insulin use. Once the statistics are analyzed, an algorithm will be created to help guide in the appropriate glucose management in subjects with GDM at UIMCC based on trends between insulin use and blood glucose levels in the study population.

Results:
Data collection is in progress. Final results with conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the importance of appropriate blood glucose control in patients with GDM.

Recognize a insulin regimen to control blood glucose in patients admitted with GDM.

Self Assessment Questions:

Which of the following is not a complication of GDM?
a)Fetal death
b)Preeclampsia
c)Increased risk of developing T2DM
d)Fetal macrosomia
e)None of the above

True or False. An insulin regimen to control blood glucose in patients admitted with GDM does depend on the weeks of gestation.

HYPERTONIC SALINE FOR THE MANAGEMENT OF CEREBRAL EDEMA AND INCREASED INTRACRANIAL PRESSURE

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Purpose

All brain injuries, including stroke, subarachnoid hemorrhage, and traumatic insults, may be complicated by life-threatening increased intracranial pressure (ICP), cerebral edema, and brain swelling, leading to global ischemia and brain herniation. Hypertonic saline is used in the management of cerebral edema and increased ICP but current scientific evidence is not strong enough to provide recommendations on the use, concentration, and method of administration in the adult population. There is also concern for potential serious adverse events with its use. The purpose of this study is to characterize the role of hypertonic saline at the Cleveland Clinic and assess the safety of its use, which may guide further treatment recommendations.

Methods

This study is a retrospective chart review of adult patients admitted to the Neurological Intensive Care Unit or General Neurology, Neurosurgery or Stroke Services at the Cleveland Clinic between June 1, 2006 and December 30, 2008. The use of 3% hypertonic saline will be evaluated in patients with and without continuous ICP monitoring with at least one dose of hypertonic saline administered. Data to be collected include: baseline demographics, past medical history, admitting diagnosis, Glasgow Coma Scale scores, hypertonic saline dose and indication, laboratory data, ICP and MAP values if applicable, computed tomography results in patients without ICP monitoring, other interventions used in the management of increased ICP and cerebral edema, and adverse events. Data will be analyzed using descriptive and inferential statistical techniques. Assuming episodes of decreased ICP and cerebral edema are found, logistic regression analysis will be used to evaluate relationships between primary outcomes and an independent variable, such as dose.

Results and Conclusions

To be determined

Learning Objectives:

Describe the rationale of hypertonic saline in the management of cerebral edema and increased intracranial pressure

Identify the potential sequelae of hypertonic saline therapy

Self Assessment Questions:

T/F

In the setting of cerebral edema and increased ICP, hypertonic saline decreases ICP by establishing an osmotic gradient between the intracelleular and intravascular space.

Hypertonic saline administration includes careful monitoring of all the following laboratory values except:

a. serum osmolarity
b. serum chloride
c. serum potassium
d. serum phosphate

SUPPLEMENTAL PARENTERAL NUTRITION FOR THE PREVENTION OF CALORIC UNDERFEEDING IN TRAUMA PATIENTS RECEIVING OPTIMAL ENTERAL NUTRITION

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PURPOSE: Malnutrition is a major risk factor for morbidity and mortality in hospitalized patients. In observational and cohort studies, negative energy balance and underfeeding have been associated with an increased number of complications, including infections. Significant energy deficits due to failure to achieve optimal nutrition early in therapy are associated with increased morbidity and mortality in ICU patients. In trauma patients, the most common method of providing nutritional support is enteral feeding. However, goal enteral nutrition (EN) support is often delayed due to problems with gastrointestinal access, gut dysfunction, and procedures requiring NPO status resulting in negative energy balance. Supplementing parenteral nutrition, in conjunction with EN will improve caloric intake and prevent negative energy balance. Due to the lack of prospective randomized controlled trials, it is not known if providing optimal caloric intake will result in improved clinical outcomes.

METHODS: This is a 120 patient, prospective randomized, pilot study evaluating pre-mix parenteral formulation added to standard EN versus standard EN alone upon nutritional and clinical outcomes. For inclusion, patients must be 18-90 years of age and admitted to the ICU trauma service with an anticipated requirement of at least 3 days of EN. EN, as an immune-enhancing, high-protein formula, will be started within 48 hours of admission and advanced according to hospital-wide protocol. Parenteral nutrition in the amount of the previous 24-hour caloric deficit (goal: 25 kcal/kg/day) will be provided over the following 12 hours. Supplemental PN will continue until either discharge or discontinuation of EN. The primary outcome is length of ICU stay. Secondary outcomes are infection, hyperglycemia, organ failure, ventilator days, and mortality.

RESULTS: This study is currently pending Institutional Review Board Approval. Due to the scale and nature of the study, preliminary results will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To discuss the role of early nutrition (enteral and parenteral) in critically-ill patients.

To review factors limiting optimal nutrition support in trauma patients.

Self Assessment Questions:

What are some barriers to acheiving target caloric goals in trauma patients?

Describe some weaknesses of prior studies evaluating the use of parenteral nutrition in critically-ill patients.

EVALUATING OUTCOMES OF PATIENTS WITH INVASIVE METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) INFECTIONS: A REVIEW OF VANCOMYCIN MICS AND SERUM TROUGH CONCENTRATIONS

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Purpose:
The purpose of this study is to evaluate and characterize patient outcomes with methicillin-resistant Staphylococcus aureus (MRSA) bacteremia based upon vancomycin minimum inhibitory concentrations (MICs).

Methods:
This is a retrospective cohort study of adult patients (≥ 18 years) admitted to Indiana University Hospital, Methodist Hospital, Clarian West, and Clarian North hospitals between the dates of January 2008 through December 2008. Inclusion criteria: patients with a positive monomicrobic blood culture (bacteremia) with MRSA that occurred ≥ 48 hours after admission. Additionally, patients will be evaluated if they have received vancomycin therapy for a duration ≥ 72 hours. Once included, patients will be stratified into two categories: MICs > 2 ug/mL and < 2 ug/mL. The primary outcome to be evaluated is in-hospital mortality. Secondary outcomes will be length of stay (LOS), both intensive care unit and total hospital, and time to sterilize blood cultures. Other data to be collected will include: demographic data, vancomycin dose, vancomycin treatment duration, and associated trough concentrations.

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

Learning Objectives:

Review the incidence and prevalence of MRSA.

Describe and differentiate the different mechanisms of S. aureus resistance to vancomycin.

Self Assessment Questions:

What is the prevalence of MRSA hospital-related infections?

What does it mean to be "hetero-resistant" hMRSA?

EVALUATION OF DARBEPOETIN USAGE AT ADVOCATE CHRIST MEDICAL CENTER IN CORRELATION WITH CENTERS OF MEDICARE AND MEDICAID SERVICE GUIDELINES

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Purpose:
The Centers of Medicare and Medicaid Services (CMS) have established guidelines for the use of erythropoiesis stimulating agents (ESA). These guidelines are constantly changing, and healthcare professionals are not always aware of the most current guidelines. Reimbursement for ESAs is also decreasing, which is why knowledge of the guidelines is crucial. The latest CMS guidelines recommend the initiation of ESA therapy only when the hemoglobin or hematocrit level is less than or equal to 10 g/dL or 30 percent, respectively. The CMS recommended target ranges are shown in table 1. The primary objective of this review is to look at the use of darbepoetin and determine if it is being used according to current CMS guidelines. The results will be used to impose restrictions on the prescribing of ESAs and implement an ESA standing order form.

Methods:
Methods: The study will be a retrospective evaluation of the use of darbepoietin in both the outpatients and inpatients of ACMC. Data will be collected on patients who received darbepoietin at ACMC during June and July of 2008. The data that will be collected will include indication, insurance information, dosage used, hemoglobin and hematocrit values.

Results:
Data collection is pending.

Learning Objectives:

Review the latest CMS guidelines for the use of ESA therapy.

Review the pharmacokinetics of ESA's.

Self Assessment Questions:

What is the target hemoglobin value for CKD and cancer patients?

What is the recommended ESA's titration schedule for CKD and cancer patients?

PHARMACIST IN A FAMILY MEDICINE CLINIC AT A COMMUNITY HOSPITAL

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Purpose

The role of the ambulatory care pharmacist is evolving. In 2002 American College of Physicians and American Society of Internal Medicine issued a joint statement encouraging collaborative physician-pharmacist relationships. These recommendations are in part based on ambulatory care Medicaid demonstration projects and Veterans Administration research which has shown a positive impact on patient care, decreased medication errors and overall decreased healthcare costs. The American Society of Health-System Pharmacists 2015 goals include "increasing the extent to which health-system pharmacists help individual nonhospitalized patients achieve the best use of medications." With this in mind the pharmacy department and Family Medicine Clinic (FMC) at Beaumont Hospital-Troy jointly desire to develop the role of a pharmacist in the FMC. This observation was designed to define the role of a pharmacist in the FMC and identify areas a pharmacist could improve pharmaceutical care.

Method

A literature search identified current ambulatory pharmacist roles and assessed associated reduced medication error and healthcare cost. A pharmacy resident observed the current FMC multidisciplinary team for two weeks to evaluate areas a pharmacist could improve pharmaceutical care. Following the two-week period a questionnaire was distributed to the staff to assess current and previous pharmacy residents impact, and future pharmacists responsibilities.

Results

During the two-week observation, residents, attending physicians, students, nurses, and other staff members primarily utilized the pharmacy resident as a drug information resource. Nine medication related interventions were made, and many other recommendations were taken under advisement for follow-up visits. Several areas for pharmacy impact were identified. Results will be presented at the conference.

Conclusions

The FMC could utilize a pharmacist to provide drug information, provide education to staff and patients, and make drug therapy recommendations. As the professional relationship develops the pharmacists clinical role may be expanded.

Learning Objectives:

Review the potential roles for a pharmacist in an Ambulatory Care setting.

Identify the role of the pharmacist for the FMC at Beaumont-Troy.

Self Assessment Questions:

True or False: Pharmacists increase patient care costs in an ambulatory care setting by adding on more medications.

The FMC has identified that a pharmacist would be most beneficial to the clinic and patients by:
a)rounding only on hospitalized patients
b)acting as a drug information resource
c)participating in a collaborative practice
d)educating staff, students, and residents
e)b and d

EVALUATION OF LIPID LOWERING STRATEGIES IN HIV-INFECTED PATIENTS RECEIVING HAART

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Background: Highly active antiretroviral therapy (HAART) has greatly increased survival in the HIV infected population since 1996. As a result, hyperlipidemia and hypertriglyceridemia leading to cardiovascular disease are commonly seen, with protease inhibitors being a significant contributing factor. Atazanavir, a recently approved protease inhibitor, was introduced to have less resistance as well as favorable effects on lipids.
Objective: Determine if a higher percentage of HIV infected patients on a HAART regimen including atazanavir achieve their lipid goals compared to those treated with an alternative protease inhibitor.
Methods: Patients seen in Indiana University Outpatient Infectious Disease Clinic from June 2003 to December 2008 were included. A retrospective chart review was performed on patients with an HIV diagnosis being treated with a protease inhibitor. Additional requirements included a baseline lipid panel before or within 30 days of starting the protease inhibitor and a follow up lipid panel after at least 6 months of therapy. Patients meeting inclusion criteria were divided into 4 groups determined by their protease inhibitor and/or lipid lowering agent. Mean lipid profile values and changes in lipid profiles of patients in these four groups will be compared.
Results: Preliminary results in 18 patients have demonstrated a statistically significant (p=0.03) decrease in triglycerides with the use of atazanavir compared to an alternative protease inhibitor. A clinically significant decrease in LDL, triglycerides, and total cholesterol was seen with the use of atazanavir (31%, 21%, & 25% respectively). A greater number of patients met their predefined lipid goals with the use of atazanavir vs. an alternative protease inhibitor (29% vs. 18%). More patients are being analyzed. Final results will be presented upon conclusion of the study.

Learning Objectives:

The initiation of HAART therapy in HIV infected patients has extended life expectancy, increasing the prevalence of co-morbid diseases namely cardiovascular disease and dyslipidemia.

Atazanavir used as part of HAART has demonstrated a reduced presence of cardiovascular disease and dyslipidemia.

Self Assessment Questions:

Which drug class often included in HAART therapy has shown the most disturbances of lipid metabolism in HIV patients?

Why has there been an increase in the prevalence of co-morbid illness such as cardiovascular disease in HIV patients regardless of antiretroviral therapy?

EVALUATION OF HALOPERIDOL CONTINUOUS INFUSIONS IN CRITICALLY ILL PATIENTS

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BACKGROUND: Delirium occurs frequently in critically ill patients and can present in hyperactive, hypoactive, and mixed forms. Untreated, a Confusion Assessment Method - Intensive Care Unit (CAM-ICU) positive or hyperactive delirium state places agitated patients at risk of self-extubation, injury, pulling of lines, elevation of oxygen consumption, and jeopardization of patient and staff safety. Intermittent bolus doses of haloperidol or atypical antipsychotics have been effective in the treatment of delirium in the critically ill. However, the use of a haloperidol continuous infusion has been employed sparingly for the treatment of hyperactive delirium. The utilization and safety of this approach to delirium management has been sparsely described.

PURPOSE: To characterize the efficacy and safety of haloperidol continuous infusion in the treatment of delirium in critically ill patients.

METHODS: An IRB approved, retrospective chart review of patients receiving haloperidol continuous infusion was conducted from January 2006 to December 2008. Those patients that received a continuous haloperidol infusion and were considered delirious based upon evaluation were selected for analysis. The information required for analysis will include basic demographic information, length of stay, time on a ventilator, APACHE II scores, Richmond Agitation Sedation Scores (RASS), EKG results, as well as daily dosages, administration times, and routes of administration of the following medications: opioid agents, benzodiazepines, propofol, neuromuscular blocking agents, antipsychotic agents, and miscellaneous sedative agents. Additionally, medications known to interact with haloperidol will be recorded. The primary endpoints will include a comparison of sedative and opiate requirements, and sedation scores prior to and after initiation of haloperidol infusion. Secondary endpoints will include EKG changes compared to baseline and the presence of adverse drug events.

RESULTS/CONCLUSIONS: Data collection and evaluation are ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

List causes and symptoms of delirium in critically ill patients.

Explain the pharmacological properties of haloperidol and why it may be effective as a continuous infusion.

Self Assessment Questions:

The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition defines delirium as a disturbance of consciousness with inattention, accompanied by a change in cognition or perceptual disturbance that develops during a short period (hours to days) and fluctuates over time. T/F

Haloperidol is an appealing choice to use in the critical care setting due to all of the following properties EXCEPT:
a. Quick onset of action
b. No risk of cardiac effects
c. Inexpensive
d. Low risk for hemodynamic or respiratory adverse effects
e. Parenteral availability

EVALUATION OF AN EDUCATIONAL IN-SERVICE ON APPROPRIATE USE OF PHARMACOLOGIC VENOUS THROMBOEMBOLISM PROPHYLAXIS

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Purpose: The American College of Chest Physicians promotes prophylaxis by pharmacological and mechanical means in order to reduce morbidity and mortality in various patient populations prone to venous thromboembolism (VTE) formation. In accordance with the Seventh Edition of the American College of Chest Physician guidelines for VTE prophylaxis published in 2004, a computerized provider order entry (CPOE) pathway was implemented at Edward Hines, Jr. Veterans Administration (VA) Hospital in 2004 in order to facilitate clinical decision making. Unfortunately, many providers are unaware or do not utilize the CPOE pathway or use prophylactic VTE therapy that is not evidence-based. The main objective of this study is to evaluate the impact of educational in-services regarding the appropriate use of the VTE prophylaxis CPOE pathway in non-intensive care unit (ICU) hospitalized patients.

Methods: This study is a retrospective chart review of a random sample of 96 patients from non-ICU general medicine patients who were candidates for VTE prophylaxis prior to the initiation of the educational in-service. For comparison, a random sample of 96 patients from non-ICU general medicine patients who were candidates for VTE prophylaxis was identified after educational in-services. The charts of subjects were reviewed for: serum creatinine on admission, reason for admission, reason for VTE prophylaxis, medication/dose of VTE prophylaxis, VTE occurrence, use of VTE prophylaxis CPOE, length of stay in general medicine, and mortality. Provider adherence to current VTE prophylactic guideline recommendations was evaluated.

Results/Conclusions: Data collection in progress. Preliminary results will be presented.

Learning Objectives:

List current recommendations for VTE prophylaxis.

Evaluate the impact of an educational in-service regarding the use of the VTE prophylaxis CPOE in non-ICU hospitalized patients.

Self Assessment Questions:

T/F PE is the second most common preventable cause of hospital death.

T/F Majority of PEs occur in surgical patients.

CLINICAL PHARMACIST IMPACT ON LOWERING HEMOGLOBIN A1C IN DIABETIC PATIENTS COMPARED TO THOSE RECEIVING STANDARD CARE

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Background/Purpose:
Performance measures for all VA hospitals are released yearly by the Office of Quality and Performance (OQP). One important measure released for fiscal year 2008 was Mission Critical Effectiveness of Care: Diabetes. Within this measure is a defined goal of greater than 85% of diabetic patients seen at VA clinics to achieve a goal hemoglobin A1C value of less than or equal to 9%. Providers at Hines VA Hospital with patients not reaching this goal were encouraged to refer these patients to clinical pharmacist managed clinics specifically to address their diabetes as part of the plan to achieve this measure. The purpose of this research is to evaluate the impact of clinical pharmacist managed clinics compared to standard care for diabetic patients in a VA setting using improvement in hemoglobin A1C as our primary outcome.

Methods:
This is a retrospective chart review of patients identified as taking either oral anti-hyperglycemic medications or insulin with a documented hemoglobin A1C of > 9% within one year of the start of the diabetes performance measure on November 21, 2007. Patients were excluded from this study if they were 90 years or older or if they did not have a follow up hemoglobin A1C documented within 12 months of the baseline reading. Patients had their record reviewed for pertinent demographic data, laboratory data, visit information, and objective screening and medication parameters. Data for all primary and secondary endpoints was evaluated at baseline and at 12 months from baseline using the last measure carried forward method.

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

Learning Objectives:

Evaluate current literature examining beneficial outcomes of lowering hemoglobin A1C

Evaluate the impact of clinical pharmacist managed care in lowering hemoglobin A1C in a diabetic population at a VA setting

Self Assessment Questions:

T/F: Recent trends have shown that fewer Americans diagnosed with diabetes are reaching their goal hemoglobin A1C

T/F: Randomized controlled studies have shown that clinically significant improvement in microvascular and macrovascular outcomes can be seen by hemoglobin A1C reductions of at least 0.5%

CLINICAL AND ECONOMIC ASSESSMENT OF PHARMACIST INTERVENTIONS IN A TERTIARY CARE INSTITUTION.

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Background:
Medication errors are the eighth leading cause of death in the United States resulting in an annual cost of $2.8 million.1 Clinical pharmacist involvement in daily rounding decreases the rate of medication errors resulting in cost savings. Clinical pharmacist activities associated with cost savings include: providing drug information, monitoring adverse drug reactions, participation in patient admission drug histories, and antibiotic stewardship.2,3 Current hospital budgets leave limited resources increasing competition for health care dollars making it necessary to document activities which contribute to cost-savings.4,5 Currently many pharmacy departments document pharmacist interventions. Literature estimates physician acceptance of pharmacist interventions to be greater than eighty percent suggesting pharmacists have a significant influence in patient drug therapy.5,7 It is important to not only document interventions but also to assess their benefit in prevention of medication errors, adverse drug events, and contribution to cost-savings.
Methods:
This retrospective study is to evaluate documented pharmacist interventions for cost savings as a result of adverse drug event prevention and other drug related events. Pharmacist interventions are documented in a CPOE system and will be retrieved from the computer system retrospectively. Data collection will include type of intervention, frequency of intervention, and drug related to intervention type. Interventions completed from January 2008 through June 2008 will be collected and evaluated. Data collection will not include any patient specific information or identifiers.After intervention data is collected a subset of interventions will be further evaluated for cost savings due to adverse drug events prevented and other drug related events. Cost savings will be determined using currently available clinically acceptable literature and hospital specific drug costs.
Results: Results and conclusions with be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the importance of documenting pharmacist interventions

Assess the clinical and economic impact of pharmacist interventions

Self Assessment Questions:

True or False: Physicians accept pharmacist interventions at least eighty percent of the time

List at least three pharmacist interventions that have been associated with cost-savings

COMPARISON OF CARDIOVASCULAR RISK AMONG YOUNG ADULTS IN DEVELOPED AND DEVELOPING NATIONS

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Purpose

According to the World Health Organization, cardiovascular disease is the leading causes of death worldwide. It is estimated that 80% of premature deaths from cardiovascular disease and stroke could be prevented through a healthy diet, regular physical activity, and avoiding the use of tobacco. The purpose of this study is to identify the most common cardiovascular risk factors among young adults in developed and developing countries. After identifying these factors, a targeted interventional program can be developed in each setting.

Methods

This prospective, cross-sectional study is designed to examine cardiovascular risk factors in young adults from the United States, India, and Syria. Subjects were recruited with flyers and internet advertisements from the University of Michigan (USA), University of Kalamoon (Syria), and Kakatiya University (India). Subjects between 18 and 35 years old who were residents of and lived in the site country for at least one year were screened for inclusion. Each subject was required to maintain a diet diary for one week and fast for a minimum of 8 hours prior to the cardiovascular assessment. Subjects who regularly took prescription or nonprescription medications, had significant past medical history, or were pregnant were excluded. To determine cardiovascular risk, the following assessments were obtained: blood pressure, lipid profile, blood glucose, obesity, physical activity, family cardiovascular history, smoking history, alcohol history, and diet history. Framingham risk score and body mass index will be calculated for each subject from the data collected.

Results

Preliminary results (n=248) suggest that significant differences in LDL ($p<0.001$), HDL ($p=0.012$), blood glucose ($p=0.001$), and BMI ($p<0.001$) exist between subjects from each country. Additionally, a number of significant differences were noted between countries pertaining to smoking history, family history of cardiovascular disease, and exercise regimens. Final analysis and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients who are at high risk of developing cardiovascular disease based upon a patient history and point-of-care testing results

Discuss the impact of socioeconomic status on the development and treatment of cardiovascular disease

Self Assessment Questions:

SJ is a 26 year old female who presented to general medicine clinic for the first time in five years. She is concerned about her overall health and well being because her brother was recently diagnosed with diabetes mellitus. Which of the following factors would place her at in increased risk of cardiovascular disease?

a) Blood pressure = 118/70 mmHg
b) Random blood glucose = 130 mg/dL
c) LDL = 99 mg/dL
d) BMI = 24
e) Total cholesterol = 274 mg/dL

T / F - Middle and high income countries have a significantly higher incidence of cardiovascular disease when compared to low income countries.

INCIDENCE OF GASTROINTESTINAL BLEEDING IN PATIENTS RECEIVING ANTIDEPRESSANTS IN A VETERAN POPULATION

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Background:

Selective serotonin reuptake inhibitors (SSRIs) are the most widely used antidepressants. In the last few years, several reports have been published suggesting that SSRIs may cause bleeding disorders; this has become a serious safety concern. More recently, serotonin norepinephrine reuptake inhibitors (SNRIs) have been implicated in GI bleeding as well. The proposed mechanism of bleeding is thought to involve the effect of SSRIs on platelets. Serotonin is required for platelet aggregation. The serotonin transporter can move serotonin into platelets for storage and transport. Use of SSRIs can deplete these stores of serotonin and thereby potentially predispose patients to bleeding complications. Bleeding severity has ranged from prolonged bleeding time and bruising to gastrointestinal (GI) hemorrhage.

Purpose:

The purpose of this study is to determine whether the use of antidepressants is associated with GI bleeding based on a random sample of patients in a veteran population.

Methods:

This study will be a retrospective, electronic chart review of patients at Jesse Brown VA Medical Center (JBVAMC) who are at least 18 years old, had an esophagogastroduodenoscopy (EGD) performed between January 1, 2000 and December 31, 2007, and had an antidepressant prescribed at least 30 days prior to the EGD. All patients that had a bleed due to a history of H. pylori will be excluded. Risk factors that will be assessed in this study include use of non-steroidal anti-inflammatory drugs, antiplatelet agents, anticoagulant agents, and/or corticosteroids. The risk factor of age will also be assessed in our review. Patients use of acid suppressing agents will also be evaluated. An analysis will be performed to categorize which antidepressants are being linked to GI bleeding after the results are available.

Results/Conclusions:

Data collection and analysis are ongoing. The results will be presented at the conference.

Learning Objectives:

Evaluate the risk factors for having a GI bleed

Review the proposed mechanism of GI bleeding associated with antidepressants

Self Assessment Questions:

True or False. Treating with an antidepressant is an absolute contraindication in a patient who has a history of a GI bleed.

Which of the following antidepressants has NOT been linked to GI bleeding based on its unique mechanism of action?

a) Fluoxetine
b) Bupropion
c) Venlafaxine
d) Escitalopram
e) Sertraline

APPROPRIATE FLUOROQUINOLONE USE IN A PEDIATRIC HOSPITAL: ANTIBIOTIC SURVEILLANCE

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PURPOSE: Fluoroquinolone antibiotic resistance is continuing to emerge and is of great concern. Ciprofloxacin is the only fluoroquinolone approved by the FDA for use in pediatrics, but studies show that other fluoroquinolone use is not uncommon in pediatrics. The American Academy of Pediatrics states that fluoroquinolone use may be appropriate when a patient has an infection caused by multi-drug resistant pathogens or when parenteral therapy is not feasible and when no other oral antibiotic is available. The objective of this antibiotic surveillance is to review the appropriateness of ciprofloxacin and moxifloxacin use in a pediatric hospital.

METHODS: This antibiotic surveillance is exempt from IRB review. Using an electronic pharmacy database, patients who received at least one dose of ciprofloxacin or moxifloxacin from October 1, 2008 through March 31, 2009 will be included. Collected patient data to be assessed will include: drug allergies, patient weight, renal function labs and medication indication. The medication data to be evaluated includes: medication prescribed, dose, duration of therapy, route of therapy, culture/susceptibility, origin of culture and change in antibiotic therapy. Appropriate use parameters for ciprofloxacin and moxifloxacin include susceptibility and medical indication. Institutional specific infectious disease approved criteria will be utilized and presented. The collected data will then be categorized into appropriate versus inappropriate pediatric fluoroquinolone use and analyzed using basic descriptive statistics.

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

Learning Objectives:

Explain dosing parameters of fluoroquinolone antibiotics in pediatric patients.

List indications for which fluoroquinolone antibiotics would be appropriate in pediatric patients.

Self Assessment Questions:

Which fluoroquinolone is FDA approved for use in pediatrics?
a.Levofloxacin
b.Moxifloxacin
c.Ciprofloxacin

True or False - Fluoroquinolone antibiotics should be considered for use in prophylactic therapy.

PHARMACOKINETICS OF APREPITANT IN PEDIATRIC CHEMOTHERAPY INDUCED NAUSEA AND VOMITING

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BACKGROUND:
Chemotherapy induced nausea and vomiting (CINV) is one of the most distressing toxicities of cancer therapy. Aprepitant is one of the newest agents to be added to the CINV pharmacotherapy arsenal. Aprepitant is approved for use only in the adult population; however, like many medications it is receiving increased used in pediatrics. Currently, there is no pharmacokinetic data in pediatrics patients published to date.

OBJECTIVES:
The objective of this study is to characterize the pharmacokinetics of the antiemetic aprepitant in pediatric cancer patients receiving highly emetogenic chemotherapy. Additionally, the study will investigate if there is a relationship between those pharmacokinetic parameters and the severity of CINV.

METHODS:
A limiting sampling strategy in a population approach will be utilized to gain insight into the absorption, distribution, metabolism and elimination of aprepitant. Patients prescribed aprepitant by their treating oncologist will be recruited into the study from the pediatric Hematology-Oncology clinic at Riley Hospital for Children. This study does not influence the antiemetics prescribed. To assess the severity of CINV symptoms, patients older than 4 years of age and all parents/caregivers will be asked to complete a 5 day brief survey regarding their CINV symptoms. Questionnaire results will then be correlated to pharmacokinetic parameters. Lastly, subjects will have DNA collected for future pharmacogenetic analysis. Thirty subjects will be recruited to this study.

RESULTS/CONCLUSION:
Results to follow pending completion of data collection and analysis.

Learning Objectives:

Identify the factors that put patients at greatest risk for CINV.

Describe the mechanism of action of aprepitant.

Self Assessment Questions:

True/False: Younger age and female sex correlate to an increased risk of CINV.

What is the primary mechanism of action of aprepitant?
a.5-HT3 receptor antagonist
b.H1-receptor antagonist
c.Substance P antagonist
d.GABA agonist

TOBACCO CESSATION TELECOUNSELING FOR INDIANA MEDICAID RECIPIENTS

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Purpose: To demonstrate the effectiveness of pharmacist provided telecounseling as a means for increaseing tobacco abstinence rates in an Indiana Medicaid Population. Proactive telecounseling is recognized by current US Public Health Service guidelines for Treating Tobacco Use and Dependence as a method to increase abstinence. The same guidelines recommend; using a combination of medication and counseling whenever possible, utilizing four or more counseling sessions, and utilizing practical counseling as well as support and encouragement throughout the quit attempt. Guidelines recommend that additional research is needed to determine the effectiveness of pharmacist provided counseling.

Methods: A Pharmacist, or a supervised Student Pharmacist, will provide tobacco cessation telecounseling to adult patients who have Indiana Medicaid benefits managed by MDwise Hoosier Alliance . Patients who are prescribed a medication intended for tobacco cessation (varenicline, bupropion, nicotine patches, nicotine gum, or nicotine lozenges) by their physician will receive an initial telecounseling phone call approximately one week from filling the prescription. Telecounseling will consist of six sessions (lasting 15-30 minute) over two months, and will include problem solving skills training, encouragement, support, medication counseling, and relapse prevention counseling. Additionally patients will be contacted at six months, and one year post education program for follow-up to document status of patients tobacco cessation.

Preliminary Results: Telecounseling will begin in February 2009 and the study will continue for one year.

Conclusion: The potential knowledge to be gained includes whether telecounseling provided by pharmacist is an effective means to increase tobacco cessation rates.

Learning Objectives:

Describe key guidelines and public health implications of tobacco cessation.

Identify the different products on the market to assist patients with tobacco cessation.

Self Assessment Questions:

Which of the following is NOT recommended as first line therapy for tobacco cessation?
a. Varenicline
b. Nicotine Patch
c. Clonidine
d. Nicotine Nasal Spray
e. Nicotine Gum

Which of the following types of counseling are recognized as effective means for increasing tobacco cessation rates?
a. Individual Counseling
b. Group Counseling
c. Telephone Counseling
d. A & C
e. All of the above

ASSESSMENT AND IMPLEMENTATION OF BEST PRACTICES TO IMPROVE NARCOTIC AND SEDATIVE SAFETY

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Purpose/Background: The Institute for Healthcare Improvements Five Million Lives Campaign identifies the need for a nationwide effort to reduce patient harm associated with the use of narcotics and sedatives. The objectives of this project are to identify narcotic and sedative best practices, assess use of these agents within Aurora Health Care hospitals, determine how best to align current with established best practice standards, and develop a tool for ongoing monitoring of adverse events with these agents.

Methods: Best practice statements regarding the use of narcotics and sedatives were compiled from recommendations issued by the Institute for Safe Medication Practices, the Institute for Healthcare Improvement, and the Joint Commission. A survey was developed to compare current practices within all thirteen Aurora inpatient facilities with these recommendations. Based on the survey results, opportunities to align Aurora Health Cares current practice with best practice recommendations were identified and prioritized. A mechanism will also be developed to provide medication safety entities within the organization a tool for performing ongoing monitoring of adverse events requiring pharmacologic reversal associated with these agents.

Results/Conclusions: Results from the survey revealed disparities in the current mechanisms in place to ensure safe use of narcotics and sedatives. Preliminary results indicate that implementation of policies and procedures to limit the number and variety of narcotic and sedative choices on order sets and patient profiles and standardizing available epidural and PCA concentrations will be priorities based on impact and feasibility. A report was created that includes number of naloxone and flumazenil doses ordered per unit per patient admission to act as a monitoring tool for adverse events.

Learning Objectives:

Identify resources for current best practices for narcotics and sedatives. □□

Describe risk reduction strategies pertinent to the use of narcotics and sedatives in acute care facilities.

Self Assessment Questions:

List three organizations that provide best practice recommendations regarding the use of narcotics and sedatives.

List three interventions that could be implemented in a hospital setting to reduce the risk of patient harm with the use of narcotics and sedatives.

EFFECT OF EXOGENOUS ERYTHROPOIETIN IN NEONATES ON DECREASING THE NUMBER OF DONOR EXPOSURES AND RED BLOOD CELL TRANSFUSIONS

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Purpose:
Prior to December 2007, administration of exogenous erythropoietin (EPO) to neonates weighing less than one kilogram was standard of care for the prevention of anemia of prematurity at the University of Illinois Medical Center at Chicago (UIMCC). The primary rationale for EPO administration is to decrease the number of red blood cell transfusions and exposure to various donors. Recently published data suggests that these benefits may not occur. The aim of this study is to determine if the change in practice of no longer administering EPO increases the incidence of donor exposures and number of blood transfusions. Also, because EPO has been linked to retinopathy of prematurity (ROP), comparison of its incidence will be made.

Methods:
This retrospective chart review was approved by the investigational review board. Infants in UIMCCs NICU from December 1, 2005 to September 11, 2008 were included. Patients were identified by query of pharmacy records to determine which patients received EPO during the specified time period. Patients were matched via weight criteria (less than 1kg and greater than 750g, between 750g and 500g, and less than 500g) to a control group of non-EPO neonates admitted after December 1, 2007. Two non-EPO subjects were matched per each EPO treated subject.

Results:
Fifty-two total subjects were included in the study (34 non-EPO and 18 EPO). Average gestational age and birth weight was 25.6wks and 776g and 25.7wks and 761g, respectively, in the non-EPO and EPO. The average number of transfusions and donor exposures were 5 and 1 (transfusion range 0-12 and donor range 0-2) for the non-EPO group and 4.8 and 1.2 (transfusion range 0-17 and donor range 0-3) for the EPO group. Incidence of ROP in the non-EPO group was 60% and 55.6% in the EPO group. Statistical analysis is pending for collected results.

Learning Objectives:

Evaluate the mechanistic theory and role behind EPO replacement in neonates with anemia of prematurity

Explain the evidence based conclusions of this study

Self Assessment Questions:

Why was EPO used in neonates with anemia of prematurity?

Did this study support the concept that EPO decreases the number of donor exposures and red blood cell transfusions in neonates with anemia of prematurity?

EXPLORING THE VALUE OF A DEDICATED PHARMACY RESOURCE IN THE PREOPERATIVE ADMISSION PROCESS

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Purpose: Currently at Froedtert Hospital, a pharmacist conducted medication history occurs within twenty four hours of a patients hospital admission. Due to patients cognitive state, a postoperative medication history may not be accurate or a patient satisfying experience. Establishing a dedicated pharmacy resource to conduct medication histories in the Preadmission Testing (PAT) Clinic would enhance medication history accuracy and patient satisfaction.

Methods: This study was conducted at a 450 bed academic medical center in Milwaukee, Wisconsin that performed 8,792 inpatient surgeries in 2007. Fifty patients seen in the PAT clinic during two nonconsecutive weeks were randomly included into the intervention arm of the study based on pharmacists availability and time of patients appointment. Fifty patients were randomly chosen during the same months to be included in the control arm of the study. Day surgery patients were excluded from the study. All patients in the intervention arm were seen by the same pharmacist to provide consistent medication history and documentation. The control arm of the study was not informed that the medication histories provided by this group would be evaluated due to the pursuit of capturing the true current practice. However, all clinic employees were aware that a pharmacist was conducting medication histories to determine the advantages of a pharmacist in the PAT clinic. Upon hospital admission, a floor pharmacist conducted the medication history as currently practiced. The effect of the intervention will be assessed by comparing the medication history documented by either study arm to medication history completed by the floor pharmacist postoperatively to determine discrepancies found by the floor pharmacists medication history. The number of discrepancies and severity of discrepancies will be evaluated and compared between each study arm.

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

Learning Objectives:

Identify advantages of having a dedicated pharmacy resource in the preadmission testing clinic.

List strategies for conducting accurate medication histories in the fast pace clinic visit.

Self Assessment Questions:

The goal of a pharmacist conducted history in the PAT clinic is
A. Increase patient satisfaction
B. Streamline medication reconciliation throughout the perioperative process
C. Decrease time spent for floor pharmacist to conduct a medication history
D. All of the above

True or False. The intervention arm of the study had less medication histories with one or more discrepancies than the control arm?

CONTINUOUS QUALITY IMPROVEMENT INITIATIVE: USE OF SMART PUMPS IN THE OPERATING ROOM

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Background
Infusion-related medication administration errors can occur as a result of transcription errors, incorrectly programmed infusion rates, and calculation errors. Smart pump technology alerts personnel if a rate is programmed that exceeds the maximum infusion rate specified for that drug. This alert allows the error to be corrected before the infusion begins.

The objective of this study is to describe the frequency and type of alerts generated from Guardrails smart pump software on infusion rate limits set for the operating room (OR) in order to identify quality improvement initiatives.

Methods
Data from alerts generated by the Guardrails software in the OR between October 1, 2008 and March 31, 2009 will be collected. Reports of medication errors occurring in the OR between April 1, 2008 and March 31, 2009 will also be collected. Information compiled will include the following: number of alerts, medication errors reported, infusions administered, drugs involved in alerts, magnitudes of overdose, actions in response to alerts, and time of day alerts are detected. Descriptive statistics will be used to report results. This study was approved by the Clarian Health IRB.

Results
At preliminary data collection, approximately 200,000 infusions were administered with the assistance of Guardrails software. Forty-two alerts in pediatric patients representing seven medications were recorded, most commonly dopamine (n=13) and fentanyl (n=9). The majority (79%) of alerts were entered 0.5 to 1.5 times higher than the max allowable infusion rate. Sixty percent of the alerts occurred between 6 AM and noon. Half of the alerts were overridden. No medication errors had been reported through the voluntary reporting system.

Conclusions
Results will be used as part of a quality improvement initiative to evaluate system utility by assessing the number of errors avoided with use of the program, and identify program modifications that could improve system efficiency.

Learning Objectives:

Explain how infusion-related medication errors can occur

Describe types of errors smart pumps detect

Self Assessment Questions:

Infusion-related medication administration errors can occur as a result of
1.transcription errors
2.incorrectly programmed infusion rates
3.calculation errors
4.all of the above

Correct answer #4

Smart pumps can
1.assess whether the volume of a subcutaneous infusion is appropriate
2.alert personnel if an infusion rate is programmed that exceeds the maximum infusion rate specified in the drug library.
3.be programmed to infuse medication at specific time point during the day
4.all of the above

Correct answer #2

EVALUATION AND ASSESSMENT OF INSULIN PEN DEVICES FOR INPATIENT HOSPITAL USE

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Purpose: The objective of this project is to evaluate and assess feasibility of instituting insulin pen devices within the inpatient setting at Aurora Memorial Hospital of Burlington (AMHB).
Methods: Prior to evaluating data, the project proposal will be reviewed by the Institutional Review Board. The project will be presented to the Aurora Health Care South Region Pharmacy and Therapeutics (P&T) Committee to introduce the idea of switching from insulin vials to insulin pen devices at AMHB. Information regarding insulin pen device use within other health care systems will be evaluated to determine potential problems that could present following the implementation of insulin pen devices. The following data regarding current insulin use will be collected: types of insulin used, amount of insulin used, amount of insulin wasted and insulin distribution and storage. After the background data has been collected and assessed, cost-effective insulin pen device alternatives will be determined. If it is determined that it may be feasible to switch from insulin vials to insulin pen devices, an implementation plan will be developed and a pilot study will be conducted following extensive nursing education. Following the implementation of the pilot study, data will be collected to determine safety and cost-effectiveness of insulin pen device use.
Preliminary Results: Assessment of insulin pen device use at other health care institutions revealed that most institutions that utilize insulin pen devices prefer the pen devices to insulin vials and that any safety issues encountered were consistent and can be prevented with thorough nursing education. Upon initial assessment of current insulin use and distribution at Aurora Memorial Hospital of Burlington, it was found that insulin aspart or insulin glargine pens could be more cost-effective than vials. Further results to be determined.
Conclusions: To be determined.

Learning Objectives:

Assess the potential advantages and disadvantages of implementing insulin pen devices for inpatient use.

Identify common insulin pen device safety fail-points cited by the Institute for Safe Medication Practices (ISMP).

Self Assessment Questions:

Which of the following are common problems encountered with insulin pen device use in hospitals as cited by the Institute for Safe Medication Practices (ISMP)?
a.Needlestick injuries
b.Withdrawing insulin from the pen cartridge using a syringe (using the pen devices like vials)
c.Using one insulin pen for multiple patients
d.Not leaving the insulin pen needle in the injection site for six seconds following injection
e.All of the above

Which of the following is NOT true regarding insulin pen devices?
a.Insulin pen devices pose no contamination risk if used for more than one patient and may be used as floor stock
b.Needlestick injuries may occur if a 90 degree angle is not maintained during injection
c.Insulin pen needles containing needle guards are available to further prevent needlestick injuries
d.Withdrawing insulin from pen devices using a syringe may result in large air pockets within the device and consequent dosing errors
e.None of the above

ANTIPSYCHOTIC PRESCRIBING PATTERNS FOLLOWING IMPLEMENTATION OF MENTAL HEALTH QUALITY EDITS IN A MEDICAID PROGRAM

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Background: Poly-pharmacy has been noted in many patient populations and is especially prevalent in the treatment of mental illness. One example of this trend is seen in the treatment of thought disorders, where multiple antipsychotics may be used to control symptoms or prevent unwanted adverse effects. In January 2007, the Indiana Medicaid Program implemented medication use edits to improve the quality of behavioral health care of its members treated with antipsychotics. The goal of the edits was to limit the use of antipsychotics to fewer than two medications. This study will provide information on how these edits affected prescribing patterns for patients who received Wishard Advantage. Wishard Advantage is a managed care program that provides medical care to patients who fall at or below the 200 percent federal poverty level and do not qualify for other assistance programs.

Methods: A retrospective chart review of adult patients (age 18-64), treated on an outpatient basis will be conducted. Patients will be included if they were taking 3 or more prescribed antipsychotics during the given time period, and had prescription drug coverage through the Wishard Advantage Plan. Prescriptions from June through December of 2006 will be compared to prescriptions from June through December of 2007 to detect changes in prescribing patterns influenced by this medication use edit. These time periods were chosen to represent prescribing patterns before and after the implementation of the medication use edit. The data collected will undergo statistical analysis to determine the total percent of patients who were on 3 or more antipsychotics before and after the Medicaid edits to determine if and how the edits affected the prescribing patterns of this population.

Results and conclusions to be presented.

Learning Objectives:

Assess how Medicaid medication use edits have affected prescribing patterns for adult patients who receive prescription coverage through the Wishard Advantage Plan. □□Assess the use of antipsychotics before and after enaction of the medication u

Assess the time period in which patients were on a 3 drug regimen

Self Assessment Questions:

What was the most commonly prescribed antipsychotic found in this population of patient?
a. quetiapine
b. olanzapine
c. haloperidol
d. risperidone

Patients with thought disorders are usually started out on 3 antipsychotics and therapy is de-escalated from there based on symptom control? T/F

CENTER OF HOPE: EVALUATING ORDER SET IMPLEMENTATION

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Purpose:
Each year more than 33 incidents of sexual assault occur per 100,000 people. The risk of an sexually transmitted infections (STI) associated with a single assault is estimated to be 26.3%. Less than 30% of all sexual assault victims receive the appropriate prophylactic measures outlined by the Centers for Disease Control and Prevention (CDC), which includes antibiotics, emergency contraception, and non-occupational post exposure prophylaxis (n-PEP), when indicated. There are limited studies evaluating proper prophylactic medication management of this population. The objective of this study is to determine the effect of order set driven care for the management of sexual assault victims admitted to the emergency department.

Methods:
All men and women, 18 years old or greater, admitted to the emergency department for sexual assault will be included. The retrospective portion of the study will include patients treated prior to order-set implementation from September 2007 through September 2008. The second half of the study will be collected on patients admitted to the emergency department from September 2008- March 2009 following order-set implementation. Data will be collected through the hospitals online patient database including: patients age, allergies, gender, type of assault, HIV status, HIV status of assailant (if known), n-PEP offered/accepted, types of medications offered/administered, and compliance with hospital order-set.

Endpoints:
The primary endpoint will be to determine if order-set implementation increased compliance with recommendations made by the CDC and the hospital for n-PEP. Secondary endpoints will include evaluation of the effectiveness of the order-set at increasing compliance with CDC and the hospitals recommendations for STI prevention/treatment following a sexual assault.

Statistics:
A chi-squared analysis will be performed to determine if a statistical significance is present between the groups.

Results and Conclusions:
To be discussed upon completion of data collection.

Learning Objectives:

Describe the proper prophylactic treatment for a person that has been sexually assaulted

Identify situations that would warrant the use of non-occupational post exposure prophylaxis for Human Immunodeficiency Virus (HIV).

Self Assessment Questions:

What is the estimated percent of people that receive the appropriate prophylactic measures following a sexual assault?
a.5%
b.30%
c.50%
d.100%

If the following individuals were sexually assaulted, who should receive n-PEP?
a.A 20 year old woman that was vaginally assaulted by an unknown male wearing a condom
b.A 30 year old male that anally assaulted with a foreign object
c.A 25 year old woman with exposure to semen during an anal assault by an unknown male
d.A 60 year old woman that was urinated upon by an unknown male

RECOMBINANT ACTIVATED FACTOR VII: A REVIEW OF CURRENT LITERATURE AND GUIDELINES FOR USE IN A COMMUNITY HOSPITAL

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Purpose: Recombinant activated factor VII has been proven to be a safe and effective treatment for bleeding episodes and surgical bleeding in patients with congenital factor VII deficiency, hemophilia A or B with inhibitors, and also acquired hemophilia. Since its approval, recombinant activated VII has been utilized for numerous off-label purposes, many of which are controversial, and the minimum effective dose has not been established. The intention of this study was to review current literature to determine which off-label uses and regimens were most practical and cost-effective for the patient population at our hospital. Subsequently this information was used to develop guidelines for use at our institution.

Methods: A literature search was conducted and current literature was reviewed in order to construct specific guidelines for the use of recombinant activated factor VII at our institution. After guidelines for use had been developed, nurses, physicians, and other health care practitioners likely to become involved in treating patients with recombinant activated factor VII were consulted and their input considered for revision of the treatment guidelines. Subsequently, a retrospective review of patients who have received recombinant activated factor VII at our institution was conducted to determine how current prescribing patterns compared to the proposed recommendations. Following the review, the guidelines for use were presented to the Medication Use Committee for approval. The approved guidelines are being implemented which includes extensive staff education. Pharmacists and physicians likely to order, dose, or prepare recombinant activated factor VII at our institution are being targeted. Following implementation, a medication use evaluation study will be conducted to assess patient outcomes and changes in prescribing patterns since guideline implementation.

Results and Conclusion: In progress.

Learning Objectives:

To identify FDA approved indications versus off-label uses of recombinant activated factor VII.

To identify precautions to avoid futile care when administering recombinant activated factor VII.

Self Assessment Questions:

What are the FDA approved indications for recombinant activated factor VII?

True/False: Use caution to avoid futile care when administering recombinant activated factor VII to patients with the following: Glasgow Coma Score ≤8, hypotension requiring ≥2 pressors, or organ dysfunction.

A COMPARISON OF THE ACCURACY OF FOUR GLUCOMETERS TO A STANDARD LABORATORY GLUCOSE ASSAY

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Introduction: As pharmacists become more involved in the care of diabetic patients, they need to be confident that results given by various blood glucose meters are reliable. This is especially critical when patients use a sliding scale to guide insulin therapy.
Objective: The purpose is to investigate the variability in blood glucose measurements between a laboratory standard blood glucose obtained from a venipuncture and current glucose meter from four different manufacturers.
Methodology: Subjects age 18 and older will be enrolled from W.W.Knight Family Practice Center and placed in one of three categories based on the laboratory standard blood sugar. Enrollment will continue until there are 35 individuals with blood sugars less than 200 mg/dL, 35 in the 201 to 300 mg/dL range, and 35 in the greater than 300 mg/dL range (total n = 105). A finger stick will be used to obtain a capillary blood sample for the four meters. A second finger stick may occur if one sample is not sufficient to test all four meters. The order for the meters used for testing will be varied. The blood sample for the laboratory standard will be obtained via venipuncture and blood sugar will be determined using an ALFA Wasserman ACE. All finger sticks and venipuncture will be obtained within a 5 minute period.
Statistical Analysis: An ANOVA will be performed for overall differences, paired t-tests for individual comparisons of each meter to the laboratory standard, and an error grid analysis will be used to determine accuracy of the various meters compared to the laboratory standard.
Conclusion: Study currently in progress with results to be presented at the conference.

Learning Objectives:

Define the factors that have an effect on the accuracy of blood glucose meters.

Describe the clinical significance of differences in accuracy among blood glucose meters.

Self Assessment Questions:

Which of the following factors can potentially affect the accuracy of blood glucose meters?
a. Internal mechanism of the device
b. Patient factors (use of control solution, general use of meter, etc.)
c. Environmental factors (humidity, extreme cold, etc.)
d. All of the above

What is the most current ADA recommendation goal for accuracy for blood glucose meters?
a. +/- 5%
b. +/- 10%
c. +/- 20%
d. +/- 50%

ACCURACY OF ELECTRONIC MEDICATION RECORDS IN AN ACADEMIC FAMILY PRACTICE CENTER.

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Purpose:
To evaluate the accuracy of electronic medication records (EMR) in an academic outpatient family practice center. Data will serve as a comparator against a prior study of accuracy of written medication records at the same practice site.

Background:
Medication reconciliation is an important issue that has come to the forefront of the health care dialogue. The 2008 Joint Commission patient safety goals address medication reconciliation as a goal across the continuum of care and hold ambulatory care to the same standard as hospitals in this process.

Methods:
Primary outcome measure is percent of currently active medications that are accurately captured by the EMR. Accuracy of a medication entry is defined as correct drug name, strength and dosing schedule of medications actually being taken. Secondary measures include the nature of any discrepancies, attributable cause, potential severity, estimated time since the last pharmacist intervention, patient age and total number of medications actually taken by the patient. The study includes primary care patients seen during regularly scheduled visits at an academic outpatient family practice clinic. New patients, pregnant women, patients under age 18 and non-English speaking patients are excluded. Patients are interviewed at the appointment by a pharmacist or pharmacy student using all available resources in assessing the current drug regimen including the patients statement of present medication regimen, caregivers, pharmacy records, medication bottles and medical records. The list of medications obtained through interview and other resources is considered the accurate standard. Concordance of EMR with this list is evaluated using a standard data collection form. Results will serve as a comparator against a prior study of accuracy of hand-written medication records at the same practice site.

Results:
Results and conclusions will be presented at the 2009 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Compare accuracy rates of traditional hand-written medication records with electronic medication records as found at an academic family practice setting.

Identify the most frequent contributory factors to errors in electronic medication records.

Self Assessment Questions:

True or False: There is substantial evidence that the implementation of the use of the electronic medication record (EMR) significantly reduces adverse drug events in the outpatient setting.

True or False: Patient-initiated modification of the medication regimen is the most common cause of discrepancies found during medication record reconciliation.

IMPACT OF PHARMACIST INTERVENTION IN PEDIATRIC CONGENITAL HEART PATIENTS

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Purpose: Currently, pharmacists are not part of medication discharge counseling for congenital heart patients unless consulted. This study will assess the impact of pharmacist intervention on parental understanding and compliance of their childs medication regimen upon hospital discharge. Parental satisfaction of medication discharge counseling will also be assessed. Goals include expanding current inpatient pharmacist medication discharge counseling programs to congenital heart patients and increasing continuity of care by having pharmacist follow-up continue into the clinic setting.

Methods: Every congenital heart patient who is discharged from Childrens Hospital of Wisconsin, concurrent with the residency year, will be eligible to participate. Patients will be randomized into two groups. The control group will receive the standard discharge instructions as provided by their doctors and nurses. The second group will receive a face-to-face pharmacist consult where the parent of the child will be provided with a medication discharge calendar, demonstration of administration technique, and clarifications of any questions, in addition to the standard discharge instructions. All parents will be given a survey to assess their satisfaction with the counseling process and amount of information given at discharge. Follow up will take place at the patients next clinic appointment at the study site, if applicable, and will consist of assessment of verbal understanding of indication, dose, and frequency of medication use and demonstration of administration technique. Dispensing pharmacies will be contacted approximately one month post-discharge to assess compliance based on refill history. Outcomes will measure statistically significant differences between the two groups in terms of compliance, appropriate administration technique, and knowledge of medication. Responses from the survey will be summarized using basic descriptive statistics. Study will follow institutional guidelines set-forth by the institutional review board.

Results: This study is in the data collection phase. Final results and conclusions will be presented at the GLPRC conference.

Learning Objectives:

List factors that make medication discharge counseling difficult, particularly in pediatric congenital heart patients.

Describe the potential benefits of having a pharmacist, rather than a nurse or doctor, perform medication discharge counseling in pediatric congenital heart patients.

Self Assessment Questions:

True or False: Pharmacists can have a positive effect on medication discharge counseling satisfaction in the pediatric patient population.

True or False: Medication compliance is increased by pharmacist medication discharge counseling.

IMPROVEMENTS IN PAIN OUTCOMES AND FUNCTIONALITY IN CHRONIC PAIN PATIENTS THROUGH INTERVENTIONS BY AN INTERDISCIPLINARY CONSULT TEAM.

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Statement of purpose:
The mission of the interdisciplinary pain clinic is to provide the most advanced cognitive behavioral rehabilitation based on a comprehensive interdisciplinary evaluation and treatment planning. The purpose of this research is to assess whether this team approach improves patient care and outcomes at the William S. Middleton Memorial Veterans Hospital.

Methods:
Initially, a review of the computerized patient records system (CPRS) will be conducted to identify patients who were consulted to the Cognitive Pain clinic and discharged from that clinic after subsequent care from October 2006 through October of 2008. A retrospective chart review will be performed using VA medical records. Patients will be excluded from review if they were discharged from the clinic due to non-adherence or after only one clinic appointment. Information to be collected includes: age, sex, diagnosis, pain score on initial visit, pain score at last visit before discharge, functions of daily living and treatment modalities utilized. Statistically, changes in pain scores from initial visit to last visit will analyzed using a two-tailed T-test, while improvements in functionality will be analyzed using a $\chi 2$ test. Primary endpoints of this study include: average pain score at the beginning of treatment and at time of discharge and identification of functional improvements in a yes/no fashion as seen through daily living functions. Secondary outcomes will identify and analyze the modalities of treatments used. It is our hypothesis that through treatment by the Cognitive Pain clinic, patients will have improved pain scores and functions of daily living.

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

Learning Objectives:

Review outcomes of an interdisciplinary pain consult service.

Identify treatment modalities used in successfully treated patients.

Self Assessment Questions:

Can interventions by an interdisciplinary team improve outcomes of chronic pain patients?

List 3 modalities of treatments that were found to be successful.

PHARMACISTS USE AND PERCEPTION OF THE TRUSTWORTHINESS OF WIKIPEDIA AND RXWIKI AS DRUG INFORMATION RESOURCES

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Background
It has been cited that 80 percent of adults in the United States use the Internet for health care purposes. A survey of pharmacists performed in 2000 showed that 81.7 percent used the Internet to obtain drug information. When using a search engine, a website that is commonly found at the top of search results is Wikipedia. As of November 2008, Wikipedia had 60 million people visit the site and it was ranked number eight of most unique visitor traffic per website. Wikipedia is a free-to-access collaborative online encyclopedia that can be edited by anyone. A recent study determined that not all drug information found on Wikipedia is accurate or complete. It becomes a challenge for pharmacists to decipher the correct information and determine which websites to trust.

Objective
To measure pharmacists use of free online drug information websites and perception of Wikipedia and RxWiki for obtaining drug information.

Methods
A 20 question survey will be developed to collect information regarding demographics (age, sex, education, training, practice setting, years of practice), use of free online drug information websites (Wikipedia, RxWiki, Medscape Drug Reference, Drugs.com, WebMD, Medline plus, Drugs@FDA, PDRhealth.com, Rxlist.com, U.S. National library of Medicine: Drug information, DrugDigest: Drug Library, Healthvision: Drug Guide, Kaiser Permanente: Drug Encyclopedia, MedLibrary.org: Medication Information Library, PersonalMD: Drug Database, Cheshire Medical Center: Healthwise Knowledge Base, Pharmaceutical company websites, Drug store websites), Wikipedia and RxWiki (perception on accuracy and completeness, willingness to recommend, awareness on who edits them). An invitation to participate and link to the web-based survey will be e-mailed February 2009 to a nationwide sample of practicing pharmacists. Survey responses will be anonymous, and recipients will be given two weeks to complete the survey. This project was approved by the local Investigational Review Board.

Results and Conclusions:
Information is pending.

Learning Objectives:

Review recent concerns of using free online drug information resources.

Describe U.S. practicing pharmacists use and perception of Wikipedia as a drug information resource.

Self Assessment Questions:

T/F One concern regarding the use of Wikipedia as a drug information resource is that the information is not always complete or accurate.

T/F U.S. pharmacists trust Wikipedia.

EVALUATION OF ANTIPSYCHOTIC USE IN THE MEDICAL INTENSIVE CARE UNIT TO TREAT ACUTE DELIRIUM

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Purpose

The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) algorithm is a tool to assess delirium in ICU patients. The CAM-ICU algorithm was implemented in the Medical Intensive Care Unit (MICU) at The Ohio State University Medical Center (OSUMC) in January 2008. Antipsychotic selection (haloperidol, risperidone, and quetiapine) should be based on and dose adjusted depending on the patients age, renal, and hepatic function. These antipsychotics can increase the incidence of QTc prolongation, therefore obtaining a baseline and follow-up ECG is recommended.

Objectives

To determine the extent to which the CAM-ICU algorithm is being followed regarding appropriateness of antipsychotic initiation, starting dose, medication choice, dosage adjustment, monitoring for QTc prolongation, and incidence of discharge from OSUMC on antipsychotic medications.

Methods

This study will be a retrospective chart review of all MICU patients being treated with antipsychotic medications for acute delirium from October to December 2007 (pre CAM-ICU) and March to May 2008 (post CAM-ICU). Electronic medical records will be used to obtain a list of all patients admitted to the MICU and further subdivided into those who received antipsychotic medications. The following data will be collected: age, weight, gender, serum creatinine, hemodialysis status, liver function, baseline ECG, follow-up ECG, QTc prolongation incidence, CAM-ICU score, Richmond Agitation Sedation Scale (RASS) score, antipsychotic initiated, dose, benzodiazepine use, and whether the patient was discharged on antipsychotics. Patients less than 18 years of age, greater than 89 years of age, pregnant females, and incarcerated patients were excluded. The collected data will be analyzed to compare the appropriateness of antipsychotic initiation, dosage adjustment, incidence of adverse effects, and to compare benzodiazepine dosage between groups. The incidence of discharge from OSUMC on antipsychotics will be assessed.

Results

This project is in the data collection phase. Results and conclusion will be presented at the conference.

Learning Objectives:

Review the CAM-ICU

To recognize the benefits and risks associated with antipsychotic use in the MICU

Self Assessment Questions:

Antipsychotic medications should be initiated at lower dosages in the elderly?
True or False

Which medication is associated with the greatest incidence of QTc prolongation?
a. haloperidol
b. risperidone
c. quetiapine

CROSS-SECTIONAL ANALYSIS OF THE OCCURRENCE OF RELAPSE IN PATIENTS TAKING QUETIAPINE FOLLOWING SUBSTANCE ABUSE TREATMENT.

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PURPOSE:

Determine if there is an association between the utilization of prescription quetiapine and the occurrence of relapse in patients following completion of a substance abuse treatment program.

METHODS:

This study is a retrospective cross-sectional chart review comparing relapse rates between individuals who utilized quetiapine therapy vs. individuals who did not receive quetiapine following completion of a substance abuse treatment program. Patients who completed the 21 day residential substance abuse treatment program at the Chillicothe VAMC between October 1st 2006 through April 1st 2008 will be identified by electronic records search. The primary outcome of the study is relapse occurring 6 months following completion of the substance abuse treatment program. Individuals must be between the ages of 18-65 and had completed the substance abuse treatment program. Inclusion in the treatment group requires dispensing of at least a 90 day supply of quetiapine during the study period. Individuals will be excluded if receiving doses of quetiapine < 25 mg/day or > 400 mg/day as will any patients with documented dual diagnosis. It was calculated that 32 patients will be needed in each group to have 80% power to detect a 10% difference in rate of relapse between the two groups.

RESULTS/CONCLUSIONS:

Research is currently in data collection phase. Results and conclusion will be presented at Great Lakes Residency Conference.

Learning Objectives:

Describe the receptor pharmacology of quetiapine and relevance to addiction.

Review current indications and associated dosages of quetiapine.

Self Assessment Questions:

Which of the following receptors does quetiapine NOT have appreciable activity?
a. Alpha-1 (α1)
b. Histamine H1
c. Dopamine D2
d. Muscarinic M4
e. Serotonin 5HT2a

There is evidence to support the use of quetiapine for relapse prevention in patients following substance abuse treatment. T or F

ASSESSING THE EFFECTIVENESS AND SAFETY OF VARENICLINE IN A VETERANS AFFAIRS POPULATION

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Purpose:
Phase III trials studying varenicline have found it to be superior to bupropion and placebo for tobacco cessation, however each of them excluded patients with significant co-morbid conditions. These exclusions become important when trying to extrapolate the success of these studies to Veterans Affairs (VA) patients, of whom many use tobacco and have at least one co-morbidity. Furthermore, since serious adverse drug events have been reported in post-marketing data, monitoring and documentation of varenicline utilization is increasingly vital. The purpose of this study is to determine the effectiveness of varenicline for tobacco cessation in a VA population. Secondary objectives include assessing the prevalence of adverse drug reactions and documentation at follow-up visits.

Methods:
A retrospective review of all patients with active varenicline prescriptions between September 2007 and September 2008 was conducted. Information gathered included age, gender, diagnoses, prescriber, history of quit attempts, history of tobacco cessation medications, tobacco-free status, documentation at follow-up visits, documented adverse drug reactions, and duration of varenicline therapy. The primary endpoint was to determine the effectiveness of varenicline for tobacco cessation. Secondary endpoints were to determine the prevalence of adverse drug reactions and documentation at follow-up visits.

Results:
Thus far 727 patients have been evaluated, of whom 196 filled varenicline prescriptions consecutively for at least 3 months and have documentation of their smoking status for this time period. Preliminary results reveal that out of these 196 patients, 41 (20.9%) have successfully quit tobacco use after an average 10.8 months of follow-up.

Learning Objectives:

Describe the shortcomings of clinical trials studying varenicline and why there is a need for further evaluation.

To identify common adverse drug reactions of varenicline.

Self Assessment Questions:

True or false: Varenicline has been proven to be significantly more effective than bupropion for tobacco cessation over the course of one year in all studies to date.

Varenicline is commonly associated with which of these side effects?
a) Fatigue
b) Hypertension
c) Abnormal dreams
d) Diarrhea

ENSURING CLINICAL APPROPRIATENESS AND EFFICIENT UTILIZATION OF A HIGH-COST CLINIC ADMINISTERED MEDICATION

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Background: With the rising expense of healthcare, cost control measures are being implemented by many healthcare organizations. Starting in 2003, Medicare began applying national and local coverage determinations (LCD) for several high-cost medications. An LCD contains indications that will be reimbursed by Medicare provided patient-specific criteria are met. The Medicare contractor for Wisconsin revised the LCD for botulinum toxin effective October 1, 2008. This medication is commonly clinic-administered for treatment of various neuromuscular and ophthalmic disorders; however, utilization is not limited to the indications specified in the LCD. If the LCD criteria are met without independent evaluation of the literature, some conditions may be left untreated. Therefore, all orders for high-cost clinic-administered medications, including botulinum toxin, are reviewed for both fiscal and clinical appropriateness by a clinical pharmacist.

Purpose: The purpose of this project is to develop and implement an evidence-based guideline which will maximize the clinically appropriate and fiscally responsible utilization of botulinum toxin.

Methods: An analysis to evaluate reimbursement prior to implementation of the LCD is underway. A guideline is being written based on both published clinical evidence and criteria proposed in the LCD. Meetings including neurologists, rehabilitation physicians, ophthalmologists, fiscal personnel, and pharmacists will be held to review the guideline and garner consensus amongst key stakeholders. The guideline will then be submitted for approval and review by the Clinic Administered Medications committee with further review and approval by the Pharmacy & Therapeutics committee. The guideline will be applied to all sites within the organization where botulinum toxin is administered. Education of providers will be the final step, and will include various communication methods.

Results are pending and will be presented at a later time.

Learning Objectives:

Explain the importance of addressing medications with Medicare local coverage determination criteria.

List the steps involved in development and approval of the botulinum toxin guideline.

Self Assessment Questions:

What two conditions listed below are not covered according to the Wisconsin contractors LCD?

A)Essential hand tremor
B)Sialorrhea (excessive drooling)
C)Spasticity due to traumatic brain injury
D)Migraine headache (new diagnosis)
E)Hyperhidrosis

True or False: Only government officials have the ability to appeal or petition for changes to the local and national coverage decisions

MAXIMIZING BAR CODE MEDICATION ADMINISTRATION SCANNING COMPLIANCE FOLLOWING THE IMPLEMENTATION OF AN INTEGRATED ELECTRONIC HEALTH RECORD

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The University of Wisconsin Hospital and Clinics (UWHC) is currently implementing a system-wide electronic medical record (EMR) (Epic Systems). The system contains functionality for computerized provider order entry (CPOE), medication ordering, bar code medication administration (BCMA), clinical documentation, billing and scheduling. UWHC first implemented BCMA in 2002 (Admin-RX-McKesson). In the spring of 2008, UWHC transitioned BCMA systems from Admin-RX to Mobile-Meds (Epic Systems). The new BCMA system is integrated with the medication ordering system and EMR.

The goals of this project are to increase BCMA scanning compliance to 100% and to improve medication charge capture accuracy via transitioning from "charge on dispense" to "charge on administration". The objectives of the project are to identify factors for why medications are not scanned before being administered; to develop strategies to overcome the current barriers to scanning; to develop targeted system improvements to maximize compliance with medication scanning; and to develop a process to continuously evaluate the rate with which administered doses are scanned and accurately documented as administered.

Identification of human factors related to not scanning medications will be gathered by the project investigator through direct observation studies. An interdisciplinary team will identify root causes to determine why medications are not being scanned prior to administration. Strategies for improvement will be prioritized by the team based on sustainability and relative impact on scanning compliance. Reporting functionality will be designed to allow continued monitoring of scanning compliance and documentation.

The proposed results of this project will be identification and ranking of causes for not scanning medications prior to administration; implementation of strategies to maximize BCMA scanning compliance enabling a transition to charge on administration in a manner that does not negatively impact pharmacy revenues; and development of system tracking indicators for continued monitoring and assessment of scanning compliance and medication administration documentation accuracy.

Learning Objectives:

Describe the human factors related to caregivers not scanning medications prior to administration

Describe system improvements that can be implemented to improve scanning compliance

Self Assessment Questions:

What are the top three reasons why caregivers are not scanning medications prior to administration?

What are two interventions that can be implemented within your institution to improve bar code scanning compliance?

IMPLEMENTATION OF A SUCCESSFUL PHARMACIST-MANAGED, WARFARIN COUNSELING PROGRAM

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Purpose:
Warfarin is widely used for the treatment and prevention of thromboembolic disorders. The Institute for Safe Medication Practices considers it a high alert medication due to its complexity of dosing, intense monitoring, and narrow therapeutic index. Data suggests that counseling patients reduces medication discrepancies and improves adherence. In order to reduce adverse warfarin effects and avoid additional health care utilization, a pharmacist-run, counseling program will be initiated at Mercy Hospital and Medical Center. Warfarin education in the hospital will assist in the patients understanding of the drug, improve adherence to the warfarin regimen and monitoring schedule, and reduce adverse effects. The primary objective is to measure outcomes of patient education of warfarin through the implementation of a pharmacist-managed, counseling program.

Method:
To determine the number of patients that could potentially be counseled, a pre-pilot study was initiated with proper review from the Institutional Review Board (IRB), in September 2008. The complete program was approved November 2008. To maintain patient confidentiality, no patient identifiers will be used during the pre-pilot and ongoing study.

The educational material chosen for this program was conducted through a systematic search. Patient education will be in the form of a visual storyboard to aid in active counseling, and as handouts for patients to reference post discharge. Hospital staff pharmacists will be recruited to assist in the warfarin counseling. To determine the effectiveness of patient education, this study will use the Oral Anticoagulation Knowledge Test (OAK) competency questions. The OAK test will aid in determining the relationship between patient knowledge and outcomes. The OAK test will be administered both pre-counseling and post-counseling to show the patients improved understanding of warfarin anticoagulation. The post-test will also include a patient satisfaction survey.

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

Learning Objectives:

Identify a pharmacist-managed, warfarin discharge counseling program, within an inpatient acute care hospital.

Review the outcomes of a warfarin discharge counseling program and patient satisfaction.

Self Assessment Questions:

True/False The OAK test cannot demonstrate a patients knowledge base of warfarin, after effective counseling techniques.

True/False There is no evidence showing counseling improves patient adherence to medication regimen.

EVALUATION OF THE UTILIZATION OF EARLY MICROBIAL CULTURES IN THE TRAUMA PATIENT POPULATION IN 2008

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Purpose: Following a traumatic injury, pro-inflammatory cytokines are released as part of the stress response to tissue injury. As a result, patients may develop the systemic inflammatory response syndrome with an elevated white blood cell count, body temperature, heart rate and respiratory rate, which is often used as evidence of infection. A previous study at Clarian Health/Methodist Hospital was conducted evaluating microbial culture utilization in the presence of early fever in adult trauma patients. This research aims to build upon those results by comparing the current microbial culture utilization on dedicated trauma services from two Level 1 Trauma Centers in Indianapolis, IN to those results previously reported. Secondary objectives include, comparing patient outcomes among those patients cultured early vs. those not cultured and describing empiric antibiotic utilization.

Methods: Per methodology outlined by the previous study, all trauma patients admitted to the intensive care unit at Clarian Health/Methodist Hospital and Wishard Health Services in 2008 were evaluated. Patients less than 18 years old, admitted from an outside hospital or extended care facility greater than 24 hours of injury or chronically immunocompromised (HIV, cancer patient, chronic immunosuppressive therapy) were excluded. Electronic and paper charts were utilized to retrospectively gather patient demographics, APACHE II scores, ISS scores, acute surgical procedures, microbial culture utilization, antibiotic therapies, trauma mechanisms, presence or absence of concomitant neurological injuries and patient dispositions.

Results: In 2002, 634 patients were evaluated. Thirty-seven percent were cultured within 5 days of ICU admission. Nine percent of patients had positive blood cultures and 14% had positive urine cultures. Overall, there was no statistically significant difference in mortality or hospital length of stay. From 2008, an estimated 1100 patients are being evaluated.

Final results and conclusions to be presented.

Learning Objectives:

Describe 3 different etiologies for the development of fever.

Identify the time frame for fever in trauma patients to be caused by infectious rather than non-infectious causes.

Self Assessment Questions:

Fever in a trauma patient less than 48 hours from injury is more likely due to non-infectious causes? T/F

Trauma, blood transfusions, and thromboembolism are all etiologies of fever development. T/F

ASSESSMENT OF VITAMIN K UTILIZATION TO REVERSE THE ANTICOAGULANT EFFECT OF WARFARIN IN A COMMUNITY HOSPITAL SETTING

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PURPOSE: The American College of Chest Physicians (ACCP) publishes evidence-based guidelines on antithrombotic and thrombolytic therapy. Within the guidelines are recommendations for the management of supratherapeutic INRs with or without bleeding. The primary objective of the study is to assess the rate of adherence with 2004 and 2008 ACCP guidelines for vitamin K utilization for reversal of the anticoagulant effect of warfarin at the four acute care hospitals within Community Health Network in Indianapolis, IN.

METHODS: A retrospective chart review will be conducted of male and female hospitalized patients eighteen years of age and older, who received vitamin K for the reversal of the anticoagulant effects of warfarin between January 1, 2008 and June 30, 2008. Patients to be excluded from the study are patients receiving vitamin K for other indications, patients under 18 or over 89 years old, prisoners, and pregnant patients. The following data will be collected: baseline demographics; prescribing physician; initial warfarin dosing; vitamin K dose and route; number of vitamin K doses given; subsequent INR values; changes in warfarin therapy after vitamin K administration; evidence of bleeding; and concomitant administration of fresh frozen plasma, prothrombin complex concentrate, or Factor VII. For the purpose of this study, the presence of serious or life-threatening bleeding will be defined as any bleeding that requires additional medical evaluation, requires at least 2 units of blood transfused, or leads to cardiac arrest, surgical/angiographic intervention or irreversible sequelae. Descriptive statistics will be used to analyze the data collected and evaluate the patient population. The data will be expressed in absolute numbers, percentages, frequencies, means, medians, and/or modes. Each patient case will be evaluated as adherent or non-adherent to the 2004 and 2008 guidelines.

RESULTS AND CONCLUSION: To be presented after completion of data collection and analysis.

Learning Objectives:

Compare and contrast the 2004 and 2008 ACCP recommendations for the management of supratherapeutic INRs with or without bleeding.

Identify opportunities to improve vitamin K utilization for reversal of the anticoagulant effect of warfarin in a community hospital setting.

Self Assessment Questions:

Which of the following is NOT a preferred route of administration for vitamin K?

a. Oral
b. Intravenous
c. Subcutaneous
d. A and B
e. None of the above

True or False: The 2008 ACCP guidelines recommend administering intravenous vitamin K in all patients with serious bleeding with any elevation in INR.

PHARMACIST CONDUCTED PATIENT EDUCATION IN A CONTINUUM OF CARE MODEL: FEASIBILITY AND IMPACT ON HEART FAILURE READMISSION RATES

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Purpose: Frequent hospital readmissions are a significant and costly problem within the heart failure (HF) population. Recent literature has shown that pharmacist involvement in the care of HF patients may reduce the rate of all-cause and HF-related hospitalizations. The purpose of this project is to evaluate the implementation of a multidisciplinary, continuity of care model for HF patients admitted to Froedtert Hospital using pharmacy services to assist with transitions in care.

Methods: HF patients within an internal medicine clinic are initially being targeted for the pilot project. In order to qualify, patients must be admitted with a HF exacerbation and have a current or past left ventricular ejection fraction of less than or equal to 40%. A daily report is used to identify these patients upon admission to the hospital. Once identified, patients are flagged to receive HF medication education and medication profile review by a pharmacist prior to discharge in addition to the usual HF discharge education delivered by a nurse. Within one week of discharge, patients follow up with a pharmacist in clinic to review discharge education and identify any potential medication related problems occurring since discharge. Within two weeks of discharge, patients follow up with a physician within this clinic, and future appointments are determined by clinical necessity. Data collection began October 1, 2008 and will run through February 28, 2009. Feasibility of implementation will be assessed via hospital-wide projections and ability to overcome barriers encountered. Due to the small sample size initially targeted, the power will not be sufficient to calculate statistical significance on the readmission rate. However, impact will be measured by pharmacist interventions in patient care.

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

Learning Objectives:

Identify pharmacist interventions that may decrease hospital readmissions.

Analyze barriers to implementing pharmacist education/services in a continuum of care model and discuss possible solutions.

Self Assessment Questions:

T/F The CMS 30-day heart failure readmission measure will only include patients readmitted in 30 days with a principle diagnosis of heart failure.

Which of the following pharmacist interventions may reduce heart failure hospitalization rates?
a.Patient medication education
b.Medication recommendations to physicians
c.Patient self-monitoring education
d.All of the above

EVALUATION OF ANTICOAGULATION MANAGEMENT IN A COMMUNITY HOSPITAL SETTING.

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Purpose: The Saint Luke Hospitals in Northern Kentucky have implemented two pharmacist-managed anticoagulation clinics. Collaborative care agreements are established with physicians in the community setting whereby clinical pharmacists trained in anticoagulation management monitor and adjust anticoagulation therapy. A retrospective review will be conducted to determine the inpatient admission rates and emergency department visits to The Saint Luke Hospitals as a result of bleeding or thromboembolic complications of warfarin therapy.

Methods: Inpatients at The Saint Luke Hospitals of Northern Kentucky administered warfarin between the dates of January 2008 to March 2008 and greater than 18 years of age are eligible for inclusion. Patients who are pregnant or not receiving continuous outpatient anticoagulation defined as less than two international normalized ratio value measurements during the study period will be excluded. Patients will be considered in the control group if they are referred to the pharmacist-managed anticoagulation clinics for their warfarin management; all other patients will be considered the comparator group. Primary outcome measures include comparison of inpatient admission rates and emergency department visits for anticoagulation related events between the control and comparator groups. Secondary endpoints include the percentage of anticoagulated patients followed by an organized anticoagulation clinic management service, and the proportion of time spent in the target international normalized ratio range for each patient. The severity of bleeding events will also be determined for each group.

Results/Conclusions: The rate of adverse events secondary to anticoagulation with warfarin remains under investigation; data collection and evaluation are in progress. Final analysis will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the components anticoagulation with warfarin and its effects on patient outcomes.

Describe the prevalence of adverse events secondary to anticoagulation with warfarin and the impact it has on morbidity and mortality.

Self Assessment Questions:

T or F: Several studies comparing pharmacist managed anticoagulation clinics to physician anticoagulation monitoring have concluded that the anticoagulation clinics provided better oral anticoagulant management than family physicians, spend more time within the therapeutic range and have a lower incidence of bleeding and thromboembolic events.

Bleeding is the most common complication of warfarin therapy, contributing to
a.Medication-related ED visits
b.Morbidity and mortality
c.Increased health care expenditures.
d.All of the above

CLINICAL OUTCOMES AND SAFETY OF COLISTIMETHATE THERAPY IN PATIENTS WITH ACINETOBACTER SPP. ASSOCIATED INFECTIONS

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Background:
Acinetobacter spp. is an increasingly problematic nosocomial pathogen capable of causing serious infections resulting in high mortality rates. It has an unique ability to rapidly acquire resistance to a broad range of antibiotics, including the carbapenem class. Over the last 2 decades, carbapenem resistance among Acinetobacter spp. has increased nearly 40%. As a result, treatment options are limited and have led to the revival of the polymyxin class of antibiotics. Polymyxins have demonstrated clinical efficacy in treating patients with Acinetobacter infections. Adverse events associated with these agents have limited their utility in the past; however, recent data suggests that they may not be as toxic as previously described. Colistimethate has become the preferred agent at William Beaumont Hospital for the treatment of extremely resistant Acinetobacter spp. Clinical data regarding efficacy and adverse events during colistimethate therapy at our institution is currently lacking.

Purpose:
To evaluate the safety and efficacy of colistimethate therapy for the treatment of Acinetobacter spp. associated infections.

Methods:
This study was a retrospective chart review of patients who had positive Acinetobacter spp. cultures from the blood, sputum, cerebral spinal fluid, urine, or wound that received concurrent intravenous and/or inhalation colistimethate therapy from 1/07-9/08. The patients were identified through pharmacy and microbiology databases. Data collection included patient demographics, cultures and sensitivities, antimicrobial agents, documented adverse events, and clinical outcomes. Patients with a diagnosis of Acinetobacter infection at an outside institution or that expired within 24 hours of starting colistimethate therapy were excluded. The primary endpoints of this study were clinical outcomes and 30-day all-cause mortality. Secondary endpoints included the incidence of adverse events including nephrotoxicity and neurotoxicity, and microbiological outcomes. Descriptive and summative statistics will be performed upon completion of data analysis.

Results/Conclusions:
Final results will be presented at the conference.

Learning Objectives:

Determine the incidence of neurotoxicity and nephrotoxicity associated with colistimethate therapy.

Assess the clinical and microbiological outcomes associated with colistimethate use.

Self Assessment Questions:

Adverse effects associated with intravenous colistimethate include:
a.Hepatic failure
b.Neurotoxicity
c.QTc prolongation
d.Nephrotoxicity
e.b and d

Mortality due to Acinetobacter spp. infections is generally lower when appropriate treatment is started earlier in the course of therapy.
True
False

EVALUATION OF THE APPROPRIATE USE OF ACID SUPPRESSION THERAPIES IN NON-INTENSIVE CARE PATIENTS

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Purpose:

The primary purpose of this project was to evaluate the appropriate use of acid suppression therapies (e.g. proton pump inhibitors and histamine 2 receptor antagonists) in non-intensive care patients at the Clement J. Zablocki Veterans Affairs Medical Center. A secondary focus was to examine how many patients on acid suppression therapy were also treated for a confirmed or suspected Clostridium difficile associated diarrhea infection during their hospitalization.

Methods:

The study entailed a retrospective chart review of 200 patients selected at random who were admitted or transferred to a non-intensive care unit. The following was considered an appropriate use of acid suppression therapy: treatment of upper GI bleed, protection from NSAID related ulcers, protection from high-dose corticosteroid use (greater than 250mg/day hydrocortisone or its equivalent), use in Helicobacter pylori eradication, treatment of new onset GERD, duodenal ulcer, Barrett's esophagus, erosive esophagitis or gastritis, and continuation of an active outpatient acid suppression regimen. In order to be considered active for this study, the outpatient acid suppression therapy prescription had to have been filled or refilled within the previous 90 days before hospital admission. Inappropriate uses of therapy included: general ulcer prophylaxis for low-risk non-critically ill patients, anticoagulant associated prophylaxis, anemia, low dose corticosteroid prophylaxis (less than 250 mg/day of hydrocortisone or its equivalent), no documented indication, and continuation of an inactive outpatient acid suppression regimen. An outpatient prescription was considered inactive if it was not filled in the 90 days prior to admission. All data collected was recorded confidentially, without patient identifiers in the Microsoft Access System.

Results/Conclusions:

Research is in the collection phase. Final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

To explain some of the appropriate criteria for use of acid suppression therapies in non-intensive care patients.

To identify how frequent acid suppression therapies are used in non-intensive care patients and some potential outcomes from their use.

Self Assessment Questions:

True of False: The American Society of Health System Pharmacists currently recommends general prophylaxis with acid suppression therapies in all non-intensive care patients.

Which of the following could be considered an appropriate indication for use of an acid suppression therapy in a non-intensive care patient?
A. Anemia
B. Use of 100 mg of hydrocortisone
C. Treatment of an upper GI bleed
D. GI prophylaxis for use with anticoagulants

EVALUATING PATIENT OUTCOMES, PATIENT KNOWLEDGE OF WARFARIN, AND PRACTITIONER ACCEPTANCE IN A PHARMACIST-MANAGED ANTICOAGULATION CLINIC

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Purpose: Oral anticoagulation therapy with warfarin presents many challenges in clinical practice. Numerous studies have shown that pharmacist-managed anticoagulation clinics have a positive impact on patient outcomes. The Monroe Clinic, located in Monroe, Wisconsin, is a not-for-profit health system featuring a multi-specialty outpatient clinic and adjoining hospital. In March of 2008, the clinic implemented Pharmacotherapist-managed anticoagulation services. The objectives of this study were to: 1) Evaluate the impact of the Pharmacotherapist-managed anticoagulation clinic on the outcomes of patients receiving warfarin; 2) Assess patient knowledge of warfarin and evaluate a potential correlation between this knowledge and INR control; and 3) Determine practitioner acceptance of the Pharmacotherapist-managed clinic.

Methods: 1) A retrospective chart review of Pharmacotherapy Clinic services was conducted on 72 patients, on long-term anticoagulation, from July 9th, 2008 to January 9th, 2009. Each chart was evaluated for time-in-therapeutic range. 2) From July through September 2008, at an initial clinic visit to the Pharmacotherapist-managed anticoagulation clinic, patients were asked open-ended questions regarding warfarin. At a six-month follow-up visit, patients were asked the same questions. Patient scores were categorized into poor, fair, good and excellent knowledge. Patient scores, improvement over six-months, and INR control were evaluated. 3) Thirty-six providers that can refer patients to the Pharmacotherapist-managed clinic received a form to assess practitioner knowledge of pharmacist education and perception of the Pharmacotherapist-managed clinic.

Results/Conclusion: Research is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the benefits of a pharmacist-managed anticoagulation clinic on patient outcomes.

Identify the challenges in developing a Pharmacotherapist-managed clinic.

Self Assessment Questions:

What are the risks associated with sub- and supra-therapeutic INRs?

What are the potential barriers to the successful development and growth of a Pharmacotherapist-managed clinic?

DIAGNOSIS AND MANAGEMENT OF RESTLESS LEG SYNDROME IN AT RISK PATIENTS

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Purpose: To explore the use of dopaminergic agents for restless leg syndrome (RLS) in two at risk populations and to assess the percentage of patients who have a serum ferritin concentration performed as part of the complete work-up for RLS, as recommended by the International Restless Leg Syndrome Study Group (IRLSSG).

Methods: A retrospective chart review will be performed using the VA Mid-South Healthcare Network VISN-9 Veterans Affairs Medical Center Computerized Patient Record System (CPRS) as well as the Kentucky Medicaid Association (KMA) database. Patients to be included are those who are at least 18 years old and have an ICD-9 diagnosis code 333.xx (restless leg syndrome) as documented in the databases. Patients to be excluded from the KMA population are those who were not continuously eligible for Medicaid between 2003 and 2007. Data will be collected on patients who have an ICD-9 diagnosis code of 333.xx documented between January 1, 2003 and December 31, 2007. The following data will be collected from this population using the CPRS and KMA databases: gender, age at diagnosis, date of diagnosis, and dates of any serum ferritin concentration, transferrin, serum iron/total iron binding capacity, complete blood count, or sleep study performed within three months prior to or after RLS diagnosis. Any dopaminergic agent (ropinirole, pramipexole, carbidopa/levodopa, bromocriptine, pergolide, rotigotine) or iron (ferrous sulfate or ferrous gluconate) prescriptions and their initiation dates will be noted. First, the differences in groups will be evaluated using bivariate comparisons. A final multivariate logistic regression analysis will be performed on the entire population to determine the factors associated with patients receiving appropriate screening and diagnosis.

Results: Pending

Conclusions: Pending

Learning Objectives:

Describe the essential criteria for the diagnosis of restless leg syndrome and explain appropriate diagnostic tests used.

Discuss the various pharmacologic therapies used for the treatment of restless leg syndrome.

Self Assessment Questions:

Which of the following is a preferred pharmacologic agent for the treatment of restless leg syndrome?
a.Metoclopramide
b.Olanzapine
c.Ropinirole
d.Selegiline

Which of the following is the lower limit of normal serum ferritin concentrations, which can be associated with increased severity of restless leg symptoms?
a.20mcg/L
b.50mcg/L
c.75mcg/L
d.100mcg/L

PHARMACOKINETICS OF COLISTIMETHATE IN PATIENTS WITH NORMAL AND IMPAIRED RENAL FUNCTION

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Purpose:
Polymixins, such as colistimethate, are a treatment option for infections due to multi-drug resistant (MDR) gram-negative bacteria. However, there is little published data characterizing the pharmacokinetic (PK) and pharmacodynamic characteristics of colistimethate, particularly in patients with renal insufficiency. The lack of specific PK data for colistimethate leaves the clinician without definitive guidance on optimal dosage regimens of colistimethate for the treatment of infections due to MDR gram-negative bacteria. The purpose of this study is to determine the PK characteristics of colistimethate in patients with normal and impaired renal function.

Methods:
Hospitalized patients aged 18 years and older receiving intravenous colistimethate therapy for the treatment of infections due to MDR gram-negative bacteria will be approached for inclusion into this study. Demographic data will be collected for each patient including age, gender, ethnicity, place of residence, co-morbidities, mediation history (including antibiotic utilization), infection-related data (including pertinent physical examination findings, site of infection, culture and susceptibility results, hospital course, response to therapy, etc), and results of renal function tests. Colistimethate will be dosed using dosing recommendations from the Pocket Book of Infectious Disease Therapy based on ideal body weight and renal function. Serial blood samples will be collected surrounding the 3rd consecutive dose of colistimethate (at steady-state) immediately at the conclusion of the one-hour infusion. Colistimethate concentrations will be determined using high-performance liquid chromatography (HPLC). All data will be recorded without patient identifiers to maintain confidentially.

Results and Conclusions:
Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Review the use of colistimethate in the treatment of MDR gram-negative bacteria.

Explain the pharmacokinetic properties of colistimethate and the impact on current dosage recommendations.

Self Assessment Questions:

True or False: The numbers of MDR gram-negative infections are on the rise.

True or False: The pharmacokinetics of colistimethate are concentration-dependent.

PHARMACIST DIRECTED CHECKLIST FOR APPROPRIATE EMPIRIC CARE OF SEVERE SEPSIS AND SEPTIC SHOCK PATIENTS IN AN URBAN EMERGENCY DEPARTMENT

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Background:
Evidence has shown early recognition of sepsis, provision of hemodynamic support, and early and appropriate empiric antibiotic therapies in particular, are associated with a reduction in mortality rates. Unfortunately, hospital overcrowding forces septic patients to spend more time in the emergency department (ED) before admission to the intensive care unit (ICU). Hence, it is critically important that early management with sufficient fluid resuscitation, vasopressor support, and appropriate empiric antibiotics is initiated in the ED.

Purpose:
To examine if a pharmacist directed checklist of empiric management for severe sepsis and septic shock patients can help increase compliance to the current guidelines and evidence-base practice as well as to assess the appropriateness of our recommended empiric antibiotic therapy in an urban emergency department.

Methods:
The study protocol has been approved by the IRB with a waiver of informed consent obtained. A pharmacist directed checklist for severe sepsis and septic shock management derived from current primary literature and the hospital specific antibiogram was implemented in January, 2009. Patients who present to the ED with severe sepsis or septic shock, without meeting the exclusion criteria, will be enrolled in the study from January 22 to March 31, 2009. Data collection for comparison include: baseline demographics, suspected source of infection, and if initial vitals, initial studies, mixed venous oxygen saturation, central venous pressure, central line or arterial line is ordered, time to first dose antibiotic, antibiotic coverage, culture and sensitivity results, vasopressor/inotrope initiation, steroid initiation, length of ICU and hospital stay. Compliance to the checklist will also be assessed for its utility at the end of the study by the investigators.

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

Learning Objectives:

Describe the rationale for a standardized management of severe sepsis and septic shock patients in the emergency department.

Explain the utility of a potential checklist of severe sepsis or septic shock management in the emergency department.

Self Assessment Questions:

What are the key elements of initial management of severe sepsis and septic shock?

True/False: Severe sepsis and septic shock management in the emergency department is over-rated because those patients are usually managed in the intensive care units.

RETROSPECTIVE EVALUATION OF MUPIROCIN USE AT A VETERANS AFFAIRS MEDICAL CENTER

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PURPOSE: Roughly 40% of all annual hospitalizations with a diagnosis of Staphylococcus aureus (S. aureus) in the United States are related to methicillin-resistant S. aureus (MRSA). Nasal carriage of S. aureus in the anterior nares is thought to be a risk factor for subsequent infection. To minimize the spread of nosocomial infections, topical antibiotics have been used to eradicate MRSA colonization. Currently, intranasal mupirocin is the agent of choice however mupirocin-resistant MRSA strains have emerged. A National Veterans Affairs Initiative began in October 2007 whereby all patients are required to have the anterior nares swabbed for MRSA colonization upon every admission or discharge from a hospital unit. If MRSA positive, patients are placed on contact precautions. Mupirocin use and resistance has not been evaluated in the setting of this initiative. The study objectives are to evaluate the overall use of mupirocin since the introduction of the MRSA initiative and mupirocin resistance in previously collected S. aureus blood cultures.

METHODS: A retrospective chart review of all adult inpatients who received mupirocin before and after the implementation of the MRSA initiative was conducted. Patients on mupirocin during October 1, 2006 through October 31, 2008 were included for analysis. Patient data collected include age, gender, ethnicity, and presence of any co-morbid disease(s), reason for admission, microbiology data, and mupirocin prescription information. To evaluate mupirocin resistance, previously collected blood cultures positive for S. aureus will be analyzed six months prior to implementation of the MRSA initiative (4/1/2007 to 9/30/2007), six months during the initiation (10/1/2007 to 3/31/2008) and six months thereafter (4/1/2008 to 10/31/2008). Mupirocin resistance will be determined according to Clinical Laboratory Standards Institute (CLSI) guidelines. All statistical analysis will be performed using descriptive statistics.

RESULTS AND CONCLUSIONS: Data collection is ongoing and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To identify which patient population or clinical situation may benefit the most from treatment with intranasal mupirocin.

To recognize and avoid inappropriate use of mupirocin so that the incidence of mupirocin-resistant MRSA strains may be minimized.

Self Assessment Questions:

TRUE/FALSE: To prevent subsequent MRSA infections, all patients who swab positive for MRSA in the nares must be treated with intranasal mupirocin

Routine decolonization of MRSA nasal carriers with mupirocin is not recommended for general hospital or outpatient use because,

a)Mupirocin has not been shown to be active against MRSA
b)Mupirocin-resistant MRSA strains have emerged
c)The risks of systemic side-effects of mupirocin outweigh the benefits
d)It is too costly to treat everyone found to be MRSA positive

AN ANALYSIS OF THE EFFECT OF TENOFOVIR ON RENAL FUNCTION IN PATIENTS RECEIVING PROTEASE INHIBITORS COMPARED WITH PATIENTS RECEIVING NON-NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITORS

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Purpose: The primary objective of this study is to compare the incidence of renal impairment in HIV-positive patients receiving a tenofovir/protease inhibitor/ritonavir (TDF/PI/r)-based regimen to those receiving a TDF/non-nucleoside reverse transcriptase inhibitor (NNRTI)-based regimen.

Methods: A retrospective chart review was conducted to evaluate all adult HIV-positive outpatients (2001-present) being treated with antiretroviral therapy at Saint Mary's Health Care Special Immunology Services (n=548). Data were collected from both electronic and paper medical records using a standardized form. For inclusion, patients had to have: been 18 years or older; been on a TDF+ritonavir-boosted PI regimen, a TDF+NNRTI-containing regimen, or a non-TDF containing regimen paired with either a ritonavir-boosted PI or NNRTI; a serum creatinine (SCr) available at baseline and at the end of the study period; and, for patients not currently receiving TDF (i.e., TDF-nave), had no history of TDF in past medication regimens.
Comparisons of the incidence of renal dysfunction are planned among four groups: 1) TDF+PI/r; 2) TDF+NNRTI; 3) non-TDF+PI/r; and 4) non-TDF+NNRTI. Changes in renal function (primary endpoint) from baseline to present, or 2 years after the initiation of therapy, will be assessed by comparing creatinine clearance (CrCl) using the Cockcroft-Gault method and glomerular filtration rate (GFR) using the Modification of Diet in Renal Disease (MDRD) method. Patients on a non-TDF+PI/r-based regimen and those on a non-TDF NNRTI-based regimen will serve as controls. CrCl and GFR changes will be tested statistically using Student's t-test. Proteinuria in TDF and non-TDF containing regimens will be evaluated using Fisher's Exact Test. Secondary analyses will include changes in HIV-1 RNA PCR and CD4 count, differences in baseline demographics between groups, and the use of other nephrotoxic medications and/or co-morbidities.

Results/Conclusions: Data collection has been completed on 536 of 548 patients. Analysis of data will begin when data collection is completed.

Learning Objectives:

Describe the proposed mechanism of the drug interaction between tenofovir (TDF) and coadministration with protease inhibitors (PI) as it relates to changes in estimated renal function.

Identify potential confounders (i.e., co-morbidities, differences in HIV disease among treatment groups, and concurrent nephrotoxic medications) that could have an independent effect on kidney function.

Self Assessment Questions:

Which receptor is proposed as being responsible for a drug interaction between TDF and PIs?
a)MRP-2
b)MRP-4
c)OAT-2
d)GRP-2

Which of the following is NOT considered to be a factor associated with the development of tenofovir-induced nephrotoxicity:
a)Increased CD4 cell count
b)Underlying renal dysfunction
c)Diabetes mellitus
d)Race
e)Duration of TDF use

VALIDATION OF METHADONE DOSING REGIMEN IN TREATMENT OF NEONATAL ABSTINENCE SYNDROME (NAS) AT NEONATAL INTENSIVE CARE UNIT (NICU)

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BACKGROUND: Infants exposed to opioids in utero have a high incidence of neonatal abstinence syndrome (NAS). Fifty-five to ninety-four percent of infants born to opioid-dependent women develop withdrawal symptoms during the neonatal period. Presented with central nervous system irritability, autonomic instability, and gastrointestinal disturbances, NAS is associated with significant morbidity in neonates resulting in treatment and prolonged hospital stay. Although the only Food and Drug Administration approved medications for treatment of withdrawal symptoms are methadone and benzodiazepines, the American Academy of Pediatrics recommend using other agents such as paregoric, diluted deodorized tincture of opium, morphine, phenobarbital, chlorpromazine, diazepam, and clonidine for treatment of NAS. Nevertheless, standardized guidelines for the evaluation and management of opiate-exposed newborns are still lacking.

PURPOSE: The purpose of this study is to evaluate the methadone weaning guideline developed at Methodist Hospital in March of 2008 for the treatment of NAS in a neonatal intensive care unit (NICU).

METHODS: This study is a retrospective chart review of 20 patients admitted to Methodist NICU with diagnosis of NAS. Data collected from January 2007 to February 2008 prior to development of dosing guideline will be compared to March 2008 to December 2008. The primary outcomes of this study are average length of hospital stay and capture period (days). Capture period is defined as time required controlling withdrawal symptoms from initiation of pharmacological treatment to the time of the maximum treatment dose. The secondary outcomes are average number of rescue doses, average number of non-pharmacological intervention, number of patients treated with adjunctive therapy (phenobarbital) and average number of adverse drug reactions (respiratory depression) documented during the treatment period.

RESULTS AND CONCLUSION: Data collection is currently in progress. Results and conclusion will be determined upon completion of data collection and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the importance of managing neonatal abstinence syndrome in opiate-exposed newborns.

Review abstinence scoring methods to measure the severity of withdrawal.

Self Assessment Questions:

T/F: Neonates exposed to methadone during the third trimester are associated with increased risk of neonatal withdrawal syndrome.

Which of the following are validated scoring methods for neonatal abstinence syndrome?
A.Lipsitz tool
B.Finnegan scores
C.Ostrea scores
D.All of the above

DEVELOPMENT OF A BUSINESS PLAN AND OPERATIONAL PROCEDURES FOR PHARMACIST PROVIDED MEDICATION THERAPY MANAGEMENT SERVICES AT A UNIVERSITY HOSPITAL

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Quality continues to be an increasingly important factor in the delivery of patient care. Organizations such as the Joint Commission, the National Quality Forum, the American Society of Health-System Pharmacists, and the Pharmacy Society of Wisconsin have been spearheading this move toward improving quality both nationally and within the state of Wisconsin. As more payers move in the direction of pay for performance it becomes increasingly important for the University of Wisconsin Hospital and Clinics (UWHC) to identify and implement strategies aimed at achieving or surpassing performance standards laid out by these groups. The purpose of this project is to create a comprehensive business plan for pharmacist provided medication therapy management services (MTMS) at UWHC.

Objectives include gaining a better understanding of the structural development of pharmacist provided MTMS and the reimbursement environment in which they operate, developing criteria for selection and referral of patients, developing methods for maximizing documentation and billing of pharmacist provided MTMS, and expanding utilization of UWHC Information Technology (IT) resources creating efficiencies with referral to and documentation of MTMS.

Methods include conducting an environmental analysis at UWHC looking at potential patient populations to be served and the available resources of the pharmacy department to determine the most efficient model for the delivery of MTMS. A gap analysis will identify the types and levels of services already being provided by pharmacists and other health care providers. Efficiencies to be gained in the referral and management of patients eligible for MTMS through an integrated electronic health record will be identified through targeted discussions with the UWHC IT team. A return on investment analysis will also be completed.

RESULTS: To be discussed upon completion of data collection and presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the benefits and potential impact that implementation of pharmacist provided medication therapy management services could have at UWHC.

Describe important aspects of a comprehensive business plan.

Self Assessment Questions:

What type of analysis was utilized to determine the most efficient model for the delivery of medication therapy management services at UWHC and what were some of the limitations of this analysis?

Identify the top 3 value added services delivered by pharmacists working in clinics at UWHC based on the pharmacists perspective.

PROCESS IMPROVEMENT INITIATIVES FOR HEPARIN INDUCED THROMBOCYTOPENIA

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Background: Argatroban medication use evaluation (MUE) was conducted to identify current gaps when treating patients with suspected or confirmed heparin-induced thrombocytopenia (HIT).

Purpose: The purpose of this study is to evaluate the appropriate use of argatroban in patients with suspected or confirmed HIT and to implement HIT management clinical practice guidelines.
Methods: Prior to collecting data, Institutional Review Board (IRB) approval was granted. A retrospective chart review was performed on 78 patients receiving argatroban between July 1, 2007 and November 30, 2007 to evaluate current clinical practice at The Ohio State University Medical Center (OSUMC). Data collection included argatroban initiation and discontinuation; appropriateness of HIT studies; average turn-around time for HIT studies; heparin allergy documentation; concurrent heparin administration; duration of argatroban therapy before HIT studies were ordered; duration of argatroban therapy after negative HIT studies were reported; cost for HIT-negative patients once negative HIT studies were reported. Argatroban MUE results were used as a basis to perform an argatroban and Failure Mode & Effects Analysis (FMEA). Gaps were identified and scored based on frequency, severity and detectability. A risk priority number was assigned to each gap.

Results: Two (20%) of the ten newly diagnosed HIT-positive patients lacked heparin allergy documentation. Twenty of 78 (26%) received heparin while also receiving argatroban. Platelet Activation Assays results were obtained in an average of 22 hours and Platelet Factor 4 Antibody results were obtained in an average of 95 hours. Average time to test was 65 hours after argatroban initiation. Duration of therapy after HIT-negative results was a median of 3.9 days. During this FMEA process 38 gaps in HIT management process were identified. Risk priority scoring was done for every gap, with the score ranging from 57 to 313.

Learning Objectives:

List the next step once HIT is suspected and a patient requires anticoagulation.

List the elements should be considered when implementing HIT management clinical practice guidelines□

Self Assessment Questions:

Once Heparin-Induced Thrombocytopenia is suspected, all heparin agents must be discontinued and an alternative anticoagulant should be initiated, if a patient requires anticoagulation. T/F

Heparin-Induced Thrombocytopenia is considered only a clinical diagnosis. T/F

INTRAVENOUS TPA FOR THE TREATMENT OF ACUTE ISCHEMIC STROKE - RELATIVE CONTRAINDICATIONS TO THERAPY AND RATES OF INTRACRANIAL HEMORRHAGE

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Purpose:
A major determinant for patients who receive intravenous tissue plasminogen activator (IV-tPA) in acute ischemic stroke is the risk of bleeding. We sought to compare bleeding rates based on the number of relative contraindications (RCIs) and to determine which RCIs are significant risk factors for bleeding when tPA is administered.

Methods:
A retrospective cohort analysis was performed for patients identified using the study institutions stroke team database. Those who received IV-tPA from February 2002 - October 2008, without absolute contraindications, were included in the analysis. Two primary outcomes were assessed: the incidence of major bleeding, including intracranial hemorrhage, based on the number of RCIs; and whether or not a relationship existed between each RCI and bleeding risk. The patients were stratified into one of two groups - those with <2 RCIs (n=10) and those with ≥2 RCIs (n=20). Bleeding rates were then compared between the two groups using both univariate and multivariate analyses.

Preliminary Results:
To date 30 patients have been evaluated. Demographics were similar between groups with the exception of mean age (60.0 vs. 81.75; p<0.001) and mean systolic blood pressure (SBP) post-tPA administration (149.7 vs. 180.5 mmHg; p=0.017). There was no difference between groups in respect to bleeding rates. On univariate analysis, patients who bled were more likely to have a higher initial NIHSS score (11.50 vs. 16.00, p=0.029) and have a higher SBP blood pressure post-tPA (149.7 vs. 180.5 mmHg, p = 0.032). On multivariate analysis, only NIHSS score >22 was a significant predictor for bleeding (p = 0.007, OR = 22.0 [2.4 - 204.76]).

Conclusion:
Bleeding rates are not significantly different for patients who have a higher number of RCIs. Patients with an NIHSS score >22 are more likely to bleed and therefore, added emphasis should be placed on the determination to administer IV-tPA to these patients.
ents.□

Learning Objectives:

Identify the possible relative contraindications to intravenous tPA therapy for patients with acute ischemic stroke.

Describe the risks and benefits to administering intravenous tPA therapy to patients with acute ischemic stroke.□

Self Assessment Questions:

Which of the following is NOT a relative contraindication to therapy with intravenous tPA?
a.Age > 75 years
b.Active internal bleeding
c.Blood glucose <50mg/dL or >400mg/dL
d.Severe renal and/or hepatic failure

According to the 1995 NINDS trial, what was the rate of symptomatic intracranial hemorrhage in their patient population?
a.25.8%
b.6.4%
c.<2%
d.15%

STATUS OF NONTRADITIONAL PHARMACY RESIDENCIES IN THE UNITED STATES

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Purpose: In 2007, ASHP House of Delegates passed a resolution that by the year 2020, the completion of an ASHP-accredited postgraduate-year-one residency should be a requirement for all new college of pharmacy graduates who will be providing direct patient care. This resolutions intent is to improve patient care provided by pharmacists. However, if this resolution was mandated, many current hospital pharmacists would not meet this requirement. Also many graduating pharmacy students would not be able to fulfill this requirement due to financial considerations upon graduation, changing workforce demographics, and the limited number of available ASHP-accredited postgraduate-year-one residencies. One way to address these issues and embrace this resolution is to establish a nontraditional pharmacy residency in hospitals. A nontraditional pharmacy residency is a residency in which the PGY-1 requirements are intentionally met on a part-time extended basis, beyond the standard ASHP defined 12 month completion period (e.g., 24-48 month period). The Ohio State University Medical Center provides one model of the nontraditional pharmacy residency program. Other model variations of the nontraditional pharmacy residency program may exist. The purpose of this research is to describe current hospital nontraditional pharmacy residency programs available throughout the United States and to determine the perceived value of offering such programs.

Methods: ASHP accredited PGY1 hospital residency program directors/pharmacy directors will be sent an electronic survey with questions pertaining to nontraditional pharmacy residencies.

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

Learning Objectives:

Define the nontraditional pharmacy residency concept

Identify current nontraditional pharmacy residency programs available Understand the perceived value and obstacles to providing a nontraditional pharmacy residency program

Self Assessment Questions:

Nontraditional pharmacy residency programs exist in the United States. True/False

Based on the results of this research, there are a limited number of nontraditional pharmacy residency programs with various models. True/False

RELATIONSHIP BETWEEN LEADERSHIP IN NATIONAL PHARMACY ORGANIZATIONS AND EXPERIENCES WITH LEADERSHIP AS STUDENTS AND NEW PRACTITIONERS

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Purpose: An impending leadership crisis is recognized in the profession of pharmacy. This may occur due to several factors, including an imbalance between the number of individuals seeking and leaving leadership positions and the limited preparation or interest of current students and new practitioners to assume leadership roles within pharmacy management. This study seeks to determine how current leaders in prominent pharmacy professional organizations may have been influenced by leadership experiences early in their pharmacy careers. It is hypothesized that the leaders of today achieved benefit from experiences in leadership as students and new practitioners.

Methods: Study participants included established leaders in national pharmacy organizations. A survey was developed to collect demographic data and document leadership activities of these individuals as students and new practitioners. A focused interview technique was utilized, where study participants interacted with one of the investigators via telephone. Potential subjects were first contacted via e-mail to provide background information on the study, an invitation to participate, and a copy of the interview questions. Prospective review of the survey allowed the participant to consider past experiences and develop responses prior to initiation of the interview.

Results: Descriptive statistics will be used to evaluate those experiences, such as an elected or appointed role in a local, state, or national organization, or presence of a mentor, and describe the influences of these experiences on the established leader of today.

Conclusions: The results are expected to provide insight as to the value of early leadership and mentoring experiences. This knowledge may be used to develop preceptors for student and resident learning experiences and faculty mentors within schools of pharmacy. Complete results will be presented at the Great Lakes Pharmacy Resident Conference, to be held in May 2009.

Learning Objectives:

Identify the primary leadership experience recognized by survey participants.

Describe how an individual institution might incorporate the experiences described in developing todays leaders.

Self Assessment Questions:

List those factors thought to be contributing to the pharmacy "leadership crisis."

True of False: The experience identified most often in the early career of a leader in the profession of pharmacy is the presence of a mentor.

EFFECTIVENESS OF CLINICAL EVENT MONITORING ON PHARMACISTS INTERVENTIONS

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BACKGROUND: The introduction of information technology into health systems has a role in minimizing adverse events and medication errors. Misys Insight is the current clinical event monitoring (CEM) application used by numerous clinicians at Community Health Network. The system compares medical information generated by various computer systems against pre-programmed rule sets. When clinical events are detected, practitioner subscribers are notified via pager or email. Due to the one-way communication of the alerts, the question remains as to what action is taken once an alert is received. At Community Health Network, pharmacists are the main subscribers of CEM alerts. Pharmacists may receive frequent alerts in a day with or without value and have little guidance on what should be performed in response to those alerts.

PURPOSE: The purpose of this study is to evaluate the utilization and perceptions of clinical event monitoring by pharmacists and implement a strategy to improve interventions.

METHODS: The first phase of the study will be an anonymous survey of pharmacist Misys Insight subscribers. The survey will evaluate the number of alerts received per day, the perceptions of the validity of clinically significant alerts and actions performed, and the resources utilized in response to the alert. Phase two will include an evaluation of the effectiveness of clinical event monitoring by performing retrospective chart reviews of six predetermined alerts from June 2008 through September 2008. The final phase of the study includes the development of an action plan for pharmacist subscribers of CEM alerts. The knowledge gained from the previous phases will contribute to the development of a manual for new pharmacists with an action plan for CEM alert interventions.

RESULTS AND CONCLUSIONS: To be discussed upon completion of data collection.

Learning Objectives:

Describe the benefits of information technology in reducing medication errors.

Identify clinical situations requiring pharmacist interventions and list potential actions to improve those situations.

Self Assessment Questions:

The benefits of information technology in health-systems include preventing adverse events and errors, providing a more rapid response to an adverse event, and tracking and providing feedback about adverse events. T/F

List potential actions that should be expected from pharmacists in response to the following clinical situations: hypoglycemia and antidiabetic agent, tizanidine and an interacting drug, and lovenox and heparin ordered.

EVALUATION OF THE MANAGEMENT OF ALCOHOL WITHDRAWAL SYNDROME AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Alcohol withdrawal syndrome (AWS) can range in severity from mild tremors and anxiety to life-threatening delirium tremens. A common precipitant for AWS is hospital admission for treatment of other health-care issues. Approximately 20% of Veterans Administration primary care patients screen positive for alcohol misuse, including severe alcohol use disorders such as alcohol dependence. Due to these reasons, AWS is an important problem to be addressed upon hospitalization. Currently at the Richard L. Roudebush VAMC, an AWS protocol is only available in the surgical intensive care unit. The objectives of this study are to evaluate the current management of AWS at our medical center and determine if designing and implementing a modified AWS protocol for the general medical wards would be beneficial.

Methods: A retrospective chart review will be conducted at the Roudebush VA Medical Center in Indianapolis, Indiana. Patients will be identified through the electronic medical record by International Classification of Diseases, 9th Revision (ICD-9) discharge codes related to AWS and will be included for data collection. Patients will be excluded if they do not meet the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR), criteria for AWS. All data will be recorded without patient identifiers and will remain confidential. Data collected will include age, sex, admission diagnosis, co-morbid disease states, history of AWS or alcohol withdrawal delirium, history of withdrawal seizures, quantity of alcohol consumption, length of stay, symptoms of AWS including time to onset, complications of AWS, and medications ordered and administered for alcohol withdrawal prevention or management. Data collected will be utilized to evaluate current management of AWS.

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

Learning Objectives:

Identify common signs and symptoms of alcohol withdrawal syndrome.

List medications used in the prevention of alcohol withdrawal syndrome.

Self Assessment Questions:

Which of the following symptoms are not commonly seen in mild alcohol withdrawal?
a.Hypertension
b.Insomnia
c.Seizures
d.Tachycardia
e.Tremors

Benzodiazepines are the drug of choice in the prevention of Wernicke-Korsakoff syndrome.
a.True
b.False

COMPLYING WITH NATIONAL PATIENT SAFETY GOAL 3E: PILOT OF A PHARMACIST-LED WARFARIN DOSING SERVICE

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BACKGROUND: Warfarin is a commonly-used anticoagulant that has the potential for serious adverse events. Since warfarin has a narrow therapeutic index, dosing needs to be adjusted for each patient to achieve desired outcomes and avoid complications associated with non-therapeutic INRs. This individualized approach to warfarin use is of great importance, as evidenced by the focus on safe anticoagulant use in Joint Commissions National Patient Safety Goal (NPSG) 03.05.01.

PURPOSE: To evaluate whether a pharmacist-led warfarin dosing service would manage a patients anticoagulation with equal or improved efficiency and safety when compared to standard care. Additionally the implementation of this program would help the health system meet the monitoring standards described in NPSG 03.05.01.

METHODS: All protocols were reviewed by the hospitals P&T Committee and study approval was obtained from the local IRB. Patients were eligible for enrollment when an order for warfarin was received by pharmacy from October 2008 through March 2009. The patients anticoagulation was then managed by the pharmacist-led dosing service. Using the P&T approved dosing protocol as guidance, warfarin doses and INRs were ordered and evaluated daily by the pharmacist. Data being collected includes: postoperative day of warfarin start, number of days to therapeutic INR, number of days with supratherapeutic INR, adverse events, and number of warfarin doses.

RESULTS/CONCLUSIONS: This research is in the data collection phase. Preliminary data suggests that the pharmacist-led service attained therapeutic INR quicker, had less supratherapeutic INR measurements, and equivocal INR at discharge. Final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify factors that may influence warfarin dose selection□□

Describe the advantages and disadvantages of starting a pharmacist-led dosing service for warfarin□□

Self Assessment Questions:

List at least three factors (drug or disease-related) that may affect a patients warfarin dose.

How does the use of a pharmacist-led warfarin dosing service benefit the health system?

IMPLEMENTATION OF A PHARMACY CLINICAL INTERVENTION DOCUMENTATION SYSTEM: A PILOT.

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Purpose

Pharmacists are an integral part of the healthcare team via their drug information expertise and clinical intervention activities. Documenting interventions enables pharmacy departments to present clinical productivity data to hospital administrators, thereby justifying future positions based on clinical need. Pharmacy leadership may use the intervention data to determine current practice and the extent to which hospital-specific guidelines are being followed. The purpose of this project is to implement a pilot of a pharmacy clinical intervention documentation system on three general medicine units, to analyze the number of documentations and the time needed to complete them.

Methods

Standardized alerts within the web-based software will be screened daily by participating pharmacists. The software alerts the pharmacist to patients with a new serum vancomycin level available, an abnormal serum digoxin level, an international normalized rate (INR) greater than 5, or a positive microbiology result with resistance to the current antimicrobial therapy. Pharmacists will either dismiss the alert due to clinical insignificance or document their corrective actions. Documentation will be standardized and include what action will be taken and what protocol is being referenced, if applicable. Pharmacists will document how much time was spent on the intervention.

Interventions will be documented for a period of four weeks. A daily report will be used to analyze the previous days interventions. The primary outcome will be the number of interventions in each category and the total and average time spent on the interventions. A financial savings analysis will be done from published values assigned to pharmacy clinical interventions where available. Also, a pharmacy clinical dashboard will be developed that will be utilized for department initiatives.

Results/Conclusions

Pending

Learning Objectives:

Identify that documenting clinical interventions can be used to evaluate clinical service needs.

Explain how a clinical service dashboard can be used to show pharmacists clinical productivity.

Self Assessment Questions:

How can clinical intervention data be presented in a "dashboard" format to hospital administration?

What is an appropriate technique that will be used to gain pharmacist "buy-in" that is needed in order to expand the pilot?

UPDATE ON THE STATUS OF A CHIEF PHARMACY OFFICER (CPO) IN A HEALTH CARE ORGANIZATION

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Background: The Chief Pharmacy Officer (CPO) is a fairly new concept to the healthcare system, and when previously assessed, the position was not widely implemented. The University Health-System Consortium (UHC) states the CPO is responsible for the following areas: financial management, operations, human resources, medication safety, drug-use policy, quality improvement, informatics/technology, ambulatory (outpatient) pharmacy services, education/academic affiliation, and research. UHC states the CPO should have the following position qualifications: graduation from an accredited school of pharmacy with a B.S. pharmacy or Doctor of Pharmacy degree; licensure or eligibility for licensure in (state); the completion of a masters degree in Pharmacy Administration, Health Administration, or Business Administration; successful completion of an academic residency in Pharmacy Administration; and pharmacy leadership experience including at least 10 years in director of pharmacy or equivalent position. UHC conducted a CPO Survey in 2007 and found that in some institutions there may be an equivalent to the CPO but the title CPO was not used. Equivalent titles mostly consisted of Vice President of Quality Affairs or Corporate Pharmacy Officer.

Purpose: The purpose of this research is to develop an update on the status of implementation of the CPO position and to determine if any further steps need to be taken to demonstrate the importance of the CPO position.

Methods: Chief Executive Officers (CEO) and Directors of Pharmacy (DOP) will receive a survey with questions relating to the CPO position. The survey will address the concept of the CPO, the advantages of the CPO, the responsibilities of the CPO and the qualifications of the CPO.

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

Learning Objectives:

Explain the perceived advantages and disadvantages of a Chief Pharmacy Officer

Discuss appropriate qualifications of a Chief Pharmacy Officer

Self Assessment Questions:

1. What does the abbreviation CPO mean?

2. According to UHC qualifications of a CPO, all of the following advanced degrees are acceptable except:
A. Masters degree in Health-System Pharmacy Administration
B. Masters degree in Health Administration
C. Masters degree in Business Administration
D. Masters degree in Education

OUTCOMES OF PATIENTS UNDERGOING KIDNEY TRANSPLANT UNDER A CYCLOSPORINE BASED STEROID AVOIDANCE PROTOCOL

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Purpose:
Corticosteroids have been utilized as maintenance immunosuppressive treatment post-kidney transplant for several years. However, their use to prevent renal allograft rejection must be balanced with complications associated with long-term corticosteroid therapy. Scientific literature depicts the benefits and the risk linked to steroid avoidance in kidney transplant. A recent analysis reported that corticosteroid withdrawal and corticosteroid avoidance were incorporated into therapeutic management. However, the analyses reported that corticosteroid avoidance was more common in practice than corticosteroid withdrawal. Post-operative practice at University of Illinois Medical Center at Chicago (UIMCC) for kidney transplant includes steroid avoidance in post-transplant immunosuppresion regimen. There are few clinical studies that evaluate the outcomes of patients that undergo kidney transplant under a cyclosporine based steroid avoidance protocol. The incidence of rejection and patient and graft survival in patients undergoing kidney transplant under a cyclosporine based steroid avoidance protocol has not been evaluated at UIMCC. The primary objective of the study was to determine the incidence of rejection and patient and graft survival. The secondary objective was to establish the incidence of diabetes and the re-initiation of steroids post-transplant.

Methods:
Retrospective review of patients presenting to University of Illinois Medical Center at Chicago receiving a cadaveric or living renal transplant between January 1st 1997 - September 2008. Inclusion criteria included low risk for kidney transplant rejection, defined as non-African American, first transplant, peak panel reactive antibody (PRA) <10%, post-operative treatment with cyclosporine, and/or patients switched to cyclosporine from tacrolimus for maintenance immunosuppressive therapy. Exclusion criteria included patients that continued steroid therapy for greater than six days post-kidney transplant, patients initiated on tacrolimus for maintenance immunosuppressive therapy, patients that received multiple organ transplants, and age less than 18 years old.

Results/Conclusions: Data collection, evaluation, and assessment of data are ongoing. Results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the effects of steroid avoidance on kidney transplant patient.

Identify the descriptive characteristics of patients undergoing kidney transplant under cyclosporine based steroid avoidance protocol.

Self Assessment Questions:

Based on a recent analysis, corticosteroid avoidance is more common in practice than corticosteroid withdrawal.
(A)True
(B)False

Long term corticosteroid therapy increases the risk of the following:
(A)Diabetes mellitus
(B)Hyperlipidemia
(C)Weight loss
(D)A and B

ACCEPTANCE PARAMETERS OF ROBOTIC TECHNOLOGY FOR ACUTE CARE PHARMACY SERVICES AT AN ACADEMIC MEDICAL CENTER

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Background: Pharmacists graduating today have completed clinically-focused training and have skills necessary to provide direct patient care. One barrier to applying these abilities is the time devoted to medication preparation and dispensing. Technology is being implemented as a way to relieve pharmacists from dispensing activities, allowing more time to provide clinical services. At The Ohio State University Medical Center (OSUMC), automation with a focus on unit dose distribution is being considered in an attempt to improve accuracy and efficiency of dispensing. The goal of implementing this technology is to allow pharmacists more time to engage in clinically focused activities.

Purpose: The purpose of this study is to define the acceptance parameters of a robotic technology being incorporated into the dispensing processes of an acute-care pharmacy.

Methods: Pre-implementation data of pharmacy operations at OSUMC were obtained during a previous evaluation. The same data points will be measured again after the implementation of the robotic technology to determine its utility. Parameters measured will include the accuracy and efficiency of robotic dispensing, and the robots impact on medication inventory management. The technology will be deemed accurate if the fill accuracy is greater-than or equivalent-to the previously determined baseline. Efficiency will be adequate if the time-to-fill for all unit dose carts is less-than or equal-to baseline, equipment failure rate does not interfere with the overall fill time, and if it is full time equivalent (FTE) neutral. Medication inventory management will be considered acceptable if the value of inventory for the unit dose cart-fill remains equal-to or less-than baseline inventory. Comparisons to pre-implementation data will be made in the form of a template and acceptance will be determined based on the combined utility parameters.

Results/Conclusion: Data collection and analysis are in progress. The results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the role of technology in the acute care pharmacy setting

Describe factors used to determine the acceptance of new technologies for acute care pharmacy services

Self Assessment Questions:

(T/F) The use of technology may relieve pharmacists from dispensing functions and allow them to become more involved with more clinically-focused activities.

(T/F) Efficiency is the only factor which should be examined when deciding whether a new technology should be implemented in an acute care pharmacy.

UTILIZATION OF PATIENT-REPORTED CHARACTERISTICS AND SURVEY MEASURES TO IDENTIFY THE OPTIMAL METHOD OF PHARMACY SURVEY ADMINISTRATION: INTERNET AND MAIL

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PURPOSE:
Diplomat Specialty Pharmacy (DSP) routinely administers pharmacy satisfaction and disease-specific questionnaires to patients via mail. With the increasing availability of internet-based surveying, it may provide greater patient survey response and be more time-and labor-efficient for the pharmacy. The primary purpose of this study is to identify the optimal method of communication (internet website or mail) for compilation of patients satisfaction with pharmacy services and self-reported outcomes, including disease severity and quality of life measures, in this community-based specialty pharmacy for patients with Crohns disease (CD).

METHODS:
Upon approval by the institutional review board, CD patients receiving adalimumab will be identified from the pharmacy database and invited to participate in the study. After completing the informed consent, participants will complete a short questionnaire by mail identifying self-reported internet use and access, competency in internet use, and education level. They will also state their preferred communication means with the pharmacy (internet or mail). Questionnaire results and participant demographics will be compared between the internet and the mail groups. From this point forward, participants will receive subsequent surveys according to their stated communication preference; the mail group will complete paper surveys returnable via mail, and the internet group will complete online surveys. Half of the participants in the mail group and the internet group will first receive the DSP - satisfaction survey and then two CD-specific surveys (disease severity and quality of life) separated by thirty days, and the remaining participants will receive the surveys in a reversed sequence. Survey response, completeness, the number of completed surveys returned in a timely manner, and the impact of survey sequence, will be compared between the groups. In addition, satisfaction survey results will be compared to data previously collected from other DSP patients.
RESULTS:
Pending project completion

Learning Objectives:

Recognize patient characteristics that may affect whether internet surveying is an acceptable form of communication.

List important considerations before survey results can be interpreted.

Self Assessment Questions:

True or false: Internet competency is not a factor to consider when deciding whether a patient population would accept taking pharmacy surveys via the internet.

Which of the followings is/are important considerations in determining whether survey results can be interpreted?
A.Survey response
B.Timeliness of survey return
C.Completeness of survey
D.All of the above

IMPACT OF A PHARMACY RESIDENT AT A LARGE ACADEMIC MEDICAL CENTER

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Purpose: The purpose of this prospective study is to assess the financial impact of pharmacy resident positions and to describe the role of the resident. Also, the evaluation of pharmacy residents by members of the medical care team will be reviewed.

Methods: In a four month, prospective, observational study (2 months currently completed) the activities and interventions of one resident will be followed. All interventions will be assigned a direct cost savings value or cost avoidance value based on the type of intervention. Interventions classified as cost saving interventions will be assigned a value based on direct drug expense. Interventions classified as potentially preventing an ADE will be evaluated based on the cost of an ADE and the probability of ADE occurrence if the intervention was not made. All interventions will be logged in the pharmacy intervention tracking system and classified by type. To determine the financial impact of the pharmacy resident position, the benefits will be compared with the costs. Benefits include cost avoidance and cost savings coupled with any reimbursement from Medicare, while the costs include resident stipend and benefits. To further establish the role of the pharmacy resident, the number of drug information requests and any inservices given or attended will be tallied. An estimate of teaching time by preceptors will also be included. Surveys evaluating the resident and the value of having a pharmacy resident on rounds will be administered to members of each medical team the resident works with.

Results/Conclusions: Preliminary results show a favorable cost/benefit ratio for pharmacy residency positions. Data collection is ongoing and will be presented at the conference.

Learning Objectives:

Define the financial impact of employing pharmacy residents at a large, academic medical center.

Describe the role of a pharmacy resident in terms of physician evaluation, time spent with preceptors, drug information requests, and presentations given or attended.

Self Assessment Questions:

T/F: The cost avoidance of an intervention is based on the acquisition costs of the drug involved.

T/F: In general, members of the medical team were satisfied with having a pharmacy resident included on the team.

ROLE OF COMMUNITY PHARMACISTS IN PATIENTS AWARENESS AND PREVENTION OF PERTUSSIS

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Pertussis is a highly communicable, vaccine-preventable respiratory disease. The nationwide resurgence of pertussis emphasizes the need for routine booster administration in all age groups. It is important that community pharmacists take an active role in decreasing the incidence of pertussis by educating patients and identifying those who should receive the pertussis vaccine.
Purpose: To determine what percentage of screened patients have been educated by a health care professional about pertussis and to evaluate the role community pharmacists play in patient education and awareness of pertussis.

Methods
The research study is a prospective, multi-site study. It will be implemented in a grocery chain pharmacy that offers extensive immunization services. A pharmacists training session will be conducted in six community pharmacy sites to educate the pharmacists about pertussis, project goals, survey administration, and patient education. Participating pharmacies will receive marketing materials to display in their stores and distribute to patients. Informed consent will be obtained as the subjects aged 18 to 64 are enrolled. Subjects who are pregnant, have uncontrolled epilepsy or have had a serious reaction to a previous vaccine, and do not meet the age criteria will be excluded from the study. A two-paged patient survey will determine a subjects risk for developing pertussis or transmitting the infection to an infant. It will also assess whether the subject has been previously educated about pertussis by a health care professional or has ever been immunized against pertussis. Subjects can choose to be immunized after completing the survey. Subjects decision to be immunized after interaction with the pharmacist will also be analyzed. All completed, unidentifiable surveys will be collected and reviewed by the investigators.

Results/Conclusions
The study is in the data collection phase. Final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the role of community pharmacists in patient awareness and prevention of pertussis.

Explain what percentage of the screened population has previously been educated about pertussis by a health care professional.

Self Assessment Questions:

Adacel contains which of the following components?
a.Acellular pertussis and diphtheria only
b.Tetanus and diphtheria only
c.Tetanus, diphtheria, acellular pertussis
d.Acellular pertussis only
e.Tetanus only

How many tetanus, diphtheria and pertussis booster immunizations are recommended for adults?
a.1
b.2
c.3
d.4
e.5

ASSESSING THE EFFECT OF GLYCEMIC CONTROL ON QUALITY OF LIFE IN ELDERLY PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: The risks and benefits of intensive glycemic control have been debated for many years. Quality of life can be compromised in elderly patients with diabetes mellitus by complications of diabetes mellitus, loss of independence, and time and effort to manage diabetes mellitus. National organizations differ in their recommendation as to the appropriate intensity of glycemic control in the elderly diabetic population. The purpose of this study is to assess the effect of tight glycemic control on patient reported quality of life in elderly patients with type 2 diabetes mellitus.

Methods: This project was approved by the Institutional Review Board at Ohio Northern University. One hundred patients from an internal medicine practice will be asked to complete the Diabetes 39 validated quality of life survey during their office visit. Results of the survey will be stratified based on glycemic control as defined by the American Diabetes Association (Hemoglobin A1c >7.0 mg/dL or ≤7.0 mg/dL). To be eligible for inclusion in the study, patients must have type 2 diabetes mellitus and be of at least 65 years of age. Patients will be excluded from the study if they have type 1 diabetes mellitus, documented depression, are unable to read or write in English, or submit an incomplete survey. Results of the survey will be analyzed using descriptive statistics and correlations will be evaluated.

Results and Conclusions: Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Explain the risks and benefits of tight glycemic control

Describe factors which affect the quality of life in elderly patients with diabetes

Self Assessment Questions:

The benefits of tight glycemic control always outweigh the risks. (T/F)

According to this study, elderly patients with a hemoglobin A1c of less than 7% report an overall better quality of life than patients with a hemoglobin A1c of greater than 7%. (T/F)

EVALUATION OF ANTIBIOTIC USE FOR GRAM-POSITIVE COCCI IN CLUSTERS ISOLATED FROM BLOOD CULTURES IN HOSPITALIZED PATIENTS: A FOCUS ON FACTORS ASSOCIATED WITH THE DECISION TO TREAT.

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Proper recognition, diagnosis, and treatment of bloodstream infections is crucial as these have high mortality rates. Blood cultures provide helpful information to allow a targeted approach to assessment and treatment of bloodstream infections. Blood cultures can also provide false-positive results that can lead to unnecessary antibiotic therapy, contributing to antibacterial resistance and increased healthcare costs. In this study, relationships between patient- and culture-specific parameters and antibiotic initiation in inpatients with Gram-positive cocci in clusters (GPCC) isolated on blood culture will be evaluated. Patient outcomes will also be described.

Hospitalized patients with blood cultures are captured on a daily blood culture report. Prospectively, this will be screened daily to identify 150 patients with positive GPCC blood cultures. All results will be followed for 5 days from collection. Patients with positive blood cultures for single organism GPCC will have data recorded: name, medical record number, location, time to positivity, time of positivity, and number of positive blood cultures at first positive culture.

Each patients medical record will be reviewed retrospectively after discharge. During review, patients will be divided into two groups: antibiotic therapy initiated (before final culture result) and no antibiotic therapy. Data collection includes adequacy and appropriateness of initial antibiotic therapy; admission and demographic information; PMH; MRSA infection history; and concurrent immunosuppressive pharmacotherapy or disease states. Severity of illness will be determined using APACHE-II scores for ICU patients and qualified APACHE-II scores for all other patients; worst daily vital signs and infection specific laboratory values obtained within 48 hours before and during the 5-day culture cycle. SIRS score, SOFA score, and need for mechanical ventilation or vasopressors/inotropes will be determined over the 5-day culture cycle. Hospital and ICU lengths of stay, as well as in-hospital mortality will be determined.

Prospectively 48 patients have been identified; data collection is still ongoing.

Learning Objectives:

Discuss the use of blood culture behaviors in determining true infection versus contamination as well as responsible organisms.

Identify patient-specific and culture-specific factors that may warrant antibiotic use for a possible bloodstream infection.

Self Assessment Questions:

True or False: Coagulase-negative staphylococci is an organism that is both a common blood culture contaminant and a cause of serious bloodstream infections.

Which factors have been associated with antibiotic initiation in patients with likely contaminant blood cultures?
a. Chills
b. Temperature ≥ 38.3C
c. Hypotension
d. A and C

INCIDENCE OF CLOSTRIDIUM DIFFICILE WHILE CONCURRENTLY ON A PROTON PUMP INHIBITOR, HISTAMINE-2 RECEPTOR ANTAGONIST, OR NO STRESS ULCER PROPHYLACTIC THERAPY

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Purpose: Recent studies have demonstrated a rise in the number of Clostridium difficile (C. difficile) cases diagnosed in hospitalized patients, which increases morbidity, mortality, and health care costs. In recent years there has been an increase in the prescribing of proton pump inhibitors (PPI) which correlates with the increased number of hospitalized patients who are developing C. difficile infections. Based upon the mode of transmission for C. difficile it has been theorized that reduced gastric acid secretion may contribute to the development of C. difficile infections. This study is designed to evaluate the incidence of C. difficile in patients receiving gastric stress ulcer prophylaxis therapy in the form of a proton pump inhibitor (PPI), or a histamine-2 receptor antagonist (H2RA), or no stress ulcer prophylaxis therapy with a gastric pH altering pharmacologic agent (NT).

Methods: This retrospective cohort study will evaluate patients admitted between January 1, 2008 and June 30, 2008. Patients eligible for inclusion will be identified using the hospital electronic database and coded drug charges. Patients will be stratified into either PPI, H2RA, or NT based upon the treatments prescribed during their hospital admission. Patients will be excluded if they have an immunocompromised state, length of stay less than 5 days, or C. difficile is present upon hospital admission. The primary outcome measured will be the incidence of C. difficile in each group defined by the presence of a positive C. difficile toxin A or B laboratory test. Further subgroup analyses will be performed to evaluate the impact of concurrent antibiotic therapy.

Results: Preliminary results indicate an association between the use of PPIs and an increased incidence in C. difficile.

Conclusion: To be presented at the meeting.

Learning Objectives:

Review of C. difficile infective process and possible influence of gastric acid pH

Review the current literature concerning the effect of gastric acid suppression on C. difficile infection rates over the past decade.

Self Assessment Questions:

T/F The increased incidence of C. difficile over the past decade correlates with the increased use of proton pump inhibitors.

T/F The vegetative state of C. difficile can remain viable after being subjected to increased gastric acid pH of 5 to 6.

EVALUATING THE EFFECTS OF PHARMACY SCHOOL EXPERIENCES ON PRACTICE AREA SELECTION

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Purpose
The goals of pharmacy practice are evolving from drug distribution responsibilities to providing patient care. With the aging baby boomer population and increasing healthcare cost, the demand for hospital pharmacists is increasing. Characterizing student pharmacists personal experiences, attitudes and perceptions of pharmacy practice will allow hospital administrators to develop better recruitment strategies for hospital pharmacists.

Methods
Contact information for colleges of pharmacy department chairs will be identified using their respective colleges of pharmacy websites. Inclusion criteria for data analysis includes student enrollment in an accredited doctor of pharmacy program within the United States having student pharmacists enrolled in all professional years. Surveys that are incomplete will be excluded. The survey will be administered using a commercially available survey software (Snap Survey, Portsmouth, NH) and will be distributed with a cover letter via electronic mail to all colleges of pharmacy department chairs with a request the survey be forwarded to their students. The survey consists of a brief demographic section, followed by questions characterizing student experience with various pharmacy practice settings. The first two sections describe and identify the perceptions created by externship experiences, including type and extent of each experiential, rotational and paid work experience. The third section focuses on extracurricular involvement, including: organization membership, extent of involvement, the influence of extracurricular involvement on practice area selection. The final section presents conclusion questions identifying each students practice area upon graduation and desired job characteristics. Two weeks post survey distribution, department chairs and student pharmacists will be contacted via electronic mail to help increase participation. A potential limitation is a low survey return rate. In order to minimize this limitation, all participating department chairs will receive summary data and data comparing their college to other colleges of pharmacy as an incentive to follow the survey to their students.

Learning Objectives:

List factors that influence student pharmacist career choices from their first professional year to their fourth professional year

Describe what role internship/externship experiences have in influencing student pharmacist career choices

Self Assessment Questions:

True or False. Student pharmacist pharmacy college experience may be a key determinant in practice area selection.

True or False. Extracurricular involvement may play a role in student pharmacist practice area selection.

EFFECTS OF CHLORHEXIDINE ON LACTOSE-FERMENTING GRAM-NEGATIVE ROD ORGANISMS AND THE EMERGENCE OF EFFLUX PUMPS

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BACKGROUND

Chlorhexidine gluconate is an antiseptic and antimicrobial skin cleanser. Koeman et al, evaluated chlorhexidine use as a preventive measure for VAP (an off FDA-labeled use) in a group of heart surgery patients. One concern with use of chlorhexidine for prevention of VAP is the potential emergence of multi-drug resistance (MDR).

MDR efflux pumps are proteins in bacteria that have the ability to pump antibiotics and other substances out, resulting in decreased efficacy and an increase in antimicrobial resistance. Biocidal agents, such as chlorhexidine, may induce the MDR efflux pumps, based on previous clinical data.

PURPOSE

The goal of this study is to determine if ventilated patients that are exposed to topically applied chlorhexidine administered as an oral rinse and colonized with lactose-fermenting gram-negative rod organisms (lac+ GNR) demonstrate a shift in their oral flora to lac+ GNR now resistant to fluoroquinolones by way of MDR efflux pump activity. The study hypothesis is that lac+ GNR the present in patients that receive oral chlorhexidine will develop resistance to fluoroquinolones by day 3 of continuous chlorhexidine use via upregulation of efflux pumps.

METHODS

This study is a prospective review of patients ≥ 18 years that are admitted to Detroit Receiving Hospital, intubated at the facility and receiving chlorhexidine oral rinse. Patients will be excluded if they receive systemic fluoroquinolones 5 days prior to the first swab culture or during their first 10 days of receiving chlorhexidine. An oral cavity swab is taken from eligible patients and 10 control patients on days 1, 3, 7 and 10 of intubation if they remain intubated and receiving chlorhexidine.

RESULTS and CONCLUSION

Results and conclusions to be presented.

Learning Objectives:

Explain the different types of efflux pumps.

Explain whether use of chlorhexidine produces fluoroquinolone resistant strains of lactose-fermenting gram-negative rod organisms.

Self Assessment Questions:

There are 5 different families of efflux pumps. TRUE or FALSE.

Literature supports use of chlorhexidine for prevention of ventilator-associated pneumonia. TRUE or FALSE

CHARACTERIZING MORBIDITY AND MORTALITY AFTER ALLOGENEIC STEM CELL TRANSPLANT IN PATIENTS WHO RECEIVED BUSULFAN THERAPEUTIC DRUG MONITORING FOR THE CONDITIONING REGIMEN

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Purpose: Busulfan is associated with interpatient variability in its pharmacokinetic profile. It is unknown if this variability translates into differences in efficacy and toxicity among patients. Patients receiving a busulfan-based conditioning regimen for allogeneic stem cell transplant are at high risk of developing significant toxicities such as veno-occlusive disease, mucositis, and infection. Therefore, an effort to reduce these toxicities has been adopted by performing therapeutic drug monitoring, which can be performed to determine a targeted dose of busulfan for patients receiving a transplant. It is our goal to compare morbidity- and mortality-related outcomes post-transplant in patients who received a pre-transplant test dose to those who did not. Our second goal is to identify factors that may result in variable plasma concentrations of busulfan leading to increased drug- and transplant-related toxicity.

Methods: This is a retrospective study conducted at the University of Illinois at Chicago. Our electronic medical record system will be reviewed to identify adult patients who received a busulfan based conditioning regimen for allogeneic stem cell transplant from January 1, 1999 through September 1, 2007. The following information will be collected and recorded: patient demographic information, anthropometric data, past medical history, social and family history, past and current medication profile, type of transplant, chemotherapy history, pertinent laboratory values, time to engraftment, and any grade 3 or 4 toxicities, such as infection, mucositis, veno-occlusive disease, acute and chronic graft-versus-host disease, neurotoxicity, and pulmonary toxicity. Data from the initiation of the conditioning regimen until 100 days post-transplant will be collected. Metabolic panel, renal function, hepatic function, calcium, phosphorus, magnesium, complete blood cell counts and febrile neutropenia will also be included when available. Factors that may potentially affect busulfan pharmacokinetics such as concomitant medications, liver function tests and time of busulfan administration will also be collected.

Results: Data collection in progress

Learning Objectives:

Explain the role of busulfan therapeutic drug monitoring for patients receiving a busulfan-based conditioning regimen for allogeneic stem cell transplant

Identify factors that may influence busulfan plasma concentrations

Self Assessment Questions:

Busulfan metabolism differs among individuals and instituting therapeutic drug monitoring may help to calculate more targeted doses for transplant
a.True
b.False

Drugs that inhibit the cytochrome P450 enzymes may affect busulfan plasma levels
a.True
b.False

CLINICAL IMPACT OF TEMPORARY THERAPY INTERRUPTIONS ON ANTICOAGULATION CONTROL

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Background: Warfarin is the most commonly prescribed anticoagulant in the world with approximately 2.5 million patients requiring therapy in North America alone. Many variables affect anticoagulation control with warfarin and most of these are well described in the literature. One variable that is not well described, but may affect anticoagulation control, is a temporary interruption in warfarin therapy. It is important to explore this variables effect as it is estimated that 250,000 patients per year require a temporary therapy interruption.

Purpose: To describe the clinical impact of temporary therapy interruptions on anticoagulation control in patients receiving warfarin.

Methods: This study is a retrospective chart review of patients seen at the Internal Medicine Center of Akron Anticoagulation Clinic from 2002 through 2007. Patients will be included if they were maintained on a stable dose of warfarin and subsequently underwent an interruption in therapy for a procedure. Patients will be excluded if they received vitamin K or were started on medications known to interact with warfarin during the interruption. Collected data will include: pre-interruption warfarin dose, type of procedure, length of interruption, starting dose of warfarin post procedure, number of clinic visits and dose adjustments post-interruption until two consecutive therapeutic INRs, and post-interruption stable dose. The primary endpoint will be change from weekly pre-interruption stable maintenance dose (mg) to weekly post-interruption stable maintenance dose (mg) of warfarin. Secondary endpoints will include: time (days) to reach a therapeutic INR post-interruption, number of clinic visits and dose adjustments until two consecutive therapeutic INRs post-interruption, association between length of therapy interruption and change in maintenance dose, association between type of procedure and change in maintenance dose, change in number of clinic visits from month pre-interruption compared to month post-interruption, and direct financial costs associated with clinic visits post-interruption.

Results and Conclusions: To be presented.

Learning Objectives:

Discuss variables that affect anticoagulation control.

Describe the clinical impact of temporary therapy interruptions on anticoagulation control.

Self Assessment Questions:

Approximately 250,000 patients per year require a temporary interruption in warfarin therapy. True/False

The American Academy of Chest Physicians recommends that warfarin should be restarted at 80% of the pre-interruption stable maintenance dose after a temporary therapy interruption. True/False

A RETROSPECTIVE ANALYSIS OF THE EFFECTS OF A PHARMACIST MANAGED INPATIENT ANTICOAGULATION SERVICE AT A VA HOSPITAL

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Background:
Warfarin is a high risk medication used for anticoagulation and it requires intensive monitoring and dose adjustments. The National Patient Safety Goals for 2009, established by the Joint Commission, also address the need for increased awareness and safety of anticoagulation in hospitals. Establishing an anticoagulation program, individualizing patient care, and educating patients about the use of warfarin are areas of anticoagulation where the pharmacists role is expected to grow. In June of 2008, a pharmacist driven inpatient anticoagulation monitoring service was initiated at Edward Hines Jr. VA Hospital. The primary purpose of this research project is to explore the effects of a pharmacist managed inpatient anticoagulation monitoring service on therapeutic targets, safety and outcomes.

Methods:
A retrospective chart review was performed comparing warfarin management in inpatients at Edward Hines Jr. VA Hospital before and after implementation of the pharmacist driven monitoring service. The primary outcome is the number of supratherapeutic INR values. Secondary outcomes include the number of INR values, therapeutic INR values, missed doses, use of vitamin K or FFP, adverse events (bleeding or thrombosis), use of bridge therapy, days to first anticoagulation follow-up, and if INR at first follow-up is therapeutic. The computerized patient record system (CPRS) will be utilized to access the outpatient and inpatient charts. Patients data recorded between September 1, 2007 and December 31, 2007 for the physician managed group will be collected. For the pharmacist managed group, patients data recorded between September 1, 2008 and December 31, 2008 will be collected. Data from these two time periods will be compared. Two hundred and sixty-eight patients will be included overall with at least 134 patients for each group.

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

Learning Objectives:

List the incidence of supratherapeutic INR values in hospitalized patients managed by a pharmacist or a physician.

Describe the effect of a pharmacist managed inpatient anticoagulation monitoring service on safety and outcomes.

Self Assessment Questions:

T/F.: Supratherapeutic INRs can lead to increased use of FFP and Vitamin K in hospitalized patients.

T/F: Daily monitoring of inpatients on warfarin helps to individualize patient therapy and minimize adverse outcomes.

EVALUATION OF A WEIGHT BASED HEPARIN PROTOCOL IN OBESE PATIENTS IN THE EMERGENCY DEPARTMENT FOR THE TREATMENT OF VENOUS THROMBOEMBOLISM

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PURPOSE: Current literature for the treatment of venous thromboembolism (VTE) recommends weight-based heparin, but there are few studies specifically targeting obese patients and the dosing recommendation for this patient population. The purpose of this study is to evaluate our weight based heparin protocol for VTE in obese patients who present to the emergency room and make appropriate adjustments if necessary.

METHOD: A chart review was conducted of patients diagnosed in the emergency room with VTE at Advocate Christ Medical Center and Hope Childrens Hospital between July 1, 2007 and July 30 2008. Patients were included in the study if they were diagnosed with VTE and a heparin drip was initiated. The following data was collected: indication for heparin, patients age, gender, actual body weight, ideal body weight (IBW), baseline labs (hematocrit, hemoglobin, platelets, PTT, PT, INR), bolus heparin dose, initial infusion rate, subsequent PTTs, adjusted infusion rate, and any reported adverse events.

RESULTS: A total of 83 patients were identified for the study. Fourteen patients under IBW were excluded. Patients who were at least 10% over IBW were more likely to be over the maximum goal PTT of 90. Only 5 patients over their IBW were under the goal PTT of 55-90. Sixty six percent of patients greater than 10% over IBW for each weight range had a PTT > 91, which is considered supratherapeutic at our institution. There were 3 adverse drug reactions. Further data analysis is pending.

CONCLUSION: Our preliminary results suggest adjustments need to be made to our protocol for obese patients. Once alteration is approved, further study will need to be done to see if utilizing an adjusted body weight is appropriate for this patient population

Learning Objectives:

Review current guidelines for treatment of venous thromboembolism.

Explain appropriateness of maximum heparin bolus dose in obese patients.

Self Assessment Questions:

What is the objective of anticoagulation in the treatment of acute VTE?

What are some disadvantages to using heparin for the treatment of VTE?

RETROSPECTIVE REVIEW OF PROTON PUMP INHIBITORS (PPI) FOR INAPPROPRIATE CONTINUATION AFTER DISCHARGE FROM A VETERANS AFFAIRS (VA) MEDICAL CENTER

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Purpose: Guidelines from the American Society of Health System Pharmacists, published in 1999, suggest stress ulcer prophylaxis use be limited to high risk patients, including intensive care unit patients with prolonged mechanical ventilation and coagulopathy. This has expanded to intensive care unit patients without risk factors and general medicine patients without evidence to support efficacy in these populations. Literature suggests that patients without stress ulcer risk factors are often started on proton pump inhibitors and then continued on these agents after discharge without an appropriate indication. The objective of this review is to assess the appropriateness of proton pump inhibitors (PPI) started during inpatient admission and continued following discharge in a veterans affairs population.

Methods: This is a retrospective review of veterans at the R.L. Roudebush VA medical center who were issued a prescription for any PPI over a two year period between September 1, 2006 and August 31, 2008. The VA health systems electronic medical record system was used to generate a list of patients. Any patient issued a PPI during admission for SUP was included. Exclusion criteria included PPI for indications of Zollinger-Ellison syndrome, Barrett's esophagus, gastroesophageal reflux disorder (GERD), esophagitis, reflux esophagitis, esophageal varices, H.pylori. or a PPI issued greater than one day of discharge date. Data was collected from each patient chart through searches of hospital admissions, medication issue date and ICD9 codes. The following data was recorded: patient age, gender, indication for PPI use, therapeutic regimen, duration of use, comorbidities, concomitant therapies, complications of PPI therapy, prescribing medical service and reason for discontinuation. Data collected will be analyzed for descriptive statistics. These statistics will be measured in percentages, medians, and ranges as appropriate.

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

Learning Objectives:

Identify two evidence based risk factors for stress ulcer prophylaxis.

Describe the importance of discontinuing stress ulcer prophylaxis when patients are discharged from the hospital.

Self Assessment Questions:

What is one risk factor necessary for stress ulcer prophylaxis?
a. pneumonia
b. leukocytosis
c. mechanical ventilation
d. admission to a hospital

The overuse of proton pump inhibitors may lead to which of the following?
a. dialysis
b. cancer
c. gastric ulcers
d. unnecessary cost

EVALUATION OF THE IMPACT OF COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE) ON SEVERAL MEDICATION USE SYSTEM PERFORMANCE INDICATORS AT AN ACADEMIC MEDICAL CENTER

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Purpose: The University of Wisconsin Hospital and Clinics (UWHC) recently implemented computerized physician order entry (CPOE). The UWHC pharmacy department wants to determine if they are realizing some theoretical benefits from CPOE on the medication use systems. The objectives of this project are to measure the impact of CPOE on: 1) medication override dispense rates from inpatient automated dispensing cabinets, 2) time from medication prescribed to first dose medication administration, 3) percent of medications documented as administered to patients prior to pharmacist order review, 4) pharmacist perception of first dose medication system responsiveness, and 5) pharmacist satisfaction with the medication order review system. The final objective is to make recommendations for improvement based on the findings.

Methods: Most of the medication use system indicators had been assessed within a year prior to CPOE implementation at UWHC, the methods and results of those analyses were reviewed at the onset of the project. Methods for the post-CPOE medication use system evaluations were aligned with the pre-CPOE methods to enable accurate comparison of pre-CPOE and post-CPOE results. The steps of each medication use system will be flowcharted to facilitate understanding of the processes and to determine appropriate data collection points. Data will be collected electronically or by direct observation if necessary. Surveys will be conducted using survey monkey. Results of the medication use system assessments will be compared to pre-CPOE study results. The resident will work with and coordinate the efforts of a fourth year pharmacy student in conducting the project.

Results: A description and assessment of the results will be presented.

Learning Objectives:

Compare several medication use system performance indicators pre- and post-CPOE implementation.

Explain the impact of CPOE implementation on pharmacist perception of and satisfaction with the medication use system.

Self Assessment Questions:

How were data collected differently in the pre- and post-CPOE medication use system assessments?

How did pharmacist perception of first dose medication system responsiveness and pharmacist satisfaction with medication order review change post-CPOE?

PROLONGED VERSUS INTERMITTENT INFUSION OF BETA LACTAMS IN THE INTENSIVE CARE UNIT: FOCUS ON PIPERACILLIN/TAZOBACTAM AND MEROPENEM

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Purpose: As a result of continuously developing antimicrobial resistance and a shortage of novel antimicrobial development, new dosing strategies have been proposed to optimize the pharmacodynamics of existing antimicrobials. Theoretically, prolonged infusions of beta-lactams should increase the time of antimicrobial exposure above the MIC and improve their efficacy. Population pharmacokinetic modeling has been used to generate new dosing strategies and can be applied directly into clinical practice. The UWHC instituted a guideline that was approved by the Pharmacy and Therapeutics Committee for the prolonged infusions of both piperacillin/tazobactam and meropenem for patients receiving this therapy in the TLC (Trauma Life Center) on August 1, 2008.

Methods: This assessment will evaluate the efficacy of prolonged infusions of piperacillin/tazobactam and meropenem in the TLC at UWHC and will be performed using a retrospective, observational model. Data will be collected by conducting a chart review of all patients admitted to the TLC who received at least 72 hours of therapy with piperacillin/tazobactam or meropenem from February 1, 2008 to January 31, 2009. The first 6 months will include patients who received the previous conventional dosing with 30 minute bolus infusions and will be compared to the following 6 months, which will include patients who received the new prolonged infusions. The following data will be collected: age, gender, primary type of critical care patient (medical or surgical), APACHE score, ICU and hospital lengths of stay, in-hospital mortality, infection-related mortality, patient ventilator days, defined daily dose (DDD), duration of therapy, and concomitant antibiotics and their duration of therapy. Data will be collected on each patient with regards to positive cultures, site(s) of infection, organism(s) isolated in culture, and MIC(s) reported for piperacillin/tazobactam and meropenem.

Conclusion: Data collection and evaluation are ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Explain the rationale and evidence behind the prolonged infusions of beta-lactam antibiotics.

Describe two issues with prolonged infusions of beta-lactams in critically ill patients.

Self Assessment Questions:

A bactericidal effect occurs when the free drug concentration exceeds the MIC for what percent of the dosing interval for the carbapenems, penicillins, and cephalosporins?

How is piperacillin/tazobactam dosed as a prolonged infusion? How is meropenem dosed as a prolonged infusion?

EVALUATION OF A SYMPTOM-BASED PROTOCOL FOR THE TREATMENT OF ALCOHOL WITHDRAWAL IN THE MEDICAL AND SURGICAL INTENSIVE CARE UNITS AT THE CINCINNATI VA MEDICAL CENTER

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Purpose: A wide range of symptoms are associated with alcohol withdrawal syndrome (AWS) from anxiety, tremulousness, headache, diaphoresis, and palpitations to delirium tremens and even death. Death usually results from complications such as arrhythmias or pneumonia. There are also complications associated with the treatment for AWS including over-sedation, respiratory depression requiring mechanical ventilation, propylene glycol toxicity from high dose lorazepam infusions, and infections. Despite widespread use of alcohol withdrawal protocols, there are a small number of published studies in medically ill patients and even fewer in the critically ill population. We hypothesize that initiation of a standardized, symptom-based alcohol withdrawal protocol in the Medical and Surgical Intensive Care Units (MICU, SICU) will decrease ICU length of stay (LOS).

Methods: A multidisciplinary team developed and implemented a standardized, symptom-based alcohol withdrawal protocol using the CIWA-Ar to evaluate and manage withdrawal patients in Cincinnati VA MICU and SICU. This is a retrospective, single center evaluation comparing observational data collected in patients 12 months before and 12 months after protocol implementation. A computerized search of records will be used to identify patients at least 18 years of age, with a discharge diagnosis of AWS or alcohol delirium, admission to an ICU, and received benzodiazepines. The primary outcome is LOS in the ICUs. Secondary outcomes include: hospital LOS, duration of medication treatment from the time of admission to the last dose of benzodiazepine, total amount of benzodiazepine used, average lorazepam drip rates, total neuroleptic medication used, amount of clonidine and metoprolol used, pneumonia rates, deep vein thrombosis rates, patients requiring mechanical ventilation, in-hospital mortality rate and protocol adherence. Protocol non-adherence will be defined as (1) assessments not recorded (number recorded/number required) or (2) medications not titrated according to protocol.

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

Learning Objectives:

Describe the benefits of a symptom-based alcohol withdrawal protocol.

Explain medication use in the treatment of alcohol withdrawal using a symptom-based protocol.

Self Assessment Questions:

Symptoms of alcohol withdrawal syndrome can include:
A. Delirium Tremens
B. Tachycardia
C. Seizures
D. Anxiety
E. All of the Above

True or False: Benzodiazepines are the preferred first-line drugs to use in treatment of alcohol withdrawal syndrome.

EVALUATION OF A PRETEST PROBABILITY SCORE IN THE DIAGNOSIS AND MANAGEMENT OF HEPARIN-INDUCED THROMBOCYTOPENIA: THE YES-HIT TRIAL

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BACKGROUND:
Heparin-induced thrombocytopenia (HIT) is an antibody-mediated, adverse effect that has a profound association with thromboembolic formation. Positive diagnostic assurance can be supported through the use of serologic testing such as an ELISA or serotonin-release assay. A pretest assessment tool known at the 4Ts (thrombocytopenia, timing of platelet fall, thrombosis, or other probable cause) was developed to help identify those patients who are at risk for development of HIT. The goal of this study is to determine whether the clinical pretest scoring system can be used to better identify those patients who are and are not at risk for development of HIT.

METHODS:
This is an investigator-initiated, single-center, retrospective study will be conducted at the University Hospital in Cincinnati, Ohio. Subjects suspected of HIT having serologic tests sent to the lab will be included for evaluation with the 4Ts clinical pretest probability tool. Subjects will be included over the period of July 2008 through March 2009. Patients will be evaluated after their HIT serologic tests are sent to the laboratory. All patients will be divided in risk categories based on the result from their 4Ts clinical pretest score. The primary objective is to evaluate the sensitivity, specificity, and predictive values of the 4Ts pretest probability tool. This will be calculated when the categorical results from the pretest probability score (low, intermediate, and high) are compared to the ELISA and SRA results.

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

There are no conflicts of interest for the investigators involved and the outcome of this research.

Learning Objectives:

Review the pathophysiology, clinical presentation, diagnosis, and treatment of HIT.

Discuss the current medical literature pertaining to HIT.

Self Assessment Questions:

Which of the following are risk factors for developing heparin-induced thrombocytopenia?

A. Source of heparin
B. Type of heparin (bovine vs. porcine vs. LMWH)
C. Duration of exposure
D. Gender
E. All of the above

Which of the following statements is TRUE?

A. In confirmed HIT, you can just stop treatment and not use a DTI
B. Fondaparinux is FDA-approved for the treatment of HIT
C. It takes five to 10 days to see the clinical decline in platelet count in HIT
D. The occurrence of HIT is the same between general medicine patients and the critically ill or surgery patients
E. The majority of patients who have HIT panels sent off actually have the disease

STANDARDIZATION OF THERAPEUTIC INTERCHANGES IN FOUR SEPARATE HEALTH SYSTEMS

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Background: Health systems utilize formularies to help contain costs and decrease medication errors. The use of therapeutic interchanges allows for compliance with formulary medications by converting orders for non-formulary drugs to equivalent formulary agents, often based on Pharmacy and Therapeutics (P&T) decisions. These approved therapeutic interchanges can vary greatly between health systems; even health systems within the same corporation may have different therapeutic interchanges.

Purpose: To create and implement a standardized therapeutic interchange list for four sites within Trinity Health: 180-bed Battle Creek Health System, 480-bed Mercy Health Partners, 340-bed Saint Marys Health Care, and 460-bed Saint Joseph Regional Medical Center.

Methods: Therapeutic interchange data was obtained from each health system and compiled into a master list, organized by American Hospital Formulary Service (AHFS) drug class. A steering committee with representatives from each site examined this list in small portions and mutual interchanges were agreed upon based on cost, availability, and current clinical evidence. These new master interchanges were taken to each sites local P&T Committee for approval and implementation. Progress from pending to approved status at each site was tracked using a color-coding system on the master list.

Results: The master list contains 485 interchanges representing 238 medications from 86 different AHFS classifications. Most interchanges are found in the inhaled corticosteroid and ACE inhibitor classes. The vast majority (67%) of interchanges were unique to single sites. Despite corporate contracts and initiatives, only 4% of interchanges were common across all sites. Perfect matches were identified between 2, 3, and all sites at rates of 11%, 5.6%, and 1.4%, respectively. To date, there is a 27% combined acceptance of master interchanges from reporting sites. Financial benefits for the project are forthcoming. Further results and conclusions will be presented at the conference.

Learning Objectives:

Review the rationale behind the utilization of therapeutic interchanges

Identify weaknesses in therapeutic interchange processes

Self Assessment Questions:

What is the definition of therapeutic interchange?

Barriers to creating a standardized therapeutic interchange list include:

a. Differences in patient populations
b. Gaining local P&T approval
c. Medication availability
d. Size of interchange list
e. All of the above

IMPROVING TIME TO FIRST DOSE ANTIBIOTIC IN PATIENTS WITH SEVERE SEPSIS OR SEPTIC SHOCK

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PURPOSE: Apply targeted interventions to improve the time to first dose antibiotic administration in patients at Sparrow Hospital with severe sepsis or septic shock, in order to decrease mortality and comply with 2008 Surviving Sepsis Campaign guidelines.
METHODS: Pre-intervention data from the first quarter of 2008 were gathered by retrospective chart review with the help of the Performance Improvement department at Sparrow Hospital. Data points collected include patient demographics, diagnosis (severe sepsis or septic shock), date, time and location of diagnosis and date and time of first broad-spectrum antibiotic administration to treat septic episode. Interventions include education of ED and ICU nurses and physicians, pharmacists, and pharmacy technicians, as well as revision of the pharmacy data entry and dispensing procedures for first dose intravenous (IV) antibiotics. Education will consist of short 5-10 minute presentations reviewing the current Surviving Sepsis Campaign guidelines pertaining to antibiotic administration, the importance of timely and appropriate empiric antibiotic administration, pharmacy procedure revisions, and utilization of the existing sepsis order set and empiric antibiotic guide. The revised pharmacy procedure will involve treating all first dose IV antibiotic orders with stat priority, placing stat reminder stickers on each antibiotic bag, and delivering the antibiotic promptly to the patients room. Post-intervention data points will be consistent with those previously collected and will be gathered by retrospective chart review for comparison.
RESULTS and CONCLUSION: Pre-intervention data collection identified 32 patients (12 with severe sepsis, 20 with septic shock). The mean time from diagnosis to first antibiotic for all units was 4 hours. For ED admissions, ICU admissions, and existing ICU patients, the mean time was 2.6, 4.8, and 7.3 hours, respectively. The mortality rate was 40%. Post-intervention data will be presented with final conclusions at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the relationship between time to first antibiotic and mortality in patients with severe sepsis or septic shock.

Describe the current Surviving Sepsis Campaign guideline recommendations regarding timing of antibiotic administration.

Self Assessment Questions:

In patients with septic shock, it has been shown that survival decreases an average of 7.6% for every hour delay in effective antibiotic therapy. T/F

According to the 2008 Surviving Sepsis Campaign guidelines, for patients with severe sepsis or septic shock, empiric broad-spectrum antibiotic therapy should be administered
A. Within 6 hours of recognition
B. Within 1 hour of recognition
C. Within 4 hours of recognition
D. Anytime, as long as blood cultures have been drawn

COMPARISON OF A PHARMACIST-ADMINISTERED AND A PHARMACIST-FACILITATED COMMUNITY HERPES ZOSTER IMMUNIZATION PROGRAM

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Purpose: Approximately one million cases of herpes zoster are reported in the United States each year. The Advisory Committee on Immunization Practices recommends that all patients over age 60 receive Zostavax as a routine immunization; however, the most current CDC reports indicate that only 2% of seniors had received the vaccine in 2007. Low immunization rates may be due to cost, convenience and safety barriers associated with the current distribution model. The purpose of this project is to develop, implement, evaluate and compare two community herpes zoster immunization programs, one using a pharmacy-administered model and one using a pharmacist-facilitated model. The objectives of this study are to 1) improve patient access to the herpes zoster vaccine, 2) determine the cost to implement a program to administer herpes zoster vaccine in two different practice models, and 3) compare two practice models.
Methods: This project will take place in one division of Kroger pharmacy. Different herpes zoster immunization practice models exist between the border states of Ohio, where pharmacists are currently unable to administer Zostavax, and Kentucky, where pharmacists are permitted by law to administer the vaccine. In Ohio, the study group will set up clinic dates and times in select pharmacies, during which contracted nurses will administer Zostavax. In Kentucky, pharmacists will administer the vaccine on an appointment basis throughout pharmacy business hours. Subjects aged 60 and above will be recruited for participation. Comparisons of vaccination numbers and costs will be completed. This project is significant to the practice of pharmacy because it has the potential to demonstrate that pharmacists improve access to preventative care thereby increasing the number of patients who are protected against shingles.
Preliminary Results: Models are currently being implemented. Results will be available for presentation at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify which patients should receive the herpes zoster vaccine.

Describe the existing barriers that may prevent eligible patients from receiving the herpes zoster vaccine.

Self Assessment Questions:

At what age does the Advisory Committee on Immunization Practices recommend all patients without contraindications receive the herpes zoster vaccine?
a.> 50 years
b.> 55 years
c.> 60 years
d.> 65 years

All of the following are possible barriers to safe and effective administration of the herpes zoster vaccine except:
a.simultaneous administration of an additional live vaccine
b.inconvenience of obtaining the vaccine from a pharmacy and transporting it to a physicians office for administration
c.high cost of the vaccine
d.possible decrease in potency of the vaccine with inappropriate transport

ANALYSIS OF METHODS FOR IDENTIFYING COST-CONTAINMENT DRUG TARGETS IN PHARMACY.

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Purpose: The University of Wisconsin Hospital and Clinics (UWHC) Pharmacy Department dedicates significant time and effort to budget preparation. Current budget methods are centered around analysis and forecasting to generate cost-containment opportunities. The purpose of this project is to describe the methods for identifying and prioritizing cost-containment targets while developing financial plans for the upcoming fiscal year. Both quantitative and qualitative assessments of drug utilization patterns will be employed. This project will assess the strengths and weaknesses of the evaluative methods used for target identification and describe techniques utilized in creating tactical plans for implementing cost-containment initiatives.

Methods: Initial data acquisition and analysis of purchasing and utilization patterns and trends will be performed, using data obtained from the UWHC electronic health record and purchasing software. This analysis will focus on a list of 60-80 drug products that compose a majority of the hospital drug budget. In addition to the quantitative analysis, qualitative assessments (including interviews with key health-care professionals in the organization) will aid in the identification of cost-containment targets. These methods will be evaluated to identify the strengths and weaknesses of each. Once targets are identified, specific tactical plans incorporating tools for implementing cost-containment initiatives (e.g., formulary measures, guidelines development, etc.) will be developed and the process of implementing cost-containment initiatives will be described.

Results: Results will include an analysis of the strengths and weaknesses of various target identification and selection techniques, a description of tactical plan development, and a cost-containment target list for our upcoming fiscal year.

Conclusion: To be presented.

Learning Objectives:

Explain the importance of qualitative measures in budget preparation and cost-containment target selection.

Review required data and methods for effective analysis in identifying cost-containment targets.

Self Assessment Questions:

Name a strength and weakenss of both quantitative and qualitative measures associated with cost-containment.

What impact do qualitative measures have on cost-containment target development?

APPROPRIATE USE OF ERYTHROPOIESIS STIMULATING AGENTS (ESAS) IN CHEMOTHERAPY-INDUCED ANEMIA: A FINANCIAL PERSPECTIVE

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Purpose: Nationwide, institutions are working to ensure proper use of ESAs due to recent guideline changes, reports of adverse drug reactions, and reimbursement concerns. The Centers for Medicare and Medicaid Services (CMS) published its final national coverage determination (NCD) on the use of erythropoiesis stimulating agents in cancer and related neoplastic conditions in May 2007. The objective of this review is to identify financial losses due to inappropriate ESA use according to CMS, to identify guidelines for appropriate inpatient and outpatient use of ESAs in the chemotherapy-induced anemia patient population, and to implement a protocol for ESA use and medication guide distribution in these patients to help optimize reimbursement.

Methods: Prior to commencement, this project will be submitted to the Pharmacy and Therapeutics Committee for review. A literature search was performed in order to determine Medicare payment guidelines for ESAs as well as manufacturer dosing guidelines. Billing information will be obtained for outpatient oncology patients from October 1, 2007, to August 31, 2008. The Explanation of Benefits (EOBs) for these patients will be analyzed to identify those claims denied due to inappropriate ESA use. The denied claims will be summed in order to gauge monetary losses due to inappropriate ESA administration in chemotherapy-induced anemia patients in the outpatient setting. Meetings will be conducted with oncologists who are affiliated with the health system in an effort to maximize feedback regarding implementation of a protocol for use of ESAs in this patient population. A drug use evaluation (DUE) will be conducted in order to identify inpatient population statistics relating to ESA administration. Financial information will be extrapolated from January 1, 2008, to June 30, 2008, by calculating cost of drug administered in the inpatient setting to patients who did not qualify for ESA use, according to current guidelines.

Learning Objectives:

To identify criteria for appropriate ESA use in the chemotherapy-induced anemia population according to CMS and manufacturer guidelines

To identify financial losses due to ESA administration outside of CMS and manufacturer guidelines

Self Assessment Questions:

What are the specific criteria for ESA use in the chemotherapy-induced anemia population?

Do financial losses due to lack of reimbursement warrant implementation of a protocol for ESA use?

IMPACT OF CARBAPENEM-HYDROLYZING OXACILLINASE GENES ON CLINICAL OUTCOMES OF BLOODSTREAM INFECTIONS CAUSED BY ACINETOBACTER BAUMANNII.

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Background: Acinetobacter baumannii is an increasingly prevalent nosocomial pathogen that is frequently multi-drug resistant. Carbapenems are a mainstay of treatment; however reported rates of carbapenem resistance in A. baumannii have been increasing. Although multiple resistance mechanisms are often employed by Acinetobacter spp, beta-lactamase production is frequently the cause of carbapenem resistance. Among the classes of beta-lactamases, metallo--lactamases [MBLs] and several carbapenem-hydrolyzing oxacillinases [CHDLs] hydrolyze carbapenems and produce resistance in A. baumannii. Genes encoding two different types of CHDLs (blaOXA-23 and blaOXA-40) have been identified in strains of A. baumannii at our institution. These blaOXA gene containing strains appear to be more stable in hosts and also capable of causing epidemiological outbreaks of infection. No study to date has evaluated clinical outcomes associated with infections caused by A. baumannii harboring blaOXA genes. This study hypothesizes that bloodstream infections caused by isolates carrying blaOXA genes are associated with poorer patient outcomes when compared to isolates that are blaOXA gene negative.

Methods: This retrospective cohort study assesses clinical outcomes in patients bacteremic with blaOXA gene positive and negative A. baumannii. Inpatient medical records were reviewed, and subjects were matched in a 1:3:3 ratio comparing PCR-confirmed blaOXA gene positive isolates (cases) with blaOXA gene negative, carbapenem resistant isolates (controls) and blaOXA gene negative, carbapenem sensitive isolates (controls). The primary endpoint evaluated was in-hospital mortality. Secondary endpoints evaluated were time to in-hospital mortality, duration of infection, duration of broad spectrum antibiotic use, and hospital length of stay after infection. Patients were matched based on age and co-morbidities. Univariate and multivariate statistics were performed as appropriate.

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

Learning Objectives:

Explain the role of blaOXA genes in antibiotic resistance

Explain the impact of carbapenem resistance on the ability to treat A. baumannii infections

Self Assessment Questions:

Oxacillinases confer resistance against carbapenems T/F

Resistance to carbapenems has been shown to impact the outcomes of patients infected by A. baumannii T/F

EVALUATION OF QUALITY CORE MEASURE COMPLIANCE WITH CENTERS FOR MEDICAID & MEDICARE SERVICES FOR HOSPITALIZED PNEUMONIA PATIENTS

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Purpose: The Centers for Medicaid and Medicare Services (CMS) are initiating pay-for-performance method to encourage quality improvement. Saint Margaret Mercy (SMM) developed a pneumonia protocol in concordance with the Infectious Diseases Society of America (IDSA) guidelines. This study was designed to evaluate the rate of compliance with both CMS quality core pneumonia measures and usage of the SMM pneumonia protocol.

Methods: The study obtained IRB approval. Charts identified by CMS coding diagnosis of pneumonia from January to March 2008 were selected for retrospective review. A case report form was used to collect demographics and clinical data. Primary outcomes were based on CMS quality core measures. Secondary outcomes included comparing chart review data from the Quality Assurance Team (QAT) to study chart review data, assessing compliance with SMM pneumonia protocol, and determining areas where compliance can be improved.

Results: Fifty charts were reviewed. Oxygen assessment and advisement of smoking cessation was completed in all patients. One patient did not receive the pneumococcal vaccination as appropriate. Forty-two patients (84%) received the influenza vaccine. Blood cultures were obtained prior to antibiotic administration in 46 patients (92%). Thirty-six patients (72%) received antibiotics within 4 hours after arrival. Initial antibiotic selection for community-acquired pneumonia (CAP) ICU and non-ICU patients were chosen appropriately 89% of the time. QAT versus study data determined diagnosis conflicted in three cases. These patients were identified with CAP but met criteria for healthcare associated pneumonia (HCAP). The protocol was used in 10 HCAP cases.

Conclusion: Compliance with appropriate initial antibiotic, influenza vaccinations, timing of blood cultures and administration of antibiotics within 4 hours of arrival can be improved. These findings will be presented to SMM committees with recommendations to change and increase awareness of the SMM pneumonia protocol.

Learning Objectives:

List the CMS quality core measures that define treatment standards for pneumonia.

Identify the value of compliance with a pneumonia protocol.

Self Assessment Questions:

Which of the following is not a CMS quality core measure:
a. Oxygen assessment
b. Advisement of adult smoking cessation
c. Pneumococcal vaccination and influenza vaccination
d. Appropriate initial antibiotic selection for community acquired pneumonia
e. Timing of blood cultures
f. Appropriate initial antibiotic selection for health care associated pneumonia

True or false: Administration of antibiotics should be within 6 hours of arrival.

IMPLEMENTATION OF A PHARMACY-LED WARFARIN MANAGEMENT PROGRAM

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Purpose: Although the benefits of anticoagulation in patients at high risk for thromboembolic complications are well established, maintaining patients on anticoagulant regimens can be difficult, because complex management is often required. The standardization of anticoagulation processes in the hospital setting is necessary to ensure optimal safety and therapeutic outcomes. This studys objectives are to examine the results of a pharmacy-led warfarin management program. The program, which included implementing a warfarin-dosing nomogram and monitoring doses, interactions and INRs by clinical pharmacists, was designed in response to the Joint Commissions National Patient Safety Goal 3E. We hypothesize that after the implementation of the program, patients that are newly started on warfarin will require five days (median) to achieve therapeutic INRs, and that by day five, 90% or more of patients will not require a change in their warfarin dosage. Furthermore, we expect a decrease in the number of hospital-wide supratherapeutic INRs after program implementation.

Methods: The Institutional Review Board approved this study. Data will be collected from electronic medical records for the first three months immediately following the program implementation. The data collected will include basic demographics such as gender, age, weight, indication for anticoagulation, and certain comorbidities. For the initial first six days of treatment, daily warfarin dosage, INR, hemoglobin, concurrent amiodarone use, and adherence to the warfarin-dosing nomogram will be documented. We will report frequency outcomes as percentages and test hypotheses concerning them by examining the 95% confidence intervals. Median time to therapeutic INR will be estimated using the Kaplan-Meier product-limit method Data compiled by the Saint Joseph Mercy Health System Quality Institute will be used to calculate the number of supratherapeutic INRs before and after program implementation.

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

Learning Objectives:

Explain the utility of a pharmacy-led warfarin management program.

List the barriers to implementing a warfarin management program.

Self Assessment Questions:

All of the following are risk factors for increased risk of bleeding in patients being started on warfarin except:
A. Cirrhosis
B. Chronic kidney disease
C. Obesity
D. Severe congestive heart failure

True or False: According to the nomogram, on day 2 if a patients INR is below 1.5, the dose should be increased by 25%.

CLINICAL AND MICROBIOLOGIC EVALUATION OF REDUCED VANCOMYCIN BACTERICIDAL ACTIVITY IN MRSA BACTEREMIA

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Diminished vancomycin susceptibility in a clinical isolate of methicillin-resistant Staphylcoccus aureus (MRSA) first occurred in 1996. Reporting of vancomycin treatment failure in MRSA infections despite appropriate antibiotic dosing has increased over the past decade. Association between higher minimum inhibitory concentrations (MICs) and worse clinical outcomes, including increased attributable mortality, led the Clinical and Laboratory Standards Institute (CLSI) to lower the susceptible vancomycin MIC of S. aureus from <4 mcg/ml to <2 mcg/ml in 2006. Cases of intermediate and resistant MIC isolates remain low, with the majority of isolates (83.6%) maintaining MIC <1mcg/ml.

Residence in the intensive care unit at the onset of infection and prior vancomycin exposure within the last 30 days have been shown to be predictive of elevated vancomycin MICs, development of persistent MRSA bacteremia, and increased mortality among patients. Increased mortality has been observed in patients with persistent MRSA bacteremia that were empirically treated with vancomycin. Minimum bactericidal concentration (MBC) determinations have detected vancomycin tolerant strains among isolates defined as susceptible by MIC criteria and may be a more sensitive predictor of treatment failure. Mutation of accessory gene regulator (agr) and vancomycin-resistance associated sensor/regulator (VraSR) genes in MRSA have additionally been associated with reduced vancomycin susceptibility.

This retrospective cohort study of sequential intensive care unit patients with MRSA bacteremia treated with vancomycin at the University of Wisconsin Hospital and Clinics from 2005 to 2008 will assess microbiologic characteristics and clinical outcomes. An electronic chart review will collect data relevant to bacteremia including empiric vancomycin dosing, vancomycin serum concentrations, and previous antibiotic exposure. Patients with vancomycin treatment failure will be compared to patients with clinical cure of bacteremia with all cause mortality as the primary endpoint. Vancomycin MICs, MBCs, and autoregulatory gene expression experiments will be performed on patient isolates.

Data collection and evaluation are currently being conducted.

Learning Objectives:

Describe how vancomycin tolerant MRSA differs from vancomycin resistant MRSA.

Identify microbiologic and clinical characteristics of patients at an increased risk of vancomycin tolerant MRSA bacteremia.

Self Assessment Questions:

Why are vancomycin minimum bactericidal concentrations (MBCs) useful when characterizing MRSA susceptibility?

What can pharmacists do to improve clinical outcomes of patients with vancomycin tolerant MRSA bacteremia?

NICOTINE REPLACEMENT PATCHES IN A NON-CONTROLLED PRESCRIBING ENVIRONMENT

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Purpose: Nicotine replacement patches can have significant adverse effects if patients are not properly counseled. The purpose of this study is to assess the effect of removing nicotine patches from formulary restriction and no longer requiring patients who receive them to be enrolled in a smoking cessation program.

Methods: All patients who have received a prescription for nicotine patches from the Milwaukee VA Medical Center since the removal of the formulary restrictions will be identified using the institutions electronic medical record. Each patient will be mailed a letter explaining the research project, a survey and a self-addressed stamped envelope. The survey will address age, gender, quantity of cigarettes smoked, effectiveness of the nicotine patch, adverse effects incurred and quality of counseling received. After the surveys are returned the data will be collected and analyzed using Microsoft Access. Analyzed survey results will be compared to the outcomes of Smoking Cessation Clinic at the same institution.

Results: Research in progress. Final results will be presented at the Great Lakes Pharmacy Residency Conference in April 2009

Learning Objectives:

Explain the impact that proper counseling has on nicotine patch users.

To identify the frequency of adverse effects associated with non-controlled prescribing of the nicotine replacement patch.

Self Assessment Questions:

True/False: For patients wanting to start smoking cessation therapy, a nicotine replacement agent should be used first line.

Multiple Choice: Which of the below is NOT an adverse effect of the nicotine replacement patch?
A. Skin reactions
B. GI upset
C. Headache
D. Sleep disturbances
E. Nausea/Vomiting
F. Increased blood pressure
G. None of the above: all are possible adverse effects

PHYSICIAN INTEREST IN PHARMACIST-MANAGED MEDICATION THERAPY MANAGEMENT SERVICES IN HOSPITAL-OWNED COMMUNITY PHARMACIES

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PURPOSE: The Medicare Modernization Act of 2003 first acknowledged cognitive services provided by pharmacists as valuable to patients and mandated that medication therapy management services (MTMS) be provided to certain Medicare beneficiaries. Successful MTMS are dependant upon pharmacists working collaboratively with physicians and other healthcare professionals to optimize medication use. Community pharmacies are in a prime position to offer MTMS to the public. For this reason, a survey was created to determine physician interest in pharmacist-managed MTMS in hospital-owned community pharmacies. The purpose of the survey is to identify specific MTMS that physicians want pharmacists in a community setting to provide for their patients. The outcomes of this survey are expected to better align MTMS with the needs of physicians and their patients.
METHODS: A web-based survey was developed to assess physicians understanding and interests in community pharmacist-managed MTMS. The survey was composed of 13 multiple choice and Likert scale questions focused on physicians previous knowledge of MTMS, perceived value of MTMS, fear of loss of business to MTMS, and interest in pharmacist monitoring and management of a variety of disease states. The survey was sent via e-mail to approximately 2,100 NorthShore University HealthSystem physicians for completion. The opening page of the survey contained an introductory explanation of MTMS and a description of the services that pharmacists could provide in a community setting. The survey was accessible online for four weeks and a reminder e-mail was sent out to the physicians one week prior to the survey deadline. Data collected will be analyzed to determine the overall interest in community pharmacy-managed MTMS and will identify the services that will be the most accepted and utilized by the health systems physicians.
RESULTS/CONCLUSIONS: Pending survey collection and data analysis, results will be presented at the 2009 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain barriers community pharmacists may encounter when developing medication therapy management services.

Identify factors that contribute to physicians referral of patients to clinical pharmacy services in the community setting.

Self Assessment Questions:

True/False: Physicians agree that community pharmacist-managed MTM services would be beneficial to their patients.

Which of the following factors influence physician participation in pharmacist-provided MTM services?
a. Previous knowledge of MTM services
b. Perceived value of MTM services
c. Loss of business to pharmacist-managed MTM service
d. More than one of the above

DEVELOPMENT OF AN ORDER CAPACITY CONTROL SYSTEM

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Purpose:
Nearly 15,000 medication orders are reviewed and entered each day by pharmacists within Aurora Health Care Hospitals. After the implementation of Pyxis Connect in 2007, the Milwaukee Metro Region developed guidelines for order entry assistance among four hospitals. However, a standard timeframe for timely order review, entry, or a process for order entry assistance within the system does not currently exist among the 13 hospitals in the Aurora Health Care System. This leads to differences in the volume of orders reviewed and processed by pharmacists at each site, resulting in variable order entry turnaround times. Potential variation in patient care as well as patient/caregiver satisfaction throughout the hospitals also exists. In addition, as unit-based pharmacists are expected to prioritize order entry along with their other clinical responsibilities, maintaining an appropriate volume of order entry is critical to balancing their patient care accountabilities and overall pharmacy services provided. Therefore, the primary objective of this project is to develop an order capacity control system to ensure consist order review and entry turnaround times within hospital pharmacies in the Aurora Health Care System.
Methods:
To establish a baseline for average time for order review and order entry turnaround, data will be collected from the 13 hospitals in Aurora Health Care. Average time for order review and order entry turnaround will be obtained via reports from our order scanning technology. After baseline data is assessed, areas for improvement will be identified, and interventions will be implemented. Data will be collected after the interventions and compared to the baseline data in order to evaluate whether the interventions improved consistency in order review and order entry turnaround times within the Aurora Health Care Hospitals.
Results/Conclusions:
Data is being reviewed for average time for order review and order entry turnaround.

Learning Objectives:

Describe the potential benefits associated with an order capacity control system.

Explain the challenges in designing and implementing an order capacity control system.

Self Assessment Questions:

Decreasing the variation in order review and order entry turnaround time is a potential benefit associated with an order capacity control system. T or F

List two barriers to developing an order capacity control system.

RISK FACTORS FOR MULTI-DRUG RESISTANT GRAM NEGATIVE BACILLI IN SEVERE SEPSIS AND SEPTIC SHOCK

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Purpose: Septic shock has a high mortality rate and it is even more so for those patients infected with multi-drug resistant Gram negative organisms. Typically, these organisms are resistant to three or more classes of antibiotics and the empiric antibiotics chosen are usually resistant. A delay in selecting appropriate antibiotics leads to increased mortality. By identifying risk factors for infections due to multi-drug resistant Gram negative bacilli, appropriate antibiotics can be started sooner thereby decreasing mortality. The purpose of this study was to identify risk factors for multidrug resistant Gram negative bacilli in patients with severe sepsis and septic shock. In addition an antibiogram will be developed for severe sepsis and septic shock based upon intensive care unit (medical versus surgical) and site of infection. All the findings of this study will be implemented into the current sepsis guidelines at the respective institution.

Methods: A retrospective case-case-control study was conducted in patients that developed severe sepsis or septic shock due to multi-drug resistant Gram negative bacilli. Patients were included if they had a diagnosis of severe sepsis or septic shock from June 2006 through October 2007 and are 18 years or older. Pregnant patients or those younger than 18 years were excluded. The multi-drug resistant Gram negative patients were compared to two groups of severe sepsis and septic shock patients in the same timeframe. One group included those that were infected with a susceptible Gram negative bacilli and the other had negative culture results. Data collection included demographics, antibiotic history, and microbiology results. Possible risk factors such as previous healthcare and antibiotic exposure, length of intensive care and hospital stay before onset of sepsis, presence of a central venous catheter were also evaluated. Logistic regression was used to identify risk factors for Gram negative multi-drug resistant bacilli.

Results: pending

Learning Objectives:

Identify risk factors for multi-drug resistant Gram negative bacilli.

Describe the epidemiology of severe sepsis and septic shock.

Self Assessment Questions:

True or False: Severe sepsis and septic shock is most often due to Gram positive organisms.

List 3 risk factors for multi-drug resistant Gram negative bacilli in severe sepsis and septic shock.

ALEMTUZUMAB (CAMPATH-1H) INDUCTION AND PREDNISONE-FREE MAINTENANCE IMMUNOSUPPRESSION IN AN OLDER RENAL TRANSPLANT POPULATION.

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Purpose: Alemtuzumab (Campath-1H) is a humanized monoclonal antibody directed against CD52 antigens located on various immune-related cells. Due to its powerful cytolytic effect on T and B lymphocytes, natural killer cells, monocytes, and macrophages, alemtuzumab has utility in renal transplantation. Additionally, when older patients receive renal transplants, questions arise over the degree of potent immunotherapy this group requires. Evidence indicates, anti-CD52 induction, compared to alternative induction agents, yields equivalent or superior effects on graft and patient survival. These patients also do not appear to be at risk for increased infectious complications. Of note, maintenance immunosuppresion often varies among these patients. The use of prednisone-free maintenance immunosuppression combined with alemtuzumab has been investigated in several patients, but none have specifically looked at older patients. It is unclear whether the data from these larger sample sizes also hold true for older patients. This retrospective cohort study evaluates the efficacy and safety of alemtuzumab induction in older kidney transplant patients compared to basiliximab induction.

Methods: A single-center, retrospective, chart review of all kidney transplant patients ≥60 years of age at the time of transplant, receiving prednisone-free maintenance immunosuppression with either alemtuzumab or basiliximab induction, and with at least three years of follow-up was performed. The primary outcome measure was graft survival at three years. Secondary outcomes at three years include: patient survival, infection rates, malignancy rates, quality of renal function, number of hospitalizations, rejection rates, and incidence of leukopenia. Data collection includes: baseline demographics (age, race, etc), cause of renal failure, donor information, induction agent used, maintenance immunosuppression, cytomegalovirus (CMV) preventative strategy, incidence of biopsy proven acute rejection, and cause of graft failure and/or death. This study has been approved by the Northwestern University Institutional Review Board.

Results/Conclusion: Study results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the mechanism of action of alemtuzumab as an induction agent in renal transplantation.

Explain current data pertaining to alemtuzumab use in renal transplantation.

Self Assessment Questions:

Alemtuzumab exhibits cytolytic activity against CD52 antigens expressed on which of the following immune cell types?
a) T lymphocytes
b) B lymphocytes
c) Natural Killer (NK) cells
d) Macrophages
e) All of the above

True/False: Alemtuzumab is FDA-indicated for the use as an induction agent in patients undergoing renal transplantation.

RELATIONSHIP BETWEEN CUMULATIVE AMINOGLYCOSIDE DOSES AND RENAL IMPAIRMENT IN ADULTS WITH CYSTIC FIBROSIS

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PURPOSE: Cystic fibrosis (CF) patients will receive multiple courses of aminoglycosides (AGs) due to lung infections and therefore have an increased risk of experiencing their associated toxicities, including nephrotoxicity. The goal of this study was to compare high versus low cumulative AG doses and the effect on renal function.

METHODS: The design was a retrospective cohort study. Inclusion criteria were admission to our institution from October 2002 to October 2008, treatment for pulmonary exacerbation of CF, at least 18 years old at the time of admission, received AGs, and had 2 sets of drug levels drawn at least 2 weeks apart. Patients were stratified into two groups: high cumulative exposure (HCE) defined as greater than 300mg/kg AG received and low cumulative exposure (LCE) defined as 300mg/kg received or less. Data collected for each patient included demographics, serum creatinine (the first recorded for the first and last admission), first and last serum AG levels drawn, and AG dose, frequency, and duration. Drug levels drawn while a patient was pregnant or admitted directly to the ICU were excluded. AG clearance for the first and last admissions in the study period, cumulative doses, and pharmacokinetic parameters (using Sawchuk-Zaske method) were determined. Any incidence of acute renal failure was documented as well as any identifiable cause and concomitant use of nephrotoxic agents.

RESULTS: 23 patients met criteria for inclusion. They were predominately female (17; 73.9%) with a median age of 26 years. 11 were stratified to the HCE group and 12 to the LCE group. The average change in clearance for the HCE group was 6.7ml/min and 5.6 ml/min for the LCE group.

CONCLUSION: The majority of patients showed a decreased aminoglycoside clearance with increased exposure. Those in the HCE group showed a more significant decrease than those in the LCE group.

Learning Objectives:

Describe the potential relationship between cumulative doses of aminoglycosides and renal function over time

List the risks associated with increased cumulative exposure to aminoglycosides.

Self Assessment Questions:

Which of the following antibiotics does not possess reliable coverage against pseudomonas aeruginosa?
A.Ceftazidime
B.Ertapenem
C.Tobramycin
D.Ciprofloxacin

A patient with cystic fibrosis will have a larger volume of distribution than one who does not. TRUE or FALSE

EVALUATION OF A PHARMACIST MANAGED ANTICOAGULATION SERVICE AT A LONG-TERM CARE FACILITY

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A retrospective, observational, non-randomized, single-center chart review will be conducted to compare INR control of warfarin patients being monitored by a pharmacist versus a traditional provider in a long-term care facility. Patients in the traditional provider monitored group will be identified as those having received warfarin in the long-term care facility during a 7 month time period between September 2007 and March 2008. Patients in the pharmacist-monitored group will be those having received warfarin in the long-term care facility during a 6 month period between September 2008 and February 2009. Patients who were on warfarin having had at least 1 INR drawn during their stay will be evaluated. Medical charts will be reviewed to gather the following data: Days of warfarin therapy, INR values, warfarin notes documented in the progress notes, whether the patient is new to warfarin therapy, and indication of therapy. The primary outcome will be time spent within the extended therapeutic INR range. Secondary outcomes include percentage of INRs within the extended therapeutic range, percentage of out of range INRs that are greater than 5, average number of INRs per 100 warfarin days, and percentage of time no INR was documented in the progress notes. Results and conclusions are pending.

Learning Objectives:

Describe national patient safety goal #3 as it relates to warfarin patients in a long-term care facility.

Describe evidence supporting pharmacists involvement in meeting the requirement described in national patient safety goal #3.

Self Assessment Questions:

Ample evidence to support pharmacist monitoring of warfarin exists for all settings including the acute care setting, the ambulatory care setting and the long-term care facility setting.
a.True
b.False

According to the 2006 survey, approximately what percentage of institutions had a pharmacist-consulted warfarin service at their facility?
a.~11%
b.~38%
c.~62%
d.~89%

EVALUATION OF LACTOBACILLUS RHAMNOSUS GG IN THE LONG TERM ACUTE CARE PATIENT.

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Purpose:
To investigate the use of Lactobacillus rhamnosus GG in the long term acute care patient to test the hypothesis that it may lower the incidence of Clostridium difficile associated diarrhea and/or diarrhea of any cause.

Methods:
This is a randomized double blind placebo control trial that began September 2008. All patients admitted to the Continuing Care Hospital during this time period were given informed consent. All who consented were screened for enrollment. Patients included were then randomized and stratified based on antibiotic use to treatment or placebo arms of the trial. The treatment arm received 2 capsules Lactobacillus rhamnosus GG twice daily with meals while the placebo arm received 2 placebo capsules on the same schedule. Treatment continued for the entire length of stay regardless of changes in antibiotic treatment status. Data to be collected includes: patient demographics, possible co-morbidities/drugs that would cause diarrhea, length of stay, history of alcohol use, smoking history, previous diagnosis of CDAD, use of histamine-2 receptor antagonists, proton pump inhibitors, or antacids, history of antibiotic use prior to CCH, use of antidiarrheal agents, labs (C. difficile toxin results, serum creatine, creatine clearance, serum albumin, Stool cultures), and antibiotic information (Antibiotic of use, duration, number of doses of antibiotic, time from first dose to symptoms of colitis, reason for antibiotic use, other recent antibiotics).

Results and Conclusion:
This research is currently in the data collection phase. Final results will be presented at the Great Lakes Residency Conference meeting.

Learning Objectives:

List the possible mechanisms of probiotics positive effects.

List 3 of the risk factors for C. difficile associated diarrhea infections.

Self Assessment Questions:

True/False: The total cost of C. difficile associated diarrhea to the US health system is estimated at $100 million/year.

Lactobacillus is normal flora in which of the following:
a.Oral Cavity
b.Vagina and vaginal fluid
c.The gastrointestinal tract
d.All of the above

EVALUATION OF ANTIBIOTIC DURATION AND OUTCOMES ASSOCIATED WITH VENTILATOR-ASSOCIATED PNEUMONIA IN THE CRITICAL CARE SETTING

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Purpose: Current American Thoracic Society/Infectious Diseases Society of America guidelines for the management of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia recommend that patients may receive therapy for a duration as short as 7 days if initial empiric antibiotics are appropriate (14 days for non-fermenting gram-negative bacilli such as Pseudomonas aeruginosa), provided that the patient demonstrates clinical improvement. The purpose of this study is to evaluate the duration of antibiotics that are utilized to treat ventilator-associated pneumonia in the critical care units. Patients will be divided into two groups based on the duration of antibiotic therapy that they receive, and outcomes will be evaluated and compared between treatment groups.

Methods: This is a retrospective chart review. Patients will be divided into 2 groups: abbreviated duration (≤8 days for most pathogens or ≤15 days for P. aeruginosa or Acinetobacter baumanii) or extended duration (>8 days or >15 days, respectively). The primary outcome will be differences in ICU days between the treatment groups. Secondary outcomes include ventilator days, antibiotic-free days, pulmonary infection relapse, development of superinfection, development of a multi-drug resistant pathogen, Clostridium difficile toxin positive culture, and cost of therapy. Patients will be included in this study if they meet the following criteria: at least 18 years of age, ≥2 days in the intensive care unit (ICU) or coronary care unit (CCU), mechanically ventilated for at least 48-72 hours, and a diagnosis of pneumonia. Ventilator-associated pneumonia will be differentiated from other sources of pneumonia by including patients with antibiotics initiated at least 48-72 hours after intubation. Only patients with positive sputum cultures will be included, and patients will be excluded from the study if initial antibiotic choices do not cover the organism grown on culture.

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

Learning Objectives:

Describe the risks and benefits of decreasing length of antibiotic therapy for ventilator-associated pneumonia.

Identify clinical opportunities to streamline antibiotic utilization.

Self Assessment Questions:

True/False: Patients with documented Pseudomonas pneumonia may be treated with as little as 7 days of antibiotic therapy, provided the patient demonstrates clinical improvement.

True/False: Decreasing duration of antibiotic therapy increases the risk of developing a multi-drug resistant infection.

ASSESSMENT OF A1C REDUCTION ONE YEAR AFTER INITIATION OF INSULIN THERAPY IN A VETERAN POPULATION

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Background: Approximately 23.6 million people in the United States are affected by diabetes mellitus, a leading cause of morbidity and mortality. Complications resulting from uncontrolled diabetes are associated with the extent of hyperglycemia measured by the glycated hemoglobin level (A1c). According to analysis of the National Health and Nutrition Examination Survey (NHANES), there has been a trend of improved glycemic control from 1999 to 2004. However, there is room for improvement to enhance the lives of diabetics.

Purpose: The purpose of the study is to assess the effectiveness of insulin titration practices, at the Cincinnati Veterans Affairs Medical Center (VAMC), at achieving the American Diabetes Associations A1c goal of less than 7% after one year of insulin therapy.

Methods: The study is a retrospective chart review of Cincinnati VAMC computerized medical charts of patients newly initiated on insulin from January 1, 2006 to December 31, 2006. Data to be analyzed includes age, gender, body mass index, A1c, concurrent oral diabetic medications, type of insulin, insulin dose (units/kg) after one year, secondary microvascular complications from diabetes, and number of primary care provider and pharmacy clinic visits in which diabetes was addressed. Exclusion criteria includes age less than 18 years old, type 1 diabetes mellitus, previous insulin treatment, A1c less than 7% at the initiation of the study period, lack of a documented A1c within 3 months before insulin initiation, and lack of a documented A1c within 3 months after the year of insulin treatment. Descriptive statistics will be performed to assess achievement of A1c goal after one year of insulin therapy, and statistical analysis will be performed to compare demographic characteristics, diabetes treatments, diabetes complications, and clinic visits.

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

Learning Objectives:

Identify variables that may have affected achievement of A1c goal.

Recall if the number of primary care and/or pharmacy clinic visits showed an effect on improved A1c outcomes.

Self Assessment Questions:

True or False: According to the American Diabetes Association, the goal A1c for all diabetics is less than 7%.

True or False: The United Kingdom Prospective Diabetes Study (UKPDS) showed that for every 1% decrease in A1c, there was a 35% reduction in the risk of microvascular complications.

JUSTIFICATION OF AN ANTIMICROBIAL STEWARDSHIP PHARMACIST IN A COMMUNITY HOSPITAL

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Purpose: With rising health care costs, increasing antibiotic resistance, and increasing concern for hospital acquired infections many institutions are turning to antimicrobial stewardship programs (ASP) for help with antibiotics. Antimicrobial stewardship involves selecting an appropriate drug while optimizing its dose and duration to treat an infection while minimizing toxicity and conditions for selection of resistant strains. Munson Medical Center, a 391-bed community hospital, developed an ASP program in the early 2000s. The goal of this project is to demonstrate the cost effectiveness of a pharmacist managed antimicrobial stewardship program in a community hospital.

Methods: Benchmarking data will be obtained retrospectively by determining daily-defined doses (DDDs) of selected antimicrobials (aztreonam, ciprofloxacin, doripenem, ertapenem, genatamicin, imipenem/cilastatin, levofloxacin, meropenem, piperacillin, piperacillin/tazobactam, tobramycin, and vancomycin) over the three-month period preceding the study initiation. Baseline cost data was also be obtained in a similar manner.

During the study phase of three weeks, a daily medication census will generate on the selected antimbicrobials and a pharmacist will review the patients. Goals of the antimicrobial stewardship pharmacist are to switch from intravenous antibiotics to oral antibiotics when applicable, ensure all patient have proper antimicrobial dosages based on renal and hepatic functions, determine severity of illness, and antimicrobial streamlining. Patients requiring changes in therapy will be reviewed with an infectious disease specialist prior to recommendations being made.

At the end of the three-week study period, a cost assessment will be performed to determine any cost savings associated with the antimicrobial stewardship pharmacist. A comparison in the DDD of antibiotics pre and post study period will also performed.

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

Learning Objectives:

Identify the clinical benefits of a pharmacist managed ASP

Discuss the economic impact of a pharmacist managed ASP

Self Assessment Questions:

List two clinical benefits derived from a pharmacist managed ASP.

T/F: There is a significant cost savings associated with a pharmacist managed ASP.

ANTICOAGULATION OUTCOMES AT A PEDIATRIC INSTITUTION: HIGH RISK OR SUCCESS?

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Purpose:

The incidence of thromboembolic events in children has been increasing. The Joint Commission implemented an anticoagulation safety goal in 2007 to decrease morbidity and mortality. Meeting this goal requires therapeutic intervention from pharmacists. Anticoagulation management guidelines have been developed for adults. Pediatric guidelines by American College Chest Physicians have been published in June 2008. We aim to report current anticoagulation outcomes within our institution as measured by the percentage of patients achieving desired therapeutic range with initial dosing for prescribed anticoagulant and by other outcomes. These data will be used to optimize our pediatric anticoagulation practices as we implement a pharmacy anticoagulation service.

Methodology:

This retrospective study was approved by the Human Investigational Committee. The computerized Pharmacy order entry system database identified patients receiving heparin,warfarin, or enoxaparin as an inpatient at Childrens Hospital of Michigan during the past year. . It is estimated that approximately 100 patients will be enrolled during the study period. A convenience sample of patients receiving these therapies on inpatient units will be examined. Data collected include: patient demographics, indication for anticoagulant, type and dose of anticoagulant administered, time to achieve desired therapeutic range, adverse events, drug interactions, and length of hospital stay. Data will be analyzed using SPSS version 15.0 descriptive statistics. A multidisciplinary committee will review outcomes for the individual prescribing services to assist in development of pediatric anticoagulation protocols.

Results/Conclusions:

Data collection and analysis in process. Results to be presented at the conference.

Learning Objectives:

Discuss characteristics that must be taken into consideration when initiating pediatric anticoagulation

Describe areas for pharmacist intervention in optimizing anticoagulation in pediatric patients

Self Assessment Questions:

True or False: Adult guidelines are a good source for pediatric anticoagulation

True or False: Indications for pediatric anticoagulation therapy are the same as adults

BENEFITS OF IMMUNIZATIONS IN INDEPENDENT COMMUNITY PHARMACIES SINCE THE RELEASE OF ZOSTAVAX

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Background: Pharmacists have participated in immunizing the community at an increasing rate over the last decade. Changes in state legislature have allowed pharmacists to become vaccine advocates and immunizers in their own community practice setting. Many studies have been conducted to initiate and improve immunization programs in the community pharmacy setting. However, more research is needed to encourage pharmacists to be advocates in preventing herpes zoster or "shingles" with the vaccine Zostavax. Currently, Zostavax is recommended by the Advisory Committee on Immunization Practices (ACIP) for every adult aged > 60 years who have no contraindications, including persons who report a previous episode of zoster or who have chronic medical conditions.

Objective: The objective of this study is to assess the impact of pharmacist-directed interventions in an independent community pharmacy setting as educators and vaccine administrators, to increase awareness of opportunities for community pharmacists to become involved with immunizing their patients on site.

Methods: A retrospective study design was performed at Mathes Pharmacy, an independent community pharmacy in New Albany, Indiana. Those vaccinated with Zostavax at Mathes Pharmacy between the months of December 2008 and March 2009 were included in the study. Surveys were completed by the patient being vaccinated to define their trust in the pharmacist administering the vaccine versus the primary care physician, and education provided by the pharmacist immunizing. Surveys were also completed by primary care physicians to assess their support of pharmacists vaccinating in the pharmacy for Zostavax. A cost analysis was preformed to determine the potential financial significance of an immunization program that includes Zostavax in the independent pharmacy setting.

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

Learning Objectives:

State the recommended age for vaccination of zoster.

List potential contraindications for receiving the zoster vaccine.

Self Assessment Questions:

The recommended age for vaccination of zoster is 65 years. T/F

Zostavax is contraindicated for those patients with active herpes zoster. T/F

EVALUATION OF VITAMIN K THERAPY TO REVERSE EXCESSIVE ANTICOAGULATION WITH WARFARIN AT THE CINCINNATI VAMC: A RETROSPECTIVE REVIEW.

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Background: Oral anticoagulation therapy with warfarin is indicated for prevention and treatment of thromboembolic disorders including atrial fibrillation and pulmonary and venous thromboembolisms. The risk of bleeding with warfarin increases significantly with an international normalized ratio (INR) greater than 5.0. It is important to properly reduce supratherapeutic INRs to a therapeutic range without overcorrection. Overcorrection may lead to an increased risk for thromboembolisms and create warfarin resistance. Decision for treatment relies mainly on the urgency to reduce the INR, the potential risk for bleeding, the presence of active bleeding, and the INR level. Vitamin K is the first-line treatment for reversal of warfarin-induced coagulopathy according to the 2008 American College of Chest Physicians (ACCP) consensus guidelines for reversal of the anticoagulant effect of warfarin.
Purpose: Evaluate adherence to the 2008 ACCP consensus guidelines on Vitamin K use in patients on warfarin therapy experiencing over anticoagulation or the need for immediate reversal of INR due to pending surgery.
Methods: A retrospective chart review of patient medical records was performed at the Cincinnati VAMC to assess adherence to the 2008 ACCP consensus guidelines for reversal of warfarin therapy. Study participants were identified through a computerized search of patient records. Inclusion criteria include hospitalized patients receiving chronic warfarin therapy who required Vitamin K on admission or during hospitalization for reversal of anticoagulation. Exclusion criteria include patients less than 18 years of age, patients with active liver disease and patients receiving total parenteral nutrition. Phase 1 of the study identifies the methods of Vitamin K use between 8/1/2007 and 8/31/2008. Phase 2 involves implementation of a Vitamin K protocol based on the 2008 ACCP consensus guidelines. Phase 3 consists of a retrospective review of patients at the Cincinnati VAMC between 1/1/09 and 3/31/09 after implementation of the Vitamin K protocol.
Results and Conclusion: pending.

Learning Objectives:

Recognize the 2008 ACCP consensus guidelines for managing supratherapeutic INRs or bleeding in patients receiving Vitamin K Antagonists.

Identify common aspects of non-adherence with the ACCP consensus guidelines for the management of supratherapeutic INRs.

Self Assessment Questions:

What patient factors should be considered when determining the course of action for the treatment of elevated INR?

T/F: INRs > 9 should be treated with IV Vitamin K.

THE IMPACT OF GENETIC TESTING ON THE OUTCOME OF WARFARIN THERAPY IN PATIENTS WHO ARE RECEIVING ANTIPLATELET MEDICATIONS

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Purpose:
It is well understood that warfarin has a narrow therapeutic window and that therapy is highly individualized. These issues make the clinicians job of accurately dosing warfarin difficult. As the field of pharmacogenomics evolves and new technologies for individualizing patients medication regimens becomes more commonly practiced, it is important for clinicians to understand new testing methods and the patients who would benefit most from them. Literature suggests that genetic testing to predict warfarin pharmacokinetics may be of limited value in all patients receiving warfarin; however, this has not been tested extensively in patients who are concurrently taking an antiplatelet medication and may be at a higher risk for bleeds. The purpose of this study is to examine if genetic based warfarin dosing will impact bleeding rates and dosing accuracy for patients taking an antiplatelet medication.

Methods:
This is a prospective, randomized study conducted at Meriter Hospital that looks to enroll 120 patients. Inclusion criteria require that the patient is new to warfarin and is concurrently taking an antiplatelet agent. The warfarin drug genotyping (Verigene) test for Cyp2C9 and VKORC1 will be performed on all patients. Patients in the control group will have their warfarin dosed per routine standard of care. Patients in the intent to treat group will have their warfarin doses determined by their genotype through the sixth dose using the algorithm available at WarfarinDosing.org. Subsequent doses will be dosed per standard of care. Patients will be followed for 30 days after their first warfarin dose. Data collection includes bleeding events, time to first therapeutic INR, and time to first supratherapeutic INR when applicable. Appropriate statistical analyses will be performed to determine if there is a significant difference between study groups in the above mentioned outcomes.

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

Learning Objectives:

Explain how to use a patient's genotype to determine the most appropriate warfarin dose.

List one advantage and one disadvantage of utilizing a patient's genotype to dose warfarin.

Self Assessment Questions:

A patient is admitted to your hospital with chest pain and difficulty breathing. His workup is positive for a pulmonary embolus. You are asked to dose the patients warfarin utilizing his genotype which is Cyp2C9 2/3 and VKORC1 A/A. Based on the above information, you would:
a. Give a more aggressive dose
b. Give the standard dose
c. Give a more conservative dose

True or False: Genetic based dosing for both the initiation and maintenance of warfarin therapy is supported in the literature.

ASSESSING THE IMPACT OF HEALTH LITERACY IN A VA PATIENT POPULATION WITH DIABETES: A PILOT PROJECT

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Purpose:
The purpose of this study is to determine if retrospective diabetes endpoints (HgA1c, retinopathy, nephropathy), blood pressure, lipids, hospitalizations or Emergency Department visits in the past year relate to current level of health literacy in VA patients with diabetes.

Methods:
This is an observational pilot project to determine if level of health literacy affects health outcomes in veteran patients with diabetes. Patients will be enrolled through pharmacy-managed ambulatory care clinics at the Madison VA. Patients with type 2 diabetes who are at least 18 years of age will be included. Patients who have had a recent CVA (in the past 6 months), patients with documented dementia, blindness, psychosis, or a severe cognitive disorder will be excluded from the study. Health literacy will be assessed using a validated multiple-choice question "How confident are you filling out medical forms by yourself?" administered in a face-to-face interview. Response options include, "A. Extremely" "B. Quite a bit" "C. Somewhat" "D. A little bit" or "E. Not at all". Level of health literacy will be classified as adequate, marginal or inadequate based on response. Patients will be categorized into "adequate" (A&B), "marginal" (C) and "inadequate" (D&E) literacy. The most recent diabetes related outcomes will be collected retrospectively using Computerized Patient Record System (CPRS). HgA1c, blood pressure, lipids, other complications, hospitalizations and use of the Emergency Department for diabetes related problems will be assessed for each group. The results will be adjusted for confounding variables that may affect diabetes health outcomes.

Results/ Conclusion:
Results and conclusions are pending.

Learning Objectives:

Identify effective methods of assessing patients level of health literacy.

Describe the effect of low health literacy level on veteran patients with diabetes.

Self Assessment Questions:

True/ False: REALM and S-TOFHLA test are the best instruments to assess a patients level of health literacy.

True/ False: About one third of American adults have low health literacy level which may impact their health status.

INCIDENCE OF VENOUS THROMBOEMOBOLISM ASSOCIATED WITH MEGESTROL ACETATE USE: A CASE-CONTROL STUDY.

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Background: Venous thromboembolism (VTE)is a common and potentially devastating complication associated with malignancy. Megestrol acetate is synthetic derivative of progesterone that is often prescribed for the treatment of anorexia, cachexia, or unexplained, significant weight loss in cancer patients. Post marketing reports of megestrol acetate indicate that there may be a risk of thromboembolic events associated with its use.

Purpose: A multi-center, retrospective, case-control study will be conducted to determine the incidence of VTE associated with megestrol acetate use.

Methods: Patients will be included if they have a cancer diagnosis and are prescribed megestrol acetate at a dosage of 800 mg per day or greater. Patients will be excluded if they have an underlying coagulopathy (factor V leiden, protein C or S deficiency, anti-thrombin III deficiency, prothrombin gene mutation, and antiphospholipid antibody syndrome) or if they are receiving therapeutic anticoagulation. Two-hundred fifty megestrol patients will be matched to 250 control patients for a total of 500 patients. A control patient will be matched to a megestrol patient according to age, sex, malignancy type, and stage of cancer. The primary outcome of this study is the incidence of VTE in cancer patients taking megestrol acetate. Secondary outcomes include the median time to VTE and to determine risk factors and patient variables that may be associated with VTE in patients receiving megestrol acetate. These potential risk factors include weight, tumor status, past or active chemotherapy or hormonal therapy, previous history of VTE, recent surgery, Eastern Cooperative Oncology Group performance status, presence of a central venous catheter, and medications.

Results/Conclusions: The incidence of venous thromboembolism associated with megestrol acetate in this study remains to be determined as data collection is ongoing. Final analysis will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe implications and treatment strategies of cancer-related cachexia and anorexia.

Recognize the potential risk of venous thromboembolism (VTE) with the use of megestrol acetate in cancer patients.

Self Assessment Questions:

T or F: Weight loss in cancer patients is associated with shorter survival and decreased response to chemotherapy.

The use of megestrol acetate in cancer related cachexia and anorexia has resulted in:
A.Increase appetite
B.Weight gain
C.Potential increased risk of VTE
D.All of the above

GANCICLOVIR PHARMACOKINETICS AFTER LUNG TRANSPLANT

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Purpose: Cytomegalovirus (CMV) has a high mortality rate in lung transplantation and is a risk factor for adverse outcomes including obliterative bronchiolitis and transplant rejection. Ganciclovir is used for CMV prophylaxis, with decreased clearances found for transplant recipients compared to non-transplanted patients. At the Cleveland Clinic, 37% of lung transplant recipients experience neutropenia, weakly associated in previous studies with elevated ganciclovir exposure. Understanding ganciclovir pharmacokinetics in this population may lead to optimized dosing to reduce neutropenia and improve clinical outcomes. The purpose of the study is to evaluate changes in pharmacokinetic parameters of ganciclovir in lung transplant recipients and develop a pharmacokinetic model of altered ganciclovir distribution in lung transplant patients.

Methodology: Prospective, observational pharmacokinetic study of 20 patients age ≥ 18 years undergoing first lung transplantation and receiving intravenous ganciclovir. Exclusion criteria are previous solid organ transplant, recent history of active CMV infection, BMI > 35, elevated serum creatinine (>1.5 mg/dl) on day 1 after transplant or pregnancy. Patients will be transplanted and receive immunosuppressive and chemoprophylactic medications according to the lung transplant protocol used at the Cleveland Clinic. A total of four blood samples will be collected, corresponding to two sets of peak and trough values at steady state for doses four, five or six and doses eight, nine or ten of ganciclovir. Trough samples will be collected within 30 minutes prior to infusion, while peak samples will be collected 30 minutes after the end of a 1 hour infusion. Plasma levels of ganciclovir will be measured using a validated HPLC assay (Mayo Clinic Laboratories, Rochester, MN). Existing one and two-compartment Bayesian ganciclovir pharmacokinetic models will be fit to plasma levels using USC*PACK. Descriptive statistics and covariate analysis of pharmacokinetic parameters will be done using SPSS.

Results and conclusions: To be determined.

Learning Objectives:

Identify risks associated with cytomegalovirus infection in patients after lung transplantation.

Describe changes in ganciclovir pharmacokinetics associated with solid organ transplant.

Self Assessment Questions:

What is the mortality rate for cytomegalovirus infection in lung transplant recipients?
A. 0.02% - 0.08%
B. 0.5% - 1%
C. 2% -12%
D. 30% - 60%

True or False: Ganciclovir levels are closely correlated with patient response to cytomegalovirus infection.

TRANSITIONING FROM SLIDING-SCALE INSULIN TO A BASAL-BOLUS REGIMENT IN A COMMUNITY HOSPITAL: A PILOT PROJECT

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Purpose: To determine if a basal-bolus insulin regimen improves management of diabetes in a community hospital setting.

Methods: Adult patients admitted to a general medicine service with a diagnosis of diabetes mellitus type 2 were enrolled in a study comparing the safety and efficacy of a basal-bolus insulin protocol to the standard sliding-scale insulin protocol. A control group consisting of 30 patients managed with a basal-bolus regimen will be compared with 30 historical controls managed with SSI. The goal BG range is 80-140 mg/dL. Basal-bolus insulin dosing is based on a total daily dose of 0.4 units/kg for patients admitted with blood glucose (BG) between 140-200 mg/dL and 0.5 units/kg for patients admitted with BG > 200 mg/dL. The total daily insulin dose will be given as 50% basal insulin and 50% prandial insulin. Outcomes include the mean BG, percentage of BG values above or below the goal of 80-140 mg/dL, mean amount of insulin used, LOS, improvement in disease-specific clinical markers, and inpatient mortality rate.

Summary of Preliminary Results: The control group had a mean BG of 155.6 57.8 mg/dL. The total incidence of hyperglycemia was 54% and the incidence of hypoglycemia was 2%. A total of 676 units of insulin were administered to the control group. The mean LOS for the control group was 7.5 days. Data for the basal-bolus group is being gathered at this time.

Conclusion: Patients on a community hospitals general medicine unit who received only sliding scale insulin for BG control had frequent hyperglycemic episodes. It is anticipated that the basal-bolus group will have fewer episodes of hypo- and hyperglycemia and will have shorter LOS than the SSI group.

Learning Objectives:

Identify limitations associated with the use of sliding-scale insulin to manage blood glucose.

Recall an appropriate basal-bolus regimen for patients with type 2 diabetes.

Self Assessment Questions:

1)What basal-bolus regimen would be appropriate for an adult male weighing 98 kg who has BG of 220 on admission?
a) Insulin glargine 50 units qhs; insulin aspart 33 units tid with meals
b) Insulin glargine 25 units qhs; insulin aspart 8 units tid with meals
c) Insulin glargine 50 units qhs; insulin aspart 25 units tid with meals
d) Insulin glargine 25 units qhs; insulin aspart 12 units tid with meals

Which group of patients may not be adequately managed with a standardized basal-bolus regimen and may need a more specialized insulin regimen?
a) Patients on glucocorticoids
b) Patients receiving high doses of vancomycin
c) Non-ambulatory patients
d) Patients with prosthetic limbs

A RETROSPECTIVE EVALUATION OF THE EFFICACY OF IV INDOMETHACIN FOR SPDA CLOSURE IN NEONATES.

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Purpose:
The NICU at Advocate Lutheran General Hospital (ALGH) has utilized a unit guideline for treating patent ductus arteriosus (PDA) treatment since 2001 with standard doses of indomethacin. PDA closure rates and the incidence of adverse effects have not been evaluated since the guideline was implemented. The purpose of this study is to determine the efficacy and safety of intravenous indomethacin used for treatment of patent ductus arteriosus in symptomatic neonates at ALGH.

Method:
Patent ductus arteriosus, an irregularity of postnatal vasculature, is one of the most common cardiovascular abnormalities in neonates. This retrospective chart review will include all neonates diagnosed with symptomatic patent ductus arteriosus (sPDA) who received at least one dose of intravenous indomethacin from January 1, 2003 to June 1, 2008 at ALGH. Infants who received ibuprofen lysine will be excluded. Subjects who meet the inclusion criteria will have the following information collected from the medical record: sex; date of birth; gestational age; reason for prematurity; APGAR scores; comorbidities; vaginal/cesarean delivery; presence of sPDA; shunt flow; hemoglobin/hematocrit; platelet count; mean arterial pressures; serum creatinine; urine output; presence of intraventricular hemorrhage and grade prior to and following treatment; birth weight/length; treatment weight/length; postnatal age at start of treatment; treatment dose, administration date and times; repeat course performed; cumulative dose of indomethacin; time to full feeds; echocardiographic results; surgical ligation; and adverse effects of treatment. The primary outcome of this study is to determine the efficacy rates achieved in our NICU using standard doses of indomethacin. Secondary outcomes will assess the safety of indomethacin by evaluating the incidence of renal impairment, bleeding and necrotizing enterocolitis.

Results:
This research is presently in the data collection stages. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

To review the pathophysiology of patent ductus arteriosus

To review treatment of symptomatic patent ductus arteriosus

Self Assessment Questions:

What are the factors involved in maintaining patency of the ductus after birth?

What is the mechanism of action of indomethacin in closing the PDA?

REVIEW OF MEMANTINE AS A NEUROPROTECTIVE AGENT IN STROKE

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Purpose: Stroke is the leading cause of disability in the United States. Ischemic stroke is a significant cause of morbidity and mortality in patients, particularly in those with atrial fibrillation, hyperlipidemia, hypertension, and diabetes mellitus. Half of stroke patients develop neurological deficits resulting in functional decline, disability, immobility, and an inability to carry out activities of daily living. There are a variety of preventative measures that are well recognized to decrease the incidence of both primary and secondary stroke. Thrombolytic agents have been shown to improve clinical outcomes, and 3-hydroxy-3 methyl glutaryl coenzyme A reductase inhibitors, and memantine have been proposed to have neuroprotective activity. Currently, no human studies exist to support the use of memantine as a neuroprotectant in humans, although there is evidence to support neuroprotective properties in animal models. The aim of this study is to evaluate the relationship between use of memantine and clinical stroke outcomes in adult patients who have been admitted with a primary diagnosis of ischemic stroke.

Methods: A retrospective chart review of adult patients admitted with ischemic stroke over the past five years will be done to evaluate the relationship between the use of memantine and National Institute of Health Stroke Scale, Rankin, and Barthel Index scores. Pre-admission, admission, and discharge scores will be compared in patients taking memantine with those not taking memantine prior to admission. Patients less than 18 years of age will be excluded. Data collected including age, race, gender, medications, concurrent diseases, illicit drug use, and amount of time on memantine prior to admission will be entered and analyzed in a Microsoft Excel spreadsheet.

Results and Conclusions: Data collection is currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the pathophysiology of ischemic stroke, functional impact on the patient, and treatment strategies that may be useful to prevent functional decline in patients who have an ischemic stroke.

Review functional outcomes in patients previously being treated with memantine who had an ischemic stroke.

Self Assessment Questions:

True or False: Memantine is an uncompetitive NMDA antagonist, blocks excessive calcium influx into neuronal cells, and may protect against neuronal cell death by restoring neuronal viability and physical function.

True or False: There is substantial clinical evidence to support the use of memantine as a neuroprotective agent in stroke.

EVALUATION OF CHARACTERISTICS ASSOCIATED WITH CHANGE IN BODY MASS INDEX (BMI) AMONG ADOLESCENT FEMALES RECEIVING DEPOT MEDROXYPROGESTERONE ACETATE (DMPA)

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Background: Depot medroxyprogesterone acetate (DMPA) is a common contraceptive choice for adolescent females. It has a convenient dosing schedule of one intramuscular injection every three months. However, up to 41% of female adolescents discontinue DMPA due to weight gain. Noted risk factors for weight gain include race, weight at DMPA initiation, and age of menarche.

Purpose: The primary purpose of this study was to determine individual characteristics associated with DMPA-associated weight gain in adolescent outpatients at Cincinnati Childrens Hospital Medical Center (CCHMC). Our goal was to generate data and present results to practitioners to enable more informed prescribing of DMPA and facilitate more specific patient counseling.

Methods: A retrospective chart review included adolescent females who received at least one DMPA injection with a minimum of one subsequent visit at CCHMC at least ten weeks after the initial injection. Weight, height, and date of measurement were recorded to satisfy the primary objective. Patients were excluded if they did not have a weight recorded on the day of DMPA injection. Patient-specific characteristics included in this analysis were gynecologic age, weight/ body mass index at DMPA initiation, and race.

Results/Conclusions: A total of 115 patients were included. The age range was 12-18 years at DMPA initiation. The race distribution was 84% black, 12% white, 3% mixed, and 1% other. Preliminary results reveal an increase in mean weight while on DMPA therapy. Data analysis is ongoing and will help determine if this weight increase is significantly different from a control population at CCHMC. Further analyses will examine the association of weight gain with patient-specific characteristics.

Dr. Gerlach, the presenter, has no conflict of interest information to disclose.

Learning Objectives:

State a common reason that adolescent females discontinue DMPA.

Describe patient characteristics that are associated with DMPA-related changes in weight.

Self Assessment Questions:

What is a common reason that adolescent females discontinue DMPA?

What are three characteristics of patients using DMPA that have been associated with a change in the patients weight?

TOLERABILITY OF AND COMPLIANCE WITH A PROBIOTIC REGIMEN AND THE DEVELOPMENT OF ANTIBIOTIC-ASSOCIATED DIARRHEA: A THREE-ARMED, RANDOMIZED, DOUBLE-BLIND, DOUBLE-DUMMY, PLACEBO-CONTROLLED PILOT STUDY

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Purpose: The primary objective of this study is to evaluate the tolerability of and compliance with a liquid versus capsule probiotic regimen. The secondary objective is to demonstrate efficacy of probiotics in reducing the incidence of antibiotic-associated diarrhea in hospitalized adults receiving antimicrobial therapy.

Methods: Study participants were identified prospectively. All hospitalized patients 18 years or older receiving any antibiotic for 5 days or longer were screened for inclusion. Exclusion criteria included patients with diarrhea on admission, use of antibiotics in the past 3 weeks, immunocompromised condition, ingesting probiotic dietary supplements in the last two weeks, endocarditis, and/or impaired intestinal epithelial barrier. After informed consent was granted, patients were randomized into one of three study arms: (I) multi-strain probiotic drink 120 mL twice a day plus placebo capsule daily; (II) placebo drink 120 mL twice a day plus triple-strain probiotic capsule daily; or (III) placebo drink 120 mL twice a day plus placebo capsule daily. This pilot study will have 90 patients (30 in each study arm). Patients and researchers were blinded to the study drink and study capsule. Bowel movement frequency and consistency was monitored as well as compliance to the treatment regimen. Participants were followed for 4 weeks after completion of the prescribed course of antibiotics.

Summary of preliminary results to support conclusion

We have screened 846 patients and identified 32 who match the inclusion criteria. Of these, 15 gave consent to participate in the study. These patients were randomly assigned to receive probiotic drink and placebo capsule (n=5), placebo drink and probiotic capsule (n=5), and placebo drink and placebo capsule (n=5).

Definitive study results are pending.

Conclusions Reached

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

Learning Objectives:

Describe benefit of probiotic use to minimize antibiotic associated diarrhea

Explain the etiology and epidemiology of antibiotic associated diarrhea

Self Assessment Questions:

Which of the following antimicrobials can potentially cause AAD?

"Probiotics" can be best described as:

INCIDENCE OF HEPATOTOXICITY WITH USE OFF-LABEL ORAL TREATMENT DOSES OF VORICONAZOLE FOR INVASIVE FUNGAL INFECTIONS.

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Voriconazole is a broad-spectrum azole antifungal that is active against many invasive yeast and mold infections. With >90% bioavailability, oral voriconazole is often preferred to the intravenous formulation due to ease of administration and indication in patients with renal insufficiency. While the approved labeled maintenance treatment dose of IV voriconazole is a weight-based 4mg/kg q12h; the approved oral dosing is a fixed 200mg q12h. In our institution, patients frequently receive oral doses on a mg/kg basis that are higher than the approved dose, with plasma concentrations obtained in long term treatment. It has been postulated that increased oral dosing of voriconazole can result in hepatotoxicity, and that first pass metabolism of oral voriconazole results in higher portal vein serum concentrations, which may cause a higher incidence of liver enzyme abnormalities than the IV formulation. Additionally, increased incidence of liver function test abnormalities may be associated with higher plasma concentrations and/or doses. The purpose of this study is to assess whether patients receiving higher than labeled oral dosing of voriconazole have an increased incidence of hepatotoxicity.

This was a matched retrospective cohort study of patients treated with oral voriconazole for presumed invasive fungal infections, comparing patients receiving the labeled 200mg q12h dose of voriconazole to patients receiving higher dose, mg/kg based oral therapy. Patients were included who received >7 days of therapy with available baseline and follow-up liver enzyme laboratory values. The primary endpoint was hepatotoxicity, as measured according to the NCI Common Terminology Criteria for adverse events, and adjusted for drug interactions and concomitant use of other potentially hepatotoxic medications. Secondary endpoints included incidence of other documented drug related adverse events, discontinuation of therapy due to adverse reactions, and correlation of drug levels (when available) to hepatotoxicity.

Data analysis is ongoing. Results and conclusions will be presented at the conference.

Learning Objectives:

Explain the adverse events associated with use of voriconazole.

Identify the role of voriconazole in treatment of systemic fungal infections.

Self Assessment Questions:

-T/F Hepatotoxicity is an adverse effect associated with use of voriconazole.

-T/F The labeled dosing of voriconazole is the same for IV and oral formulations.

A RETROSPECTIVE AND CONCURRENT EVALUATION OF ALCOHOL WITHDRAWAL MANAGEMENT IN THE INTENSIVE CARE UNIT

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BACKGROUND: Alcohol withdrawal protocols seldom address the needs of those patients admitted to the intensive care unit requiring more aggressive therapy. No guidelines are available for management of these patients relative to the titration of benzodiazepine doses or for use of other agents; furthermore, there is little literature available on this subject. Given the significant risk involved with under or over treatment of alcohol withdrawal, new guidelines will be developed and implemented in the interest of standardizing care to improve patient outcomes.

PURPOSE: To determine if the use of alcohol withdrawal guidelines results in safer and more effective treatment of alcohol withdrawal in the intensive care unit than unguided therapy.

METHODS: A retrospective and prospective evaluation will be performed. Alcohol withdrawal patients will be identified by generating reports of electronic medical records for patients with at least one of the following: Admission to the medical or cardiac intensive care unit, diagnosis of alcohol withdrawal, alcohol withdrawal seizure, or delirium tremens, Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) score > 8, blood alcohol level > 0, alcohol withdrawal order set (WET order). Patients will be included if they meet inclusion and exclusion criteria. Outcomes of patients post-guideline implementation will be compared to those of patients treated prior to the guideline. The primary outcome is the length of time on benzodiazepine infusion. Secondary outcomes include number of patients requiring propofol "rescue" therapy, number of patients requiring mechanical ventilation, length of stay (ICU and total hospital stay), number of cases of nosocomial or aspiration pneumonia, number of patients experiencing seizures due to alcohol withdrawal, number of patients experiencing propylene glycol toxicity, and number of patients requiring reversal agents for over-sedation/respiratory depression.

RESULTS AND CONCLUSIONS: Results and conclusions will be presented at the Great Lakes Pharmacy Residents Conference.

Learning Objectives:

Describe the proposed rationale for the initiation of a continuous benzodiazepine infusion in alcohol withdrawal patients

List monitoring parameters for the efficacy and toxicity of intravenous lorazepam in the treatment of alcohol withdrawal

Self Assessment Questions:

In general, acute agitation in alcohol withdrawal patients on continuous benzodiazepine infusions is best managed by:
a. Administration of a bolus dose of a benzodiazepine
b. Increase in the dose of a continuous benzodiazepine infusion

Patients managed with lorazepam continuous infusions should be monitored for:
a. Propylene glycol toxicity
b. Signs and symptoms of alcohol withdrawal (CIWA-Ar Scores)
c. Respiratory depression
d. All of the above

ENHANCING COMPLIANCE WITH INTERNATIONAL GUIDELINES REGARDING INITIAL VASOPRESSOR UTILIZATION IN SURGICAL PATIENTS WITH SEPTIC SHOCK

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Purpose: On the basis of recent ground-breaking trials in the treatment of sepsis, the Surviving Sepsis Campaign (SSC) produced a set of guidelines in 2004 that were subsequently updated in April of 2008, to provide a guide to healthcare staff on the management of patients with severe sepsis and shock. One of the elements included in the SSC guidelines is recommendations regarding the selection of vasoactive agents in patients with septic shock. The primary objective of this study is to evaluate institutional compliance with the SSC guideline with respect to the selection of vasopressors among patients who presented to the OR with septic shock. Secondary endpoints include timely measurement of a serum lactic acid, appropriate monitoring of central venous pressure, and provision of appropriate fluid resuscitation.

Methods: This is an observational study intended to evaluate vasopressor selection in surgical patients in the NorthShore University HealthSystem sepsis database. An educational intervention regarding vasopressor selection in patients with septic shock was designed in collaboration of the Department of Anesthesia. The intervention outlined the recommendations of the SSC and summarized the literature relating to vasopressor selection in septic shock. The intervention was delivered at a monthly Department of Anesthesia meeting. At the meeting, barriers to utilizing norepinephrine in the Operating Room (OR) were assessed. In response to suggestions from meeting attendees, norepinephrine was placed in the OR automated dispensing cabinets as a kit with a 250 milliliter bag of normal saline. Retrospective and prospective data for the six months prior to and four months after the intervention will be collected. The data will be compared to determine any correlation between the above interventions and selection of vasopressors in surgery cases involving patients in septic shock.

Results/Conclusion: Analysis of results is ongoing. Results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the preferred vasopressors for patients in septic shock.

Explain why phenylephrine is not a preferred vasopressor for patients in septic shock.

Self Assessment Questions:

What are the two SSC preferred vasopressors for septic shock?
A.Epinephrine and norepinephrine
B.Dopamine and norepinephrine
C.Vasopressin and dopamine
D.Vasopressin and norepinephrine

True/False: Phenylephrine increases splanchnic blood flow, which is deleterious in septic shock.

EVALUATION OF A WEIGHT-BASED HEPARIN DOSING PROTOCOL IN OBESE PATIENTS.

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Purpose: Although studies have demonstrated the utility of weight-based heparin dosing, the optimal strategy for obese patients has not been defined. Weight-based dosing results in faster achievement of therapeutic anticoagulation, fewer complications, and decreased costs; however, most studies included insufficient numbers of obese patients to evaluate this population. Studies suggest weight-based dosing may yield higher activated partial thromboplastin time (aPTT) values in obese patients, but whether an initial dose cap or dosage adjustment should be employed remains unknown. The purpose of this study is to determine if a weight-based strategy with dose capping results in appropriate time to therapeutic anticoagulation in obese patients.

Methods: Patients receiving heparin continuous infusions from July 2006 through October 2008 were randomized to non-obese (BMI < 30kg/m2) and obese (BMI ≥ 30kg/m2) groups. A sample size of 170 will achieve a power of 80% to detect a 6 hour difference in time to therapeutic aPTT (α <0.05). Retrospective review was conducted for patients receiving heparin per institutional protocols. Primary endpoint is time to first therapeutic aPTT in obese and non-obese patients. Secondary endpoints are dosage associated with therapeutic aPTT and bleeding incidence, defined by thrombosis in myocardial infarction (TIMI) bleeding criteria.

Results: To date, 65 patients have met inclusion criteria (28 non-obese, 37 obese). Mean BMI values are 25 kg/m2 in non-obese and 40 kg/m2 in obese subjects. Mean time to therapeutic aPTT is 20 hours and 25.5 hours and mean dosage required to achieve therapeutic aPTT is 17 units/kg/hour and 15 units/kg/hour in non-obese and obese groups, respectively. Incidence of minor bleeding is 10.7% in non-obese and 5.5% in obese subjects; no major bleeding events were reported.

Conclusions: Preliminary analysis reveals a similar time to therapeutic anticoagulation between groups. Safety data indicates no increased bleeding risk in obese patients utilizing current dosing strategies.

Learning Objectives:

Describe current strategies for weight-based heparin dosing and indications for their use.

Describe limitations of current weight-based heparin dosing practices in the obese patient population.

Self Assessment Questions:

True/false: Weight-based dosing of heparin has been demonstrated to achieve therapeutic targets more rapidly than non weight-based dosing.

An initial dose cap can be considered for initial heparin dosing in _____ patients.
a) Obese
b) Non-obese

EFFICACY AND SAFETY OF ATORVASTATIN IN KIDNEY TRANSPLANT PATIENTS TAKING CYCLOSPORINE

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Purpose. To investigate effects of the drug interaction between cyclosporine and atorvastatin on the efficacy and safety of atorvastatin in renal transplant patients.
Methods. We reviewed medical records of renal transplant patients between 2005 and 2007 to identify patients receiving cyclosporine who initiated and continued atorvastatin for at least 8 weeks. Patients whose cholesterol data are missing, who received other cholesterol-lowering agents, whose atorvastatin was started within 4 weeks post-transplant or the dose was changed before 8 weeks of therapy, and patients taking sirolimus, investigational agents or known inhibitors of CYP 3A4, p-glycoprotein or OATP 1B1 were excluded from analysis.
From baseline to 8  4 weeks, mean percent change in LDL and total cholesterol (TC) were compared to that of the general population (CURVES, Am J Card 1998) using a two-sample t-test (=0.05). Hepatotoxicity was defined as LFT elevations greater than three times the upper limit of normal. Myotoxicity was further classified as myalgia, myositis, or rhabdomyolysis.
Results. Treatment with atorvastatin 10 mg for 9.6  5.3 weeks decreased LDL by 22.9  26.2% and TC by 17.5  17.6% in 56 renal transplant patients taking cyclosporine, mycophenolate and prednisone. Reductions in LDL and TC were significantly less compared to 38  10% and 28  9% in 73 historical controls, respectively (p<0.003 for both). No hepatotoxicity was observed. Data collection for atorvastatin 20 mg and 40 mg and myotoxicity is in progress.
Conclusions. Cyclosporine appears to reduce hepatic uptake of atorvastatin resulting in decreased LDL and TC reduction in renal transplant patients. Based on these data, higher doses of atorvastatin may be required in renal transplants taking cyclosporine to achieve adequate LDL reduction. Data from atorvastatin 20 mg and 40 mg will help determine the efficacy and safety of using higher atorvastatin doses in this patient population.

Learning Objectives:

Recall the importance of LDL reduction in renal transplant patients to reduce the risk for cardiovascular events.

To describe the enzymes and transporters involved in the cyclosporine-atorvastatin drug interaction.

Self Assessment Questions:

Which of the following statements is false regarding cardiovascular risk reduction in renal transplant patients?
a.Cardiovascular disease is the leading cause of death in renal transplant patients with a functioning graft.
b.Renal transplant patients are unlikely to have comorbid conditions and are usually classified as low-risk according to NCEP guidelines.
c.Statins are the drug of choice for LDL reduction in renal transplant patients.

Which of the following enzymes/transporters is not implicated in the cyclosporine-atorvastatin drug interaction?
a.CYP 3A4
b.P-glycoprotein
c.CYP 2C9
d.OATP 1B1

ASSESSING ANTIBIOTIC ADMINISTRATION IN PATIENTS WITH SEPTIC SHOCK BEFORE AND AFTER THE IMPLEMENTATION OF A SEPSIS BUNDLE

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Delayed antimicrobial administration may be a risk factor for hospital mortality among critically ill patients. Kumar et. al. found that initiation of antimicrobial therapy within the first hour following onset of septic shock-related hypotension was associated with a 79.9% survival to hospital discharge. For every additional hour to effective antimicrobial administration in the first six hours after the onset of hypotension, survival dropped an average of 7.6%.

The aim of this study was to evaluate timing and selection of antimicrobial therapy for patients diagnosed with septic shock before and after the implementation of a sepsis bundle in a medical intensive care unit.

Patients admitted from the emergency department or a general medical ward were included if they presented with clinical signs of severe sepsis and refractory hypotension. Antibiotic therapy was evaluated in patients with documented infection. Empiric antibiotic selection was judged to be appropriate based on susceptibility testing of the pathogen.

Preliminary Results: Prior to implementation of a sepsis bundle, sixty patients were identified with septic shock. Ten patients received antibiotics prior to shock onset and three died. The overall mortality rate for patients treated with antibiotics after shock was 64% (32/50). Ten of twenty-four (42%) patients who received antibiotics within 4.5 hours of shock died, compared to 22 of 26 (85%) patients who died receiving antibiotics > 4.5 hours after shock (p = 0.002). The odds of mortality was 9.4 times higher when antimicrobial therapy delay was greater than 4.5 hours (p = 0.005). For patients with APACHE II scores greater than 29, mortality was 88% (14/16) regardless of the delay. For patients with a documented infection (31 of 50), mortality was 58% compared to 74% among patients with a suspected infection (p = 0.20).

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

Learning Objectives:

Define potential reasons for an increase in the incidence of sepsis and septic shock and recommendations for the management as published by the Surviving Sepsis Campaign.

Discuss the rationale for the implementation of a sepsis bundle in an Intensive Care Unit.

Self Assessment Questions:

What is a potential reason for an increase in the incidence of sepsis?

a. The emergence of the human immunodeficiency virus (HIV) infection
b. An increase in the number of Intensive Care Unit admissions per year
c. A decrease in the use of immunosuppressive agents
d. A decrease in the use of antimicrobial agents

True or False: A key recommendation to the management of severe sepsis and septic shock as published by the Surviving Sepsis Campaign is the reassessment of antibiotic therapy with microbiology and clinical data to narrow coverage.

IMPACT OF PHARMACIST CARE ON PATIENT OUTCOMES IN AN OUTPATIENT HEART FAILURE CLINIC

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Purpose: Despite vast improvements in treatment over recent years, the prognosis for patients diagnosed with heart failure remains poor. Medication non-adherence, owing mainly to lack of patient understanding about heart failure and the medications used in its treatment, and failure to titrate heart failure medications appropriately have been identified as major causes of this problem. Several studies have demonstrated the effectiveness of pharmacists interventions in reducing morbidity and mortality associated with heart failure. The primary objective of this retrospective study is to determine how many medication-related recommendations made by a pharmacist in an outpatient heart failure clinic resulted in actual medication adjustments made by other clinical providers. The secondary objective of this study is to determine if direct intervention by a pharmacist in an outpatient heart failure clinic improves patient adherence to medications used in the treatment of heart failure.

Methods: The electronic hospital database will be used for identification of patients seen in the William S. Middleton VA Hospital Heart Failure Medication Management Clinic between 1/1/09 and 3/31/09. Data collected, with patient identifiers removed, will include age, gender, cause of heart failure diagnosis, presence of systolic and/or diastolic dysfunction, comorbidities, number of pharmacist-recommended medication adjustments, and number of pharmacist-recommended medication changes that resulted in actual medication adjustments by other heart failure clinical providers. Data collected prior to and post-direct pharmacist intervention will include NYHA heart failure classification, left ventricular ejection fraction (LVEF), systolic/diastolic blood pressure, heart rate, serum creatinine, heart failure medications, and number of "late" refills for heart failure medications (defined as refills ordered more than 2 weeks past when a medication was due to be refilled). Approximately 30-50 charts will be reviewed.

Results/Conclusions: Results and conclusions are pending.

Learning Objectives:

Discuss the importance of providing comprehensive medication education to patients diagnosed with heart failure.

Identify potential barriers that patients face leading to increased risk for medication non-adherence and heart failure exacerbation.

Self Assessment Questions:

True or False: The incidence of heart failure in the United States is decreasing.

True or False: Patients with a reduced left ventricular ejection fraction (LVEF) should receive both an ACE inhibitor and a beta-blocker regardless of whether or not they have had a myocardial infarction.

USE OF BEERS CRITERIA TO EVALUATE MEDICAL RESIDENT PRESCRIBING IN ELDERLY OUTPATIENTS

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Purpose:
Previous studies have revealed the Beers criteria to be a useful tool in identifying potentially inappropriate medications (PIMs) and decreasing medication adverse events in older adults. Recent studies in elderly ambulatory patients showed rates of PIM prescribing to vary between 20-45%, based on the revised Beers criteria. The purpose of this study is to examine the incidence of PIM prescribing based on Beers criteria and to identify commonly prescribed PIMs and patient factors which may influence prescribing of these medications by medical residents in an ambulatory clinic. The results will be utilized to develop educational initiatives which increase awareness of PIMs for elderly patients and improve prescribing practices for medications which may pose an unnecessarily high risk within this population.

Methods:
This is an observational, cross-sectional study using the revised Beers criteria to evaluate appropriate medication use in the elderly. St. Vincent Joshua Max Simon Primary Care Center internal medicine patients who are ≥65 years old will be assessed for inclusion. Two groups of patients will be identified using computer generated queries; those currently taking one or more Beers criteria medications and those not taking any Beers criteria medications, focusing on a single point in time. One hundred patients from each group will be randomly chosen for inclusion in the study. The primary endpoint is to examine the incidence of Beers criteria medications being prescribed in the study population. Secondary endpoints include identifying commonly prescribed PIMs, drug classes, and average durations of use. Additional endpoints include determining if elderly patients are at greater risk for being prescribed these medications based on demographics, total number of medications, number of chronic disease states, or year of experience of their primary resident physician.

Results and Conclusions:
Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe the incidence of resident prescribed potentially inappropriate medications (PIMs) based on the Beers criteria in elderly outpatients.

Identify drug classes included in Beers criteria which are prescribed most commonly to elderly patients by medical residents.

Self Assessment Questions:

(T / F) Greater than 25% of elderly patients in an outpatient resident clinic were prescribed Beers criteria medications

(T / F) Benzodiazepines, muscle relaxants, and NSAIDs are classes of Beers criteria medications commonly prescribed to elderly patients by medical residents

GROUP VISITS FOR PATIENTS WITH DIABETES MELLITUS IN A PRIMARY CARE SETTING

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Purpose:
Diabetes mellitus (DM) is a prevalent disease that accounts for a large number of patient visits to primary care physicians. In the face of increasing demands for healthcare, group visits have emerged as a novel approach to manage chronic disease states in the primary care setting. The objective of this study was to evaluate the impact of group diabetes visits on surrogate endpoints.

Methods:
Enrollment criteria were diagnosis of DM, hemoglobin A1C>9.0%, and at least one visit to the Family Medicine Center in the last year. Patients were scheduled to attend two group visits with a care team consisting of a physician, a family medicine resident, a nurse, a pharmacist, and a pharmacy resident. Each visit consisted of assessment of vital signs, an interactive discussion about diabetes, an evaluation of medications, a review to ensure all pertinent labs were current, and a summary of recommendations made by the care team. Outcome measures were a hemoglobin A1C<7%, blood pressure of <130/80 mmHg , LDL cholesterol <100 mg/dL, annual eye examination, monofilament testing at each visit, annual microalbuminuria, and smoking status. Each of these measures were taken at baseline for enrolled patients and compared to post-intervention outcomes.

Results
Data collection currently in progress. Results and conclusions will be presented at conference.

Learning Objectives:

Recall the primary literature regarding diabetes group visit outcomes

Describe one way to incorporate group visits into a primary care clinic

Self Assessment Questions:

True or False: There is evidence that diabetes group visits can improve blood pressure control

List 3 challenges in designing and implementing group diabetes visits

ASSESSMENT OF PEDIATRIC PAIN MANAGEMENT

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Purpose
The purpose of this study is to evaluate the efficacy of different pain management strategies and assess patient and parent satisfaction with pain management.

Methods
This study is a prospective study in which pediatric patients and their parent/guardian will be asked to complete a survey. Inclusion criteria are all patients with an inpatient status on the pediatric floor or the pediatric intensive care unit, ages 8-17, who receive at least one intervention for pain. Excluded from the study are pregnant patients, non-english speaking patients/family members, and patients with cognitive impairment. The patient and one parent/guardian will be asked to complete a survey to evaluate their satisfaction with pain management while admitted to the hospital. The survey will be given every three days during the admission and at the time of discharge. In addition to survey results, data collected and recorded will include pain scores, pain scale used, type of intervention, medication given, dose given, and route of administration.

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

Learning Objectives:

Identify pain management issues unique to the pediatric population.

Identify strategies for managing pain in the pediatric population.

Self Assessment Questions:

1.True or False: Pediatric patients are better at communicating information about their pain status than adult patients.

2.True or False: All pediatric patients who experience pain should receive pharmacologic intervention.

INSULIN GLARGINE USE IN CRITICALLY ILL PATIENTS

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Purpose: The use of long-acting drugs is ideal for many patients; the same is not necessarily true for critically ill population. Typically, short acting agents are preferred for patients within an intensive care unit (ICU). Due to the rapidly changing health status of critically ill patients, medications with long durations of action may pose a potential safety risk. To date, an assessment of the overall use of insulin glargine in critically ill patients has not been conducted. Without data regarding the use of insulin glargine in the ICU, appropriate recommendations for its use are difficult to make. The purpose of this project is to characterize the use of insulin glargine in ICU patients. The results will be used to determine the safety in this patient population.

Methods: Prior to initiation, this study was determined to be exempt from review by the Institutional Review Board. The health systems electronic order entry system was used to identify patients who over a six month period of time were prescribed insulin glargine. Patients younger than 18 years of age, prisoners, and pregnant females were excluded. Permanent records and the electronic documentation system were used to collect the following data: dose of insulin glargine and number of times administered; doses of dextrose 50% as treatment of hypoglycemia; number of hypoglycemic occurrences and potential reason for occurrence; reported adverse events from hypoglycemia; renal and liver function laboratory results; and the use of a concomitant regimen of sliding scale regular insulin. Following collection, the data will be analyzed to evaluate the overall trends of insulin glargine use for patients with the ICU. Additional analysis will be used to evaluate the safety of this medication within the study population.

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

Learning Objectives:

Identify the appropriateness of insulin glargine use in a critically ill patient.

Describe the safety risks associated with insulin glargine use in critically ill patients.

Self Assessment Questions:

True/false: The use of insulin glargine has been extensively studied in the critical care patient population.

True/false: In this evaluation, hypoglycemia is more likely to occur when tube feeds are turned off.

RETROSPECTIVE STUDY OF ORAL VORICONAZOLE LEVELS AND CLINICAL OUTCOMES IN ADULT CANCER PATIENTS WITH INVASIVE ASPERGILLOSIS

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Purpose:
Invasive aspergillosis (IA) is a life-threatening infection in cancer patients with prolonged neutropenia, or in allogeneic hematopoietic stem cell transplantation patients. Voriconazole is currently approved as the drug of first choice for the primary treatment of IA. Voriconazole therapeutic drug monitoring may be useful due to wide inter-patient variability in dose-concentration relationships, a narrow therapeutic range, and significant drug-drug interactions. Therefore, voriconazole level monitoring may play an important role in enhancing the safety and efficacy of voriconazole. Some experts recommend a target serum level of 2-6 mg/L but this is still preliminary.The primary objective of this study is to evaluate the correlation between oral voriconazole doses and serum levels. The secondary objective of this study is to evaluate the efficacy and adverse effects of voriconazole.

Methods:
Between January 2006 and December 2008, cancer patients that received oral voriconazole for the treatment of IA and available voriconazole trough levels were identified by the pharmacys electronic database. Data collection included age, height, weight, race, cancer diagnosis, voriconazole doses, voriconazole levels, gastrointestinal status, concurrent medications, adverse events, and clinical outcomes relevant to the IA infection. The above data was collected by reviewing electronic and paper-based medical records. Data was analyzed for the relationship of voriconazole doses in mg/kg, voriconazole levels, and clinical outcomes.

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

Learning Objectives:

Describe the appropriate prophylaxis and treatment for invasive aspergillosis in cancer patients.

Identify the risk factors of developing invasive aspergillosis and the diagnostics.

Self Assessment Questions:

Which agents are used for the primary or salvage treatment of invasive aspergillosis?
I. Voriconazole
II. Caspofungin
III. Fluconazole
IV. Amphotericin B
A.I and II
B.I, II, III, IV
C.I, II, IV
D.None of the above

JF is a 79 year old male who has AML and has completed induction chemotherapy. He has been neutropenic for about 20 days and presents with fever (101oF), and chills. CT of the thorax shows consolidation in the right upper lobe of the lung with a halo sign. Serum aspergillus antigen was ordered and came back as 2.6 (≥0.5 is positive).

List JFs patient risk factors for developing invasive aspergillosis and the diagnostics that are positive for Aspergillosis.

CORONARY ARTERY BYPASS GRAFT SURGERY AND OUTCOMES WITH RECENT CLOPIDOGREL EXPOSURE

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Purpose

Clopidogrel administration may increase bleeding after coronary artery bypass graft surgery (CABG). Due to this risk, the American Heart Association, the American College of Cardiology, the Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists recommend patients going for CABG have surgery delayed 5-7 days after receiving clopidogrel.
Several studies have investigated clopidogrel administration and post-CABG bleeding complications. Most studies have found that delaying surgery at least five days reduces bleeding complications, but this has not been a universal finding.
The purpose of this study is to compare patients undergoing CABG with recent clopidogrel exposure (≤ 5 days prior to surgery) to those without recent clopidogrel exposure (> 5 days prior to surgery) to determine bleeding outcomes.

Methods

A retrospective chart review will be conducted in isolated CABG patients from January 1, 2008 to December 31, 2008. Patients will be case matched based on age (5 years) and gender.
Data collection will include: demographics, pertinent baseline labs, hospital length of stay, comorbidities, previous cardiovascular procedures, pertinent preoperative medications, operative details, information up to 48 hours postoperation, mortality, readmission and reason for such within 30 days of operation.
The primary bleeding endpoint will be defined as requiring ≥ 2 units of blood within 48 hours post-CABG. Life threatening bleeding will be defined as (requiring ≥ 4 units of blood, death due to bleeding, ≥ 5g/dL hemoglobin fall, reoperation for bleeding, intracranial hemorrhage).
Data will be collected from patient medical records, OSUMCs electronic medical record (eResults), the Critical Care information system (Essentris), and the Society of Thoracic Surgeons Adult Cardiac Surgery Database.
Statistical analysis will be done using descriptive statistics.

Results

Results will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions

Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe pharmacological and nonpharmacological risk factors associated with bleeding in coronary artery bypass graft surgery.

Recognize various definitions used in published literature to classify bleeding events.

Self Assessment Questions:

True/False Age is a risk factor for increased bleeding after CABG surgery.

True/False TIMI major and minor bleeding criteria are often used to measure bleeding outcomes.

EVALUATION OF PRE- AND POST-TRANSPLANT GLYCEMIC CONTROL PERFORMANCE MEASURES AND ASSOCIATION WITH TRANSPLANT-RELATED OUTCOMES IN LIVER TRANSPLANT RECIPIENTS.

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Purpose:
As surgical techniques and immunosuppressive regimens improve, co-morbidities associated with chronic hyperglycemia will assume increasing importance in reducing long term graft attrition and patient death. Despite detrimental consequences of new onset diabetes mellitus (NODM) post-transplantation and the opportunities to individualize therapy, liver transplant recipients may not be routinely screened for diabetes pre-transplant or monitored and managed appropriately post-transplant. Guidelines for the treatment and management of new-onset diabetes after transplantation and the American Diabetes Association 2007 Standards of Medical Care in Diabetes aim to reduce the incidence and impact of NODM by incorporating more rigorous pre- and post- orthotropic liver transplantation evaluations and emphasizing the need for stringent glycemic control.

Methods:
The current study is a retrospective, single center pilot study evaluating the level of glycemic control and transplant-related outcomes in liver transplant recipients within both the inpatient and outpatient settings at The University Hospital. Patients, greater than or equal to 18 years of age, who underwent a primary, deceased donor liver transplant on January 2005 to December 2007, will be eligible for inclusion. Patients undergoing a multi-organ transplant will be excluded.
The primary outcome measure is the percentage of glucose readings "at goal" based on post-transplant inpatient and outpatient glycemic targets. Secondary endpoints include incidence of hypoglycemia (<60mg/dl), percentage of glucose readings recorded at guideline-recommended time intervals, percentage of patients developing cytomegalovirus, length of hospital stay, rejection episodes, wound infections, readmissions, re-transplantations, overall graft and patient survival, and cause of death.
Results/Conclusions:
Data collection completed. Results will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To discuss and apply guidelines for pre-operative screening and post-operative monitoring and management of diabetes mellitus following liver transplantation.

To identify risk factors for diabetes mellitus in the transplant population and to assess the impact of transplant-related outcomes associated with glucose abnormalities.

Self Assessment Questions:

Which is the most diabetogenic immunosuppressive agent?
a)Cyclosporine
b)Daclizumab
c)Tacrolimus
d)Sirolimus

Liver Transplant Guidelines emphasize:
a)That prevention of New-Onset Diabetes Mellitus requires a multidisciplinary approach to screening, monitoring, and counseling of patients.
b)Adherence to intensive glycemic monitoring and define targets for outpatient glycemic control
c)A link between patient education and optimizing minimally diabetogenic immunosuppressive regimens
d)All of the above

EVALUATION OF A NEW OXYTOCIN PROTOCOL

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BACKGROUND
An interdisciplinary quality committee implemented a new oxytocin administration protocol. This was driven by evidence that intravenous oxytocin, given at certain amounts, can cause hemodynamic changes. Additionally, there is evidence that initiation of oxytocin after delivery of the fetus (active management of the 3rd stage of labor), as opposed to after delivery of the placenta (expectant management), reduces bleeding complications without increasing adverse outcomes. The new protocol was implemented to address these issues. It includes a single standardized strength of oxytocin and the drug must always remain on an infusion pump at a regulated infusion rate. The new protocol calls for active management of the 3rd/4th stages of labor regardless of the mode of infant delivery.

PURPOSE
The purpose of this retrospective study is to quantitatively evaluate whether this protocol had an impact on the use of supplemental uterotonic agents, and to identify unintended adverse effects of the new protocol.

METHODS
This is a retrospective chart review to evaluate the use of additional uterotonic agents in parturients 2 months after the new oxytocin protocol implementation date compared to patients in the 2 months prior to protocol initiation. Additional data will be collected to evaluate the incidence of hypotension, use of post-delivery vasopressors, and estimated blood loss (EBL) in parturients who delivered via cesarean section, and the EBL in patients who delivered vaginally.
Subjects parity, type of labor, indication for cesarean delivery, expected risk factors for postpartum hemorrhage, and demographics will be collected and evaluated. Patients medical records and pharmacy dispensing of medications will be reviewed to determine the incidence of supplemental uterotonic and vasopressor agent use.

RESULTS
Final results with conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the use of oxytocin in labor and delivery.

Reveiw the potential advantages of implementing a standardized oxytocin delivery protocol.

Self Assessment Questions:

If given too fast, oxytocin can lead to hemodynamic changes such as hypotension? T/F

Which of the following medications can be used to treat postpartum hemorrhage?
a.Hemabate (Carboprost)
b.Cytotec (Misoprostol)
c.Methergine (Methylergonovine Maleate)
d.All of the above

DEVELOPMENT AND IMPLEMENTATION OF A CLINICAL PHARMACY DASHBOARD AT AN ACADEMIC MEDICAL CENTER

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Purpose: The University of Wisconsin Hospitals and Clinics (UWHC) is implementing an electronic medical record (EMR). The EMR provides opportunity for the electronic retrieval and analysis of clinical and administrative data. A need has been identified for a tool that will demonstrate the pharmacists collective contribution towards the goals of the pharmacy department and of the organization. One tool that can fulfill this need is a dashboard. Currently, UWHC has an organizational-wide dashboard with six domains: clinical effectiveness, quality and safety; patient satisfaction; market position; financial health; employee growth and management; and operational efficiency. The pharmacy department has developed multiple goals for each of these domains. The primary objective is to develop and implement a clinical pharmacy services dashboard for pharmacy managers and pharmacists. Secondary objectives include the education of pharmacists on the purpose of a dashboard and the development of processes for maintaining the dashboard and for integrating new metrics.

Methods: A team of inpatient clinical pharmacists, pharmacy managers, and a decision support analyst brainstormed a list of potential metrics related to the 6 domains. The main themes of these metrics were summarized in a survey and sent to all pharmacists to help prioritize the measures. With the assistance of a decision support analyst and an information technology analyst, the metrics will be built and displayed in the dashboard. Pharmacist education will occur through team meetings, in-services, emails, and personal communication. A proposal will be drafted for endorsement by relevant department committees that will outline the maintenance of the dashboard and the integration of new metrics.

Results Pending

Learning Objectives:

Describe the purpose of dashboard

List methods for the creation of the dashboard

Self Assessment Questions:

What type of tool was used to prioritize potential measures?

How can a dashboard improve patient care?

IMPLEMENTATION AND EVALUATION OF PIPERACILLIN-TAZOBACTAM EXTENDED INFUSION REGIMEN

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Purpose: This project aimed to implement a hospital-wide piperacillin-tazobactam (P/T) extended infusion (EI) regimen at University of Illinois Medical Center at Chicago (UIMCC), perform quality assurance monitoring to identify and resolve barriers to regimen adherence, and evaluate clinical efficacy of the extended infusion P/T regimen compared to the intermittent 30 minute P/T infusion. Additionally, the drug acquisition cost-savings associated with an EI regimen will be calculated.

Methods: After extensive medicine, nursing, and pharmacy education, the P/T EI regimen was implemented at UIMCC on 12/15/08. All adult patients receive P/T 3.375g every 8 hours infused intravenously over 4 hours with the exception of those with renal dysfunction in which P/T is given every 12 hours. One-time only doses administered intra-operatively are the sole exemption from the EI regimen. Patients prescribed P/T were identified daily by the pharmacy database and the administration of each P/T dose was monitored for appropriateness by a pharmacy representative for 4 weeks.

To assess efficacy, data will be collected on patients receiving P/T EI under the UIMCC guideline for the treatment of infections caused by P. aeruginosa. These patients will be compared to a historical cohort who received 30 minute intermittent P/T infusions for the treatment of P. aeruginosa infections. Subjects will be randomly selected and screened for eligibility retrospectively. The P/T expenditure for the EI regimen will be compared to the expenditure for the traditional 30 minute infusion regimen.

Results: Preliminary data indicate that the primary barriers to EI P/T regimen adherence include limited intravenous access, Y-site incompatibilities, and diagnostic procedures. Based on available data in the literature, we expect an increase in P/T drug exposure, thereby improving outcomes for patients with P. aeruginosa infections. The EI P/T regimen should also result in decreased drug expenditure.

Conclusion: Pending data analysis

Learning Objectives:

Describe the rationale for the extended infusion of -lactams, such as piperacillin-tazobactam.

List the barriers to guideline adherence for the extended infusion piperacillin-tazobactam regimen.

Self Assessment Questions:

The proposed benefits to an extended infusion piperacillin-tazobactam regimen include:
a.increase drug exposure
b.improve patient outcomes
c.decreased drug expenditure
d.all of the above

Primary barriers to extended infusion regimen adherence include:
a.Lack of IV access
b.Drug incompatibilities
c.Lack of IV pumps
d.Both a and b

ASSESSING MEDICATION USE AND ACCESS AMONG MENTAL HEALTH INPATIENTS

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BACKGROUND: Patients who receive inpatient psychiatric treatment are at greater risk for suicide than other mental health patients or the general population. Among VA patients with depression the suicide rate in the first 12 weeks following discharge from inpatient settings is 568/100,000 person-years, approximately 5.5 times greater than that of all VA patients receiving depression treatment and 50 times the suicide rate in the general population. Psychiatric inpatients are also at higher risk for accidental overdose; although accidental overdose in these patients has received less attention in the literature than has suicide.

PURPOSE: The purpose of this study is to assess the prevalence of and potential risk factors (e.g. pain, sleep disturbances, psychiatric severity) for intentional and accidental overdoses, in addition to the quantity and potential lethality of prescribed medications, past medication use behaviors and toxicity awareness among psychiatric inpatients.

METHOD: This small pilot study is a prospective survey of 30 psychiatric inpatients admitted to the Ann Arbor Veterans Administration (AAVA) inpatient mental health unit. Surveys include inpatients self-report of intentional and unintentional medication overdoses and patient characteristics associated with report of overdose and access to lethal combinations of prescribed medications.

Patients demographics, current psychiatric symptoms, substance abuse, suicidal ideation, and pain will be assessed using standardized questionnaire. Patients will also undergo a standardized pharmacy interview to determine their current and past use of medications, their knowledge regarding the potential toxicity of their medications, and their opinions regarding potential pharmacy-based initiatives to increase medication safety.

All admitted patients will be eligible unless their psychiatrist believes participation is contraindicated or they are unable to give informed consent due to inability to understand the key elements of the study.

RESULTS: This research is in the data collection phase. Preliminary results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe potential risk factors for intentional and accidental medication overdose among psychiatric inpatients.

Identify areas of opportunity to reduce the risks from medication misuse and overdose among patients discharged from an inpatient mental health unit.

Self Assessment Questions:

The majority of surveyed inpatients reported past intentional or accidental overdoses. T/F

The majority of surveyed inpatients have access to potentially hazardous quantities, combinations and/or types of prescribed medications. T/F

"DEVELOPMENT OF AN INNOVATIVE EMPLOYER-PRECEPTOR TRAINING PROGRAM IN A PATIENT-CENTERED GROCERY CHAIN PHARMACY."

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Purpose: To develop, implement and evaluate a preceptor training program for community pharmacists who employ pharmacy interns in a patient-centered grocery chain pharmacy.
Methods: Pharmacy preceptorship by an experienced pharmacist provides an invaluable learning experience for pharmacy interns and has long been a core component of pharmacy education. The positive effects of preceptor training programs on learning outcomes in advanced pharmacy practice experience (APPE) rotations and residencies have been reported previously, but no studies to date have examined the role of employer-preceptors in community pharmacies. A preceptor training program will be conducted and evaluated to fill this gap and ultimately re-engineer and improve the practical training of pharmacy interns in one community pharmacy chain. Approximately 20 pharmacists employed in one division of a grocery chain pharmacy will be randomized to the training group or control group. Training will consist of four main content areas: 1) Review of the companys current intern training program and its contents, 2) Additional pharmacy tasks and responsibilities that preceptors should be teaching to interns, 3) How to facilitate learning activities and develop a learning action plan, 4) How to provide effective feedback. Learning activities will include lecture, slide show presentation and handouts, role-playing activities, and interactive in-class exercises. Paired evaluations of preceptor attitudes and knowledge regarding the intern training program will be conducted before and after training for both the training and the control group. Paired evaluation of intern attitudes regarding their internship experience will also be conducted before and after preceptor training. Intern reports of frequency of learning activities completed at baseline and 3 months post-preceptor training will also be evaluated.
Preliminary Results: Baseline surveys were collected in February and are currently undergoing analysis. Preliminary results will be available for presentation at the Great Lakes Resident Conference in April 2009.
Conclusions: To be determined.

Learning Objectives:

Explain the results of prior studies evaluating the positive effects of preceptor training programs on learning outcomes in APPE rotations and residencies.

Discuss beneficial effects of preceptor training on student and/or resident performance and satisfaction.

Self Assessment Questions:

Which of the following is NOT a positive effect of APPE/residency preceptor training programs demonstrated in the literature?
a. Ability of the preceptor to give more effective feedback
b. Increased retention of qualified preceptors by colleges of pharmacy/residency programs.
c. Increased success in planning learning activities
d. All of the above are positive effects of preceptor training

True/False: The ability of preceptors to give effective feedback not only improves students' performance but also increases student satisfaction with their practical learning experiences.

EVALUATION OF KETAMINE INFUSION AND ASSOCIATED ADVERSE DRUG EVENTS

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Statement of Purpose:
Ketamine is a non-barbiturate rapid-acting general anesthetic indicated for sedation, analgesia, and as an adjunct intubation agent. Recent evidence supports the use of ketamine, an N-methyl-D-aspartate receptor antagonist, as an analgesic in cancer patients with pain refractory to high-dose opioids. Although the efficacy of ketamine used for analgesia is supported by clinical trials, widespread use has been limited by cardiovascular and central nervous system adverse drug events (ADEs) observed with anesthetic doses of ketamine (0.01 to 0.03 mg/kg/min [approximately 40 mg/hr] continuous intravenous (IV) infusion). Increased monitoring is recommended and includes baseline EKG and continual telemetry. However, clinical studies suggest sub-anesthetic doses of ketamine (2.5 to 20 mg/hour), used in the treatment of refractory cancer pain, may be associated with decreased ADE rates. The primary objective of this study is to determine whether decreased ketamine doses are associated with subsequent decreases in ADEs. Secondary objectives of this study include identifying the most common ketamine dose used for the treatment of refractory cancer pain and evaluating drug or disease interactions associated with its use.

Statement of Methods:
Prior to initiation, this study was granted approval from The Ohio State University (OSU) Institutional Review Board. Patient selection was completed using the Pharmacy Departments information system to identify patients at the OSU James Cancer Hospital who received an IV ketamine infusion within the previous twenty-four months. Electronic and paper medical records were reviewed for diagnoses, dosing, adverse effects, and other relevant information. Data was analyzed to determine adverse events associated with ketamine doses used for refractory cancer pain. Pre-existing conditions, relevant medications, and reasons for discontinuation were recorded and analyzed to determine correlation with adverse events.

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

Learning Objectives:

Describe the use of ketamine for refractory cancer pain and how this use differs from other indications.

Identify the most common adverse events associated with ketamine use and explain how use of low dose ketamine impacts the frequency of these events.

Self Assessment Questions:

What are some of the clinical uses of ketamine?

What side effects are most commonly associated with ketamine therapy?

IMPLEMENTATION OF A PEER EVALUATION SYSTEM IN A DECENTRALIZED PHARMACY DEPARTMENT

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Objective: Currently the pharmacy department at Aurora St. Lukes Medical Center utilizes a general Aurora Health Care evaluation form, which is filled out by the individual and his or her supervisor. A peer review can provide additional input to the current evaluation process. The primary goal of this project is to implement a peer evaluation system in the pharmacy department at Aurora St. Lukes Medical Center. A secondary goal is to make the evaluation process more useful to both management and their employees.

Methodology: The current literature was reviewed for current peer evaluation practices in the healthcare setting. Goals of the evaluation process were established, as well as the utilization of the data collected. The evaluation tool was then decided upon and plans were made for distribution. A large portion of time will be spent on staff education and the completion of the forms. The evaluations will then be collected and reviewed by management and his or her employees. A final data review will be done to assess the ease of tool use, the helpfulness of the information collected and plans for future peer evaluations.

Results and Conclusion: To be presented at Great Lakes

Learning Objectives:

Describe the benefits of peer evaluations

Describe the barriers for implementing a peer evaluation in a large decentral pharmacy department

Self Assessment Questions:

Which is a benefit of peer evaluations

A. Increased personal accountability
B. Increased performance of pharmacy department
C. Personal and professional growth
D. All of the above

List 3 barriers to implementing a peer evaluation

INDUCTION IMMUNOSUPPRESSION THERAPY WITH RABBIT ANTITHYMOCYTE GLOBULIN IN KIDNEY TRANSPLANT RECIPIENTS

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Purpose: Rabbit antithymocyte globulin (ATG) is a polyclonal antihuman antibody directed primarily against T lymphocytes. While its FDA indication is for treatment of acute rejection in renal transplant recipients, it is commonly used as induction therapy. At The Ohio State University Medical Center, ATG is used as induction immunosuppressive therapy in combination with a rapid glucocorticoid taper in kidney transplant recipients. Common side effects are infusion-associated reactions, leukopenia, and thrombocytopenia. Per the kidney transplant protocol, induction therapy consists of five doses of ATG. Daily dosage adjustments are made based on white blood cell and platelet count. The first dose of ATG runs over six hours and if tolerated, the subsequent infusions are run over four hours. Patients are premedicated with acetaminophen and diphenhydramine to minimize infusion-associated reactions. Currently, a protocol does not exist to standardize dose adjustments. Additionally, a correlation has not been evaluated between episodes of acute rejection and cumulative ATG dose. The objective of this study is to characterize ATG dosing and dose adjustments, assess the impact of infusion time and premedication on adverse reactions, and evaluate the correlation between cumulative ATG dose and episodes of acute rejection.

Methods: This study received Institutional Review Board exempt approval. The health systems electronic medical record system was used to identify patients who received a kidney transplant in 2006. The following data are being collected: age, gender, type of transplant (cadaveric, living related, living unrelated kidney), etiology of primary renal disease, height, dosing weight, immunosuppression regimens, ATG dose, dosage adjustments, cumulative dose, infusion time, premedication, side effects, renal function, liver function, white blood cell count, platelet count, and details of any acute rejection episode.

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

Learning Objectives:

Identify side effects associated with rabbit antithymocyte globulin (ATG) that necessitate a reduction in dose.

Evaluate acute rejection episodes based on cumulative ATG dose.

Self Assessment Questions:

T/F: ATG is FDA approved for the treatment of acute rejection in renal transplant recipients.

T/F: Leukopenia and thrombocytosis are two of the most common side effects associated with ATG.

COMPARISON OF INTRAVENOUS COLISTIMETHATE SODIUM DOSING STRATEGIES IN ADULT, HOSPITALIZED PATIENTS.

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Purpose:
Multi-drug resistant gram-negative organisms have emerged as significant pathogens in hospitalized patients in recent years. The lack of new antibiotics targeting these bacteria has led to the revival of colistimethate sodium, the intravenous form of colistin. Colistin was developed before modern pharmacokinetic and pharmacodynamic evaluation and its use limited due to the reported high rates of nephrotoxicity and neurotoxicity; thus, its safety and efficacy are largely unknown. More recent use of colistin has questioned the accuracy of earlier reports. Despite data documenting a more acceptable safety profile, clinicians are still left with questions as to how to most effectively administer this medication. Given the limited data on the safety, efficacy and optimal dosing of colistin, we are evaluating our current dosing strategies and the relative safety of these regimens.

Methods:
Retrospective chart review of patients requiring intravenous colistimethate sodium admitted to Methodist Hospital of Indiana and Indiana University Hospital. Exclusions included patients: less than 18 years old, on renal replacement therapy at the start of colistimethate sodium therapy, received less than 48 hours of drug or initiation of therapy at an outside hospital. Data was collected on baseline characteristics, colistimethate sodium dosing strategies, concomitant medications, outcomes and rates of adverse events, specifically nephrotoxicity.

Results:
A total of 39 patients were included in this study. Patients were divided into three groups: 5mg/kg/day given once daily, or divided into twice daily and thrice daily doses (n=16, 19, 4; respectively). Combined baseline characteristics include age 47.118.1 years, APACHE II score 14.78.1, gender 51% female. Reasons for stopping colistin therapy included completing treatment (31%), nephrotoxicity (33%), discharge home on medication (10%) and death (23%).

Conclusion:
The rates of renal dysfunction and further outcomes data for each dosing regimen will be presented and subjected to statistical evaluation and multivariate analysis.

Learning Objectives:

Review the currently published data for safety and efficacy of intravenous colistimethate sodium.

Review the safety and efficacy of once daily and multiple daily dosing strategies for intravenous colistimethate sodium.

Self Assessment Questions:

Colistin 300mg is equivalent to all of the following except:
a. Colistimethate sodium 720mg
b. Colistin 9,000,000 IU
c. Colistin sulphomethate 300mg
d. Polymyxin E 300mg

Colistimethate sodium is the less active prodrug of colistin which exhibits concentration dependent activity against many gram-negative organisms. T or F

CARBAPENEM-RESISTANT AND CARBAPENEM-SUSCEPTIBLE ACINETOBACTER BAUMANNII BACTEREMIA AND PNEUMONIA: A RETROSPECTIVE COMPARISON OF PATIENT CHARACTERISTICS AND OUTCOMES

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Background: The incidence of carbapenem-resistant A. baumannii (CRAB) is concerning and presents a significant challenge. Comparisons of CRAB to carbapenem-susceptible A. baumannii (CSAB) patient populations have not been performed and little data are available helping to differentiate patient-specific risk factors for CRAB infection. Preliminary research at The University Hospital (TUH) has revealed a clinical cure rate of 31% and18% in-hospital mortality for CRAB-related hospital acquired pneumonia (HAP) and bacteremia in the surgical/trauma and medical intensive care units (ICUs)

Purpose: To evaluate differences in patient outcomes between patients with CRAB and CSAB HAP or bacteremia and identify potential clinical and patient-specific risk factors associated with CRAB.

Methods: This is a retrospective, single-center, observational study evaluating differences in patient outcomes between patients with CRAB and CSAB HAP or bacteremia. Included patients were medical or surgical intensive care unit patients age 18 or older with at least one occurrence of A. baumannii bacteremia or pneumonia defined as clinical signs or symptoms of infection and positive respiratory or blood cultures (resistant or susceptible) within the last 5 years. Primary outcomes included clinical cure (resolution of signs of infection), microbiologic cure (negative repeat cultures), and definitive antibiotic therapy duration in patients with CRAB or CSAB. Relapse rate, with relapse defined as re-infection within 14 days and recurrence as re-infection after > 14 days, were also measured. Secondary outcomes included length of hospital stay, ICU length of stay, duration of mechanical ventilation, number of patients requiring vasopressor therapy, changes in renal function, and in-hospital mortality. Patient demographics were analyzed to find potential risk factors for CRAB.

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

Learning Objectives:

Review differences in antibiotic therapy duration and cure rates between CRAB and CSAB HAP and bacteremia.

Identify possible risk factors for the development of CRAB.

Self Assessment Questions:

True or False: A. baumannii has been coined the new "Gram-negative MRSA."

Previous large studies at institutions outside of The University Hospital in Cincinnati, Ohio have found mortality rates associated with HAP caused by Carbapenem-resistant A. baumannii to be as high as
a. 85%
b. 10%
c. 25%
d. 44%

EFFECT OF A STANDARDIZED POLICY ON CHRONIC NON-MALIGNANT PAIN PATIENTS IN A GENERAL INTERNAL MEDICINE CLINIC

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Purpose:
The purpose of the study is to determine how the implementation of a pain policy at an internal medicine clinic affects the satisfaction, functionality, and severity of pain of patients who are being treated for chronic non-malignant pain (CNMP).
Methods:
Physicians practicing at an academic medical center internal medicine residents clinic will receive an interactive lecture series regarding the clinics pain policy. The lecture series will include an explanation of an updated pain agreement, pain policy overview, and appropriate approach to CNMP management. Patients who are being treated for CNMP at the clinic will be administered a written survey adapted from the Brief Pain Inventory, Oswestry Disability Questionnaire, and the American Pain Society Guidelines for the Treatment of Pain. Eligible patients will be identified by review of an electronic medical record to ensure that they meet inclusion criteria. Patients will be included if they have been receiving an opioid prescription from the clinic for at least 3 months for CNMP and are 18 years of age or older. Prior to the first physician visit following implementation, eligible patients will be asked to complete the survey. Patients who complete the initial survey will have the survey re-administered six months later. Demographic data for each patient will be collected. Pre and post survey data will be compared via paired t-test and the Holms stepwise testing procedure will be used to adjust for multiple comparisons.
Results:
Results are expected to demonstrate an improvement in the outcomes of CNMP following policy implementation.

Learning Objectives:

Recognize the common barriers to effective management of chronic non-malignant pain

Identify effective tools to assess chronic non-malignant pain

Self Assessment Questions:

Barriers to effective management of chronic non-malignant pain in the primary care setting include which of the following:

a. Lack of prescriber knowledge on chronic non-malignant pain management
b. Stigma associated with chronic non-malignant pain
c. Lack of a means to objectively assess pain in patients
d. All of the above

Which of the following is the most appropriate measure to assess a patients chronic non-malignant pain?

a. Pain severity scales
b. Functionality assessments
c. Frequency of breakthrough medication use
d. Strength of opioid medication necessary to control pain

DEVELOPING A PILOT PROGRAM FOR PHARMACIST-CONDUCTED MEDICATION RECONCILIATION AND MEDICATION THERAPY MANAGEMENT SERVICES (MTMS) IN AN AMBULATORY CLINIC SETTING

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Background: The University of Wisconsin Hospital and Clinics (UWHC) is an academic medical center with 85 ambulatory clinics. Most UWHC ambulatory clinics have registered nurses and medical assistants complete medication reconciliation component at each clinic visit. The completion of the medication reconciliation process by a pharmacist during each clinic visit creates an opportunity for provision of MTMS with the potential for identification of medication interventions.

Objectives: To determine whether pharmacist-conducted medication reconciliation and identification of potential medication interventions in an ambulatory clinic setting: 1) improves the accuracy and completeness of electronic medical record medication lists; 2) leads to an increased provision of medication therapy management services; 3) improves patient satisfaction with clinic care.

Methods: Patients taking four or more prescription medications to treat or prevent two or more chronic conditions are invited to participate in this study. Patients are randomized to participate in one of three groups: 1) patients receive standard care; 2) patients meet with the medical assistant with their personal medication bottles available for the medication reconciliation component of the appointment; 3) patients meet with a pharmacist with their personal medication bottles for 30 minutes prior to their scheduled clinic appointment to verify the completeness of the list of medications in the electronic medical record and identify possible therapeutic interventions or answer any medication questions and concerns. All patients enrolled in this study are asked to complete a brief satisfaction survey.

Results: Example variables to be reported post-implementation will include: 1) number and type of medication discrepancies between the patient-reported medication list and the list in the electronic medical record; 2) number and type of medication interventions identified by the pharmacist and accepted by the physician; 3) patient satisfaction with respect to access to information and communication of that information during the clinic visit.

Learning Objectives:

Define the process of medication reconciliation and recognize its importance in the ambulatory clinic setting.

Describe the impact a pharmacist has on patient care in an ambulatory clinic setting.

Self Assessment Questions:

What is the purpose of medication reconciliation and when should it occur in the patient care process?

What activities have pharmacists completed in ambulatory clinic settings that result in improved patient care?

IMPLEMENTATION AND REVIEW OF AN ORDERSET FOR THE EMERGENT REVERSAL OF WARFARIN ANTICOAGULATION IN THE EMERGENCY DEPARTMENT FOR PATIENTS PRESENTING WITH SPONTANEOUS HEMORRHAGE

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Purpose:
Methodist Hospital Emergency Department does not currently have a standardized protocol for reversal of warfarin anticoagulation in patients presenting with spontaneous hemorrhage. The purpose of this study is to compare time to successful reversal of anticoagulation, degree of anticoagulant reversal measured by INR before and after an anticoagulant reversal orderset is implemented.

Methods:
This study consists of two groups; the first is a historical control group from December 2007 to December 2008 which will be evaluated for trends in current warfarin reversal in patients presenting with spontaneous hemorrhaging. This will be compared to patients admitted utilizing the anticoagulation reversal orderset developed through March of 2009 as the second group. Patients 18 years of age and older presenting to the Methodist Hospital Emergency Department with a diagnosis of hemorrhage receiving outpatient warfarin therapy will be evaluated. Patients presenting with traumatic injury or documented liver dysfunction will be excluded from analysis. Data collection include: demographics, anticoagulant indication, hemorrhage location, initial INR, INR after reversal agents given, reversal agents (including dose and route of administration), number of red cell units infused, number of platelet units infused, number of fresh frozen plasma units infused. The primary endpoint is time to documented INR of 1.5 or less. Secondary endpoints include: doses and route of reversal agents, number of red cell units infused, number of platelet units infused and number of units of fresh frozen plasma infused, and mortality.

Results and Conclusions:
Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

List the most common types of spontaneous hemorrhage presenting to the emergency department requiring anticoagulation reversal

Discuss the most common anticoagulation methods utilized by emergency department physicians

Self Assessment Questions:

What anticoagulation reversal agent currently approved in Europe may become approved in the United States?

What is a limiting factor of infusing fresh frozen plasma in patients with co-morbid conditions such as heart failure?

ANTICHOLINERGIC USE IN CHILDREN AND ADOLESCENTS TAKING ANTIPSYCHOTICS

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PURPOSE: Treatment with first generation antipsychotics is associated with extrapyramidal symptoms (EPS). Newer second generation antipsychotic (SGA) agents have a lower likelihood of inducing EPS in adults. Clinical observations indicate that children and adolescents may be more sensitive to these effects and require therapy with anticholinergic agents, which may adversely affect cognition and school performance. The purpose of this study is to examine anticholinergic use in children and adolescents taking SGAs to determine whether differences exist across individual agents.

METHODS: This study, approved by the University of Illinois at Chicago (UIC) investigational review board, is a retrospective chart review of patients seen at UIC outpatient clinics. Subjects who had prescriptions filled for SGAs at UIC pharmacies between January 1, 2005 and September 1, 2008 were identified using the pharmacy database. Subjects are 5 to 18 years of age and have received at least two consecutive months of a SGA. Patients with documentation of neurologic disorders or medications other than antipsychotics known to cause EPS will be excluded. Information currently being collected includes sociodemographic data, medical and psychiatric diagnoses, medication doses, schedules and indications, duration of SGA and anticholinergic therapy, and documentation of EPS. Summary statistics for demographic characteristics, antipsychotic utilization, anticholinergic utilization, indications, diagnoses and relative doses will be tabulated for the study sample as a whole. A chi-squared analysis will be performed to determine whether anticholinergic use differs across SGAs. Spearmans rho will be used to identify other variables correlated with anticholinergic use.

RESULTS and CONCLUSIONS: 197 patients meeting age and prescription criteria were identified for review. A total of 236 antipsychotic trials were identified. To date, 48 records have been assessed, 30 of which have met inclusion criteria. Of these, 4 were prescribed anticholinergic for EPS. Comprehensive results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To review the use of antipsychotics in children and adolescents.

Name anticholinergic use across children and adolescents receiving aripiprazole, risperidone, and quetiapine.

Self Assessment Questions:

Which second-generation antipsychotics are FDA-approved for use in children and adolescents with schizophrenia or bipolar disorder I?
A.Olanzapine
B.Risperidone
C.Aripiprazole
D.B and C
E.All of the above

Which of the following antipsychotic-associated side-effects are commonly treated with anticholinergic therapy?
A.Weight gain
B.Dystonia
C.Hyperprolactinemia
D.Insulin resistance

IMPROVING COMPLIANCE WITH NATIONAL GUIDELINES REGARDING CARDIOPROTECIVE DRUGS IN PATIENTS WITH CKD AND ESRD.

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Purpose: This project is designed to evaluate the usefulness of prescriber education aimed at increasing the prescribing rates of cardioprotective medications for patients with Chronic Kidney Disease (CKD).
Methods: This will be a time-series analysis, looking at patients at two prespecified time points (pre- and post-intervention). The intervention will consist of inservicing the rounding nephrologists and the medical residents at monthly intervals on the benefits and risks of initiating and/or dose maximizing cardioprotective medications (Angiotensin converting enzyme inhibitor (ACE-I) or angiotensin reeceptor blocker (ARB), statin, and aspirin). A random sample of consecutive patients admitted to the inpatient nephrology unit between June and August 2008 will be selected to evaluate intervention effect. Patient demographics, baseline creatinine and GFR, peak potassium value, and past medical history, as well as whether or not the patient is on an ACE-I, ARB, statin, and aspirin and the dose of each will be collected. Discharge medications will be evaluated for the selected patients to assess physician intervention (if an ACE-I, ARB, or statin was prescribed or changed). In addition, patients enrolled in HAP insurance will have pharmacy claims data analyzed if a discharge order for ACE, ARB, or statin drugs is written to evaluate patient adherence to these regimens. After inservices (December 2008 - February 2009), the same data will be collected as the initial interval. The primary endpoint will be the change physician initiation and/or dose maximization of ACE-I or ARBs from pre- to the post-interventional interval. Secondary endpoints will include statin and aspirin prescription rates as well as dose changes in each of these drugs.
Preliminary Results: Data yet to be analyzed
Expected findings: Data yet to be analyzed

Learning Objectives:

Following this presentation, participants will be able to identify potentially cardioprotective and renoprotective strategies in patients with CKD.

Following this presentation, participants will be able to state educational interventions useful in influencing prescribing patterns and optimizing care for patients

Self Assessment Questions:

Patients on hemodialysis have 20 times the rate of cardiovascular disease when compared to age and sex matched patients
A. True
B. False

Which of the following drugs have been shown in a large clinical trial to reduce cardiovascular mortality in patients with CKD?
A. ACE-Is
B. ARBs
C. Aspirin
D. Statins
E. None of the above

ASSESSMENT OF BASIC MEDICATION MANAGEMENT KNOWLEDGE FOR PATIENTS WITH DIABETES AND HYPERTENSION IN AN INDIGENT CARE SETTING

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Purpose: MTM programs and brown bag reviews have helped health care providers identify drug related problems and optimize medication use, however, there is a lack of published data looking specifically at medication knowledge and deficits in this knowledge. The primary objectives of this study are: To determine if patients (1) understand the purpose for each medication, (2) follow prescribed medication directions, and (3) know diabetes and/or hypertension treatment goals. Secondary objectives are: To determine any correlations between knowledge level and demographics, clinical status (fasting blood glucose, A1c, blood pressure), number of medications, number of chronic disease states, and previous disease state or medication education.

Methods: This study will be conducted at three federally qualified health centers. Charts will be reviewed for inclusion criteria requiring patients to be English-speaking adults, diagnosed with diabetes mellitus and/or hypertension, and currently using at least 5 chronic medications. Eligible participating patients will be seen by the investigator during their regularly scheduled provider appointment. After several baseline questions, the patient will be asked (1) to match each medication (including non-diabetic and non-hypertensive medications) to its respective disease state card, (2) to explain how they take each medication (quantity and frequency), and (3) to identify fasting blood glucose, A1c, and/or blood pressure treatment goals from 4-option choice cards. Patient responses will be recorded and categorized as correct, incorrect, or unknown by patient. A medication list will be completed throughout the research appointment for the patient to keep. The chart will be reviewed for demographics and the most recent clinical values of fasting blood glucose, A1c, and blood pressure. A one to two week follow-up satisfaction survey will also be conducted via telephone.

Results and Conclusions: Preliminary results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Review the ADA treatment guidelines for diabetes.

Review the importance of patients being knowledgeable about their medical care.

Self Assessment Questions:

True/False: ADA treatment goals for diabetes are A1c <6.5%, fasting blood glucose 70-130, and blood pressure <130/80.

True/False: Evidence suggests that when patients are more knowledgeable about their self-care, they are more likely to have positive clinical outcomes.

IMPACT OF MEDICATION ADHERENCE TO PEGYLATED INTERFERON PLUS RIBAVIRIN THERAPY FOR HEPATITIS C WITH CONCURRENT SELECTIVE SEROTONIN REUPTAKE INHIBITOR THERAPY

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Background
Peginterferon (PEG IFN) plus ribavirin is an effective combination antiviral therapy for hepatitis C virus (HCV) infection but is often associated with a high rate of depression. In multiple studies, it has been found that depression has been linked to suboptimal outcomes including poor adherence, premature therapy discontinuation and decreased viral clearance. Studies have indicated that adherence to optimal HCV therapy can enhance sustained viral response, which may be linked to eradication of the HCV infection. However, optimal treatment outcomes require careful management of side effects related to HCV therapy. Studies have shown that concurrent selective serotonin reuptake inhibitor (SSRI) therapy during HCV therapy is effective in managing interferon-induced depression. In light of emerging data, which has shown that adherence to HCV therapy is associated with improved outcomes, strategies are needed to prevent the disruption of interferon therapy for patients with HCV infection.

Objective
To examine and compare the adherence and discontinuation rates for PEG IFN-plus-ribavirin therapy with and without a concurrent SSRI therapeutic regimen.

Methods
This was a retrospective test-control study of pharmacy claims for PEG IFN, ribavirin and an SSRI between January 1, 2006 and December 31, 2008. The test group included patients who initiated PEG IFN-and-ribavirin therapy during the study time frame and were prescribed an SSRI within three months of initiating their HCV therapy. The control group included patients who initiated PEG IFN-and-ribavirin therapy during the study time frame and were not prescribed an SSRI for the entire duration of their HCV therapy. Adherence to therapy was assessed by measuring the medication possession ratio. Patients were considered to have discontinued therapy if no claims for PEG IFN treatment were found for six continuous weeks during their HCV treatment period.

Results
Pending data collection and analysis.

Conclusion
Pending data collection and analysis.

Learning Objectives:

Describe the contributing factors associated with suboptimal adherence of HCV therapy regimen.

Discuss the impact of adherence of HCV therapy on the pharmacy benefit manager, the client, and the member.

Self Assessment Questions:

What is the approximate prevalence of hepatitis C treatment-induced depression?

Which SSRIs have been studied and shown to be efficacious in treating interferon-induced depression?

ANTIBIOTIC USAGE AND RESISTANCE PATTERNS FOR GRAM NEGATIVE BACILLI AT THE RICHARD L. ROUDEBUSH VETERANS AFFAIRS MEDICAL CENTER

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PURPOSE: The increasing prevalence of antibiotic resistance has hastened the need for institution-specific antimicrobial stewardship programs. Antimicrobial pressure has been proposed as a mechanism for the increased prevalence of multidrug resistant Gram negative bacilli (GNB) in hospitals worldwide. An understanding of antibiotic usage and resistance trends at individual medical centers is critical to developing stewardship programs specific to the institution. The objective of this proposal is to study trends in GNBs antimicrobial resistance from 2006-2008 at the Richard L. Roudebush Veterans Affairs Medical Center (RLR-VAMC) and to examine for possible correlation with antimicrobial usage. The results from this study will be used to develop policies and procedures for antimicrobial use at RLR-VAMC.

METHODS: This is a retrospective analysis of antibiotic utilization and resistance patterns at the RLR-VAMC. The study covered the period between January 2006 and December 2008. Antimicrobial resistance patterns were extracted from the central microbiology database. Minimal inhibitory concentrations (MICs) of piperacillin/tazobactam, cefepime, imipenem/cilastatin, and ceftriaxone against Escherichia coli, Pseudomonas aeruginosa, Enterobacter cloacae, and Klebsiella pneumonia were obtained. Percent of susceptible isolates were determined using breakpoints recommended by the National Committee for Clinical Laboratory Standards (NCCLS). Microbiological data was classified according to the location where the samples were collected as unit samples (MICU, SICU) and ward samples (medical-surgical wards). Total inpatient usage (in grams) per year of each of the antibiotics of interest (pipercillin/tazobactam, cefepime, imipenem/cilastatin and ceftriaxone) were extracted from the central VA pharmacy database at the RLR-VAMC. Trends in antibiotic usage and resistance patterns were then evaluated. Linear regression was used to analyze the possible correlation between antimicrobial usage (in grams) and antibiotic resistance trends (MIC and percent susceptible) over time.

RESULTS/CONCLUSION: Data collection is ongoing and results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain three reasons for using antimicrobial stewardship programs within healthcare organizations.

Identify the minimal inhibitory concentrations (MICs) of common IV antibiotics used in hospitalized patients against gram negative bacilli.

Self Assessment Questions:

What is the minimal inhibitory concentration (MIC) resistance breakpoint for piperacillin/tazobactam against Pseudomonas aeruginosa?

A.) MIC of 4
B.) MIC of 8
C.) MIC of 32
D.) MIC of 64

Antimicrobial stewardship programs improve overall antimicrobial utilization by:

A.) Optimizing patient response to antimicrobial therapy
B.) Minimizing overall costs associated with antimicrobial therapy
C.) Preventing susceptibility mismatches between organism and antimicrobial therapy
D.) Minimizing unintended consequences of antimicrobial usage
E.) All of the above

SIGNIFICANCE OF PERI-PROCEDURAL PHARMACOTHERAPY ON POST-CARDIAC INTERVENTION MYONECROSIS

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BACKGROUND: Elevation of cardiac markers post-percutaneous coronary intervention (PCI) have been identified as negative prognostic indicators of myocardial infarction, need for urgent revascularization, and death. Myonecrosis results from the showering of microemboli during stent placement causing occlusions within the microvasculature. Antiplatelet therapy with glycoprotein IIb/IIIa inhibitors is thought to minimize this process by reducing platelet aggregation. Direct thrombin inhibitors are commonly used during PCI procedures due to the anticoagulation benefits with reduced risk of bleeding. The purpose of this study is to identify the effects of peri-procedural pharmacotherapy treatment options utilized in clinical practice at Methodist Hospital on post-PCI cardiac enzymes.

METHODS: This was a retrospective, observational study of patients who underwent PCI for unstable angina or non-ST segment elevation myocardial infarction at Methodist Hospital between January 1, 2007 and July 1, 2008. Data collected included peri-procedural pharmacotherapies, pre and post-procedural CK-MB and troponin, patient demographics, and adverse events. Elevations in post-procedural CK-MB and troponin will be compared among 3 treatment groups: heparin plus a GPI, bivalirudin alone, or heparin without a GPI or direct thrombin inhibitor.

The primary outcome for this study is the effects of the 3 pharmacotherapeutic treatment groups on post-procedural cardiac enzyme levels as a surrogate marker of negative ischemic outcomes. Secondary outcomes assessed will include post-myocardial infarction, death, urgent revascularization, and bleeding.

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

Learning Objectives:

Identify prognostic indicators associated with negative outcomes following percutaneous coronary intervention (PCI).

Review the recommendations for antiplatelet therapy for patients with UA or NSTEMI undergoing PCI.

Self Assessment Questions:

True/False: Post-intervention elevation of cardiac markers has been identified as prognostic indicators of myocardial infarction, need for urgent revascularization, and death.

Which of the following medications achieves antiplatelet activity via inhibition of glycoprotein IIb/IIIa receptors?
a. Abciximab
b. Eptifibatide
c. Bivalirudin
d. A and B

EVALUATION OF SULFONYLUREA DOSE ESCALATION ON GLYCOSYLATED HEMOGLOBIN IN A VETERAN POPULATION

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Background: Glyburide and glipizide are sulfonylurea medications used in the treatment of type 2 diabetes at the VA Ann Arbor Healthcare System (VAAAHS). Previous studies suggest that the glycosylated hemoglobin (HbA1c) lowering effect of sulfonylureas plateaus before reaching the manufacturers maximum dose. However, a review of prescribing practices at the VAAAHS revealed that over 40% of prescriptions for glyburide and glipizide are written for doses ≥20 mg per day.

Purpose: The primary objective of this study is to determine the difference in HbA1c after doubling the dose of glyburide and glipizide to ≥20 mg per day in veterans with type 2 diabetes.

Methods: This retrospective study was designed to examine three sulfonylurea dosage groups: glyburide 5mg twice daily increased to 10mg twice daily, glipizide 5mg twice daily increased to 10mg twice daily and glipizide 10mg twice daily increased to 20mg twice daily. Subjects were identified by active prescriptions for the higher dose therapy of each group from July 1, 2008 to December 18, 2008. Subjects were eligible for inclusion if they were sequentially prescribed both doses of the sulfonylurea as outlined above and a HbA1c was available after at least 75 days on a stable diabetes treatment regimen with each dose. HbA1c and weight will be compared before and after the date of dose increase. Additional data including patient demographics, body mass index, serum creatinine, concomitant diabetes medications, and documented episodes of outpatient hypoglycemia will be reported.

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

Learning Objectives:

Discuss literature describing the dose-response relationship between sulfonylureas and HbA1c

Recognize the effect of doubling the dose of glyburide and glipizide to ≥20 mg per day on HbA1c in veterans with type 2 diabetes

Self Assessment Questions:

True or False: According to AACE diabetes guidelines, the glucose-lowering effect of sulfonylureas usually plateaus at approximately one-half of the maximum recommended dose.

True or False: The effect of sulfonylureas is independent of beta-cell function

ENTEROCOCCAL INFECTIVE ENDOCARDITIS - INCIDENCE, RISK FACTORS FOR RESISTANCE, AND CLINICAL OUTCOMES

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Purpose: Enterococcal species are currently the third leading cause of endocarditis both in the United States and worldwide. Despite advances in the diagnosis and treatment of bacterial endocarditis, the mortality rate of enterococcal infective endocarditis (EIE) has not changed significantly over the past few decades. Prior studies have shown varying risk factors for the acquisition of EIE; however, further studies are needed to elucidate specific risk factors antimicrobial resistance. Furthermore, prior studies have shown varying outcomes with regard to the clinical impact these differences might impose. The purpose of this study is to characterize the outcomes of patients with EIE and bacteremia at Henry Ford Hospital. Additionally, risk factors for antimicrobial resistance and outcomes in these patients will be studied.
Methods: This is a retrospective cohort study, evaluating patients admitted from January 2006 to February 2009 and diagnosed with EIE or enterococcal bacteremia. Patients will be identified by scanning ICD-9 codes for infective endocarditis and enterococcal infection as well as by screening for enterococcal spp. bloodstream infections. Patients will be evaluated according to the Modified Duke Criteria for the diagnosis of infective endocarditis. Patients will be classified as definite, probable, or rejected as having endocarditis. Additionally, patient demographics, clinical data, and microbiologic data will be assessed. Patient outcomes (cost of hospitalization, length of stay, etc) will be summarized. Microbiologic characteristics (i.e., vancomycin resistant enterococci, etc) in particular will be evaluated and any differences in these subsets of patients will be discussed. Backwards stepwise logistic regression to evaluate risk factors for particular microbiologic characteristics and outcomes will be performed.
Results: Data collection is currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe treatment options for patients with enterococcal bloodstream infections and infective endocarditis

Recogize the impact of antimicrobial resistance on antibiotic selection and outcomes in patients with enterococcal bloodstream infections and infective endocarditis.

Self Assessment Questions:

True or false: Mortality rates from enterococcal infective endocarditis have improved dramatically over the past 2 decades.

True or false: Beta-lactam monotherapy against enterococcal infections demonstrates bactericidal activity.

EVALUATION OF THE USE OF DROTRECOGIN ALFA IN A TERTIARY CARE TEACHING MEDICAL CENTER

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Purpose: Drotrecogin alfa (Xigris) is the first FDA approved drug for the treatment of severe sepsis. The drug is given by continuous infusion for ninety-six hours and infused at a rate of 24 micrograms/kilogram/hour. Drotrecogin alfa is dosed using the patients actual body weight on the day the drug is initiated. The exact mechanism of the medication is unknown; however, the drug demonstrates anti-thrombotic, thrombolytic, and anti-inflammatory properties. Bleeding is the major adverse effect. The purpose of this study is to characterize the use, timing, adverse effects, and mortality associated with drotrecogin alfa at The Ohio State University Medical Center (OSUMC). The results of this study will be used to improve drotrecogin alfa use in severe sepsis at OSUMC.

Methods: All patients diagnosed with severe sepsis and treated with drotrecogin alfa at OSUMC from February 1, 2008 to January 31, 2009, will be included in the study. Pregnant women, patients <18 or >89 years old, and incarcerated patients will be excluded. The following information will be collected using the electronic charting systems, patient charts, and progress notes: dosing weight, time from onset of severe sepsis to treatment with drotrecogin alfa, patient demographics, length of drotrecogin alfa therapy, absolute and relative contraindications, number of organ system failures, number of bleeding events, and patient mortality. The appropriate timing of treatment with drotrecogin alfa from the onset of severe sepsis will be evaluated. Empiric antibiotic therapy will also be evaluated to determine if therapy appropriately covered final culture results.

Learning Objectives:

Discuss the indications for use and appropriate dosing of drotrecogin alfa in the treatment of severe sepsis.

Discuss optimal timing from onset of severe sepsis to initiation of drotrecogin alfa therapy.

Self Assessment Questions:

Which of the following is the appropriate dosing regimen for a patient weighing 185 kg?
a. 24 micrograms/kg/hr adjusted body weight infused for 96 hours
b. 24 micrograms/kg/hr ideal body weight infused for 96 hours
c. 24 micrograms/kg/hr actual body weight infused for 96 hours

A patient who is actively bleeding from any site should not receive drotrecogin alfa.
True or False.

PLASMA CONCENTRATIONS OF ANTI-THYMOCYTE GLOBULIN BEFORE AND AFTER PLASMAPHERESIS IN ABO INCOMPATIBLE AND POSITIVE CROSS-MATCH KIDNEY TRANSPLANT RECIPIENTS

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Recipients of ABO incompatible (ABOI) and positive cross-match (PXM) organ transplants are at high risk for antibody-mediated acute rejection. Patients receiving high risk kidney transplants at the University of Illinois Medical Center (UIMC) undergo plasmapheresis three times prior to transplant, the day of transplant, and days 1, 3, 5, 7, and 9 post-transplant. Antithymocyte globulin (ATG) is given during the transplant procedure and after each plasmapheresis session. Using this UIMC protocol, the overall incidence of acute rejection in PXM patients within 1 year was 42%. To date there have been no studies examining plasma levels and optimal dosing of ATG in high risk kidney transplant patients undergoing plasmapheresis. Based on studies of other immunoglobulins it would be expected that some ATG is removed by plasmapheresis, however, it is unknown how much is removed or how the removal of ATG may affect early and late rejection rates. The objective of this study is to determine plasma ATG concentrations before and after plasmapheresis in ABOI and PXM kidney transplant patients. By comparing these ATG levels, it will be possible to determine the amount of ATG removed during plasmapheresis. Ten patients undergoing ABOI or PXM kidney transplants will be prospectively enrolled and will receive ATG per UIMC protocol. Blood samples will be collected before and after each plasmapheresis session on days 1, 5, and 9 post-transplant. Plasmanate samples will be taken on the same days. A final blood sample will be collected at the patients 1 month follow-up clinic appointment (post-operative day 30 + 5 days). Each blood and plasmanate sample will be assayed for the plasma concentration of ATG. Patient records will also be monitored for serum creatinine levels and occurrence of rejection at discharge, and at 1, 3, 6, and 12 months post-transplant. Patient enrollment and data collection are currently ongoing.

Learning Objectives:

Describe the mechanism of action of anti-thymocyte globulin when used for prevention of rejection in kidney transplant recipients.

Identify strategies to decrease rates of rejection after high risk kidney transplants, such as ABO incompatible and positive cross-match transplants.

Self Assessment Questions:

Which of the following is FALSE regarding the mechanism of action of anti-thymocyte globulin (ATG)?
a. ATG is an antibody against T-cell surface antigens
b. ATG decreases circulating T-cells by preventing T-cell proliferation
c. ATG administration can result in release of cytokines such as TNF, IL-6, and IL-1
d. The effects of ATG are not specific to T-cells and can also cause destruction of lymphocytes

True or falseRemoval of antibodies by plasmapheresis can decrease the incidence of acute antibody-mediated rejection in kidney transplant recipients.
a. True
b. False

EVALUATION OF WARFARIN-RIFAMPIN INTERACTION IN THE AMBULATORY SETTING

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Purpose: The interaction between warfarin and rifampin is well documented, but there are very few published studies or case reports that quantify the interaction with respect to international normalized ratio (INR). Induction of the cytochrome P450 enzyme and P-glycoprotein transport system are the currently accepted mechanism that explains rifampin's interaction with warfarin. Rifampin also causes some drugs to become more polar by inducing glucuronidation, leading to an increase in excretion. Studies have shown that rifampin substantially increases warfarin clearance and impairs its antithrombotic effect within 5-10 days of concurrent administration. Dose increases of 100-200% have shown to be necessary at the peak of enzyme induction. At the offset of induction, a 70% reduction in warfarin dosing has been demonstrated within 4 to 8 weeks after rifampin discontinuance. The primary objective of this study is to recognize patterns in pharmacokinetic and pharmacodynamic effects seen when introducing an interacting drug, rifampin, to a patient stabilized on warfarin. The primary outcome to be measured is the change from baseline in INR after the addition of rifampin to patients warfarin regimen.

Methods: A retrospective chart review will be performed to assess patients who concurrently received warfarin and rifampin enrolled through the VA Anticoagulation Service. Electronic medical records will be reviewed for patients who received both warfarin and rifampin during May 1, 2003 to December 31, 2008. Data collection will include: patient age, diagnosis and indication for warfarin, target International Normalized Ratio (INR), warfarin dose adjustments while on rifampin, INRs during treatment with rifampin, and INRs/warfarin dose adjustments after rifampin stopped until in the target range.

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

Learning Objectives:

To be able to describe the interaction that occurs between rifampin and warfarin.

Describe how to make dosing adjustments for warfarin patients when rifampin is initiated.

Self Assessment Questions:

How much of a change in the weekly warfarin dose would you expect to see with the addition of rifampin?
a. Increase 30-50%
b. Increase 100%
c. Decrease 25-50%
d. Decrease 60-75%

On average, when is the expected onset of rifampin-warfarin interaction seen?
a. 1-4 days
b. 5-10 days
c. 21-28 days
d. 50-56 days

INCIDENCE AND MANAGEMENT OF BEVACIZUMAB ASSOCIATED HYPERTENSION IN OUTPATIENT ONCOLOGY CLINIC

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Purpose: Bevacizumab, a vascular endothelial growth factor (VEGF) inhibitor is utilized to treat a wide range of cancers. However, clinical trials of bevacizumab reported the incidence of hypertension (HTN) up to 36%. A national guideline has not been established to manage bevacizumab-induced HTN. The incidence and management of bevacizumab associated HTN were evaluated in an outpatient oncology clinic.

Methods: A randomized, retrospective chart review of 100 patients who received at least one dose of bevacizumab from 1/1/07 to 12/31/07 was conducted. The overall incidence and management of hypertension were evaluated. Other bevacizumab associated toxicities were compared in patients with or without hypertension.

Results: The overall incidence of bevacizumab-induced HTN was 31% (95%CI: 22%-40%) with CTC (v 3.0) grade 3 HTN rate of 10%. The number of patients with a history of HTN or uncontrolled BP prior to bevacizumab therapy was significantly different across the four HTN grade groups (p= 0.0019). Out of 31 patients who had grade 1-3 HTN, 8 patients (26%) were managed by the oncologists, 8 patients (26%) by the primary care physicians, and 15 patients (48%) had no management. Bevacizumab was held in 3 patients due to high blood pressure (BP) resulting in one patient discontinuing bevacizumab therapy. The odds of other bevacizumab associated adverse events in patients with grades 1-3 HTN was 2.776 times than that of patients with grade 0 HTN (p=0.0201).

Conclusions: Bevacizumab was associated with HTN in 31% of patients. Patients with history of HTN or uncontrolled BP prior to initiating bevacizumab were at an increased risk to develop a higher grade of HTN. Management of bevacizumab-induced HTN could be improved since BP of 63% of patients with grades 2 and 3 HTN was not adequately controlled.

Learning Objectives:

Review bevacizumab and its common toxicities that may impact patients treatment of cancer.

Recall incidence and management of bevacizumab associated hypertension in an outpatient oncology clinic.

Self Assessment Questions:

What are bevacizumab associated toxicities?
a)Wound healing complications
b)Hypertension
c)Thrombosis
d)All of the Above

T/F: The possible mechanism of bevacizumab associated hypertension is less production of nitrous oxide.

IMPACT OF COMMUNITY PHARMACY-BASED MANAGEMENT OF A TARGETED DIABETIC POPULATION

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Purpose: Community pharmacists who have access to patient laboratory data, prescription records and refill histories can provide better patient specific medication therapy management that will lead to measurable improvement in key laboratory indices in patients with diabetes.

Methods: A program to manage diabetic patients in an independent pharmacy located in a non-teaching family medicine clinic was developed; 70 diabetic patients are seen in the clinic weekly. Of those, approximately 10 patients weekly utilize our study pharmacy. In the pharmacy, new prescriptions, vital signs and laboratory data [hemoglobin A1C (HgA1C), blood pressure, and low density lipoprotein (LDL), SCr] are reviewed. Interventions are based on American Diabetes Association goals for HgA1C, blood pressure, and low density lipoprotein (LDL). Additionally, each patients medication refill profile is evaluated for compliance, concurrent prescriptions and cost/formulary issues. The clinic provider is contacted with recommendations prior to filling the prescription.

Summary of Results: This program is in preliminary stages with an expected start date of February 2009.

Conclusion: This model may be adapted to other community pharmacies or ambulatory care clinic settings or applied to a variety of chronic diseases.

Learning Objectives:

State American Diabetes Association treatment goals for hemoglobin A1C, LDL and blood pressure.

Discuss the impact of community pharmacists on the management of patients with diabetes

Self Assessment Questions:

What is the ADA recommended goal for blood pressure in patients with diabetes?
A. <140/90
B. <130/80
C. <120/80

All community pharmacists should know that the first line of therapy for patients with type 2 diabetes is:
A. Metformin
B. Insulin
C. Exenatide

THE EFFECT OF ANTIMICROBIALS ON RNAIII PRODUCTION IN STAPHYLOCOCCUS AUREUS.

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Background

Staphylococcus aureus has been shown to secrete pheromone-like substances into the extracellular milieu which help govern bacterial proliferation. High concentrations of these substances induce a phenotypic change in S. aureus. This phenomenon is known as quorum sensing. RNAIII has been shown to be a quorum sensing mediator that governs production of multiple toxins in S. aureus. The regulatory system for RNAIII is very complex and a better understanding of the pathways involved may provide novel chemotherapeutic targets for S. aureus related infections.

Purpose

The purpose of this study is to characterize the effect of sub-inhibitory concentrations of clindamycin and linezolid on the production of the quorum sensing mediator RNAIII in S. aureus. We hypothesized that these agents would blunt the up-regulation of RNAIII mRNA as the bacteria reach a quorum.

Methods

Two laboratory strains of S. aureus, one methicillin sensitive (MSSA) and one methicillin resistant (MRSA), were cultured in tryptic soy broth in the presence of either linezolid or clindamycin at concentrations ranging from 0.125 to 0.5 times the minimum inhibitory concentration (MIC). Cultures were begun at 1x10^5 CFU/ml and grown over 24 hours. Samples were harvested at various timepoints, colony counts were performed, and RNA from the bacteria was isolated and quantified. Previous work in our laboratory has validated a standard protocol to quantify the production of RNAIII in relationship to a constitutively transcribed housekeeping gene, 16s RNA. The relative amounts of RNAIII and 16s RNA at each time point were determined by quantitative RT-PCR, and these results were compared to the total colony counts through the logistic and stationary phases of the bacterial growth curves. Mean ratios were compared over time and analyzed using repeated measures analysis of variance.

Results and Conclusions

Results are expected to be presented at the Great Lakes Residency Conference.

Learning Objectives:

Recogize the effect of antimicrobials on the production of RNAIII in S. aureus.

Recognize potential new antimicrobial targets which may be characterized if antibiotics selectively influence RNAIII production.

Self Assessment Questions:

Some bacteria have the ability to change their phenotype based on the size of their inoculum. T or F

RNAIII is a quorum sensing mediator in Staphylococcus aureus. T or F

THE IMPACT OF FUNCTIONAL DECLINE AND MEDICATIONS FOR TREATMENT OF DEMENTIA ON TIME TO DEATH IN DEMENTIA PATIENTS USING HOSPICE CARE.

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Purpose

To examine the relationships among functional status, medications for treatment of dementia, and time to death in hospice patients, and apply outcomes to current protocols for admission criteria and medication use in hospice settings for patients with end-stage dementia.

Methods

Scores from the Palliative Performance Scale (PPS) and Functional Assessment Staging Tool (FAST) reflect functional status and are used as criteria by hospice programs in end-stage dementia patients for admission to hospice care and recertification under the Medicare Hospice Benefit. The current accepted determinant for admission to hospice for patients with end-stage dementia is defined as a FAST score of 7 or greater. Medications for treatment of dementia (MTD) such as acetylcholinesterase inhibitors and memantine have no strong evidence in the clinical literature demonstrating benefit in end-stage dementia. Clinicians usually recommend discontinuing these medications on admission to hospice if the patient has a FAST score ≥ 7b. Analyzing the relationships of FAST and PPS scores, MTD use, and time to death will provide insight to the functional decline of dementia patients and their appropriateness for hospice care. This analysis will also provide guidance for MTD use in the hospice setting. A retrospective chart review of deceased dementia patients using home-based hospice care will provide information on: time from admission into hospice until death, demographics, PPS and FAST scores, and MTD use. The primary outcome will examine admission FAST and PPS scores for a relationship with time to death. Secondary outcomes include comparing admission FAST/PPS scores and time to death in MTD users and non-users; determining if a correlation exists between the FAST and PPS scoring tools; and patterns of functional decline as demonstrated by FAST/PPS score changes in MTD users versus non-users.

Results/Conclusion

The results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe criteria for hospice admission of end-stage dementia patients and the typical course of their functional decline.

Recognize the appropriateness of medications for treatment of dementia in the hospice setting.

Self Assessment Questions:

True or False: Medicare Beneficiaries with Alzheimers disease are eligible for hospice if they have a FAST level of greater than or equal to 6 and comorbid or secondary conditions.

True of False: Upon admission to hospice, most end-stage dementia patients are using an acetylcholinesterase inhibitor or memantine.

ASSOCIATION OF CYTOMEGALOVIRUS VIREMIA AND GRAFT-VERSUS-HOST DISEASE IN ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION

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PURPOSE: Graft-versus-Host disease (GVHD) after allogeneic hematopoietic stem cell transplantation (HSCT) has been recognized as a risk factor for cytomegalovirus (CMV) infection. However, whether or not CMV is associated with the development of GVHD has not been fully elucidated. Infectious priming of T-cell lymphocytes has been postulated as being a possible etiology of GVHD, and CMV is the most common viral infection in transplant patients, it is possible that low levels of viral replication may predispose patients to the development of GVHD. The aim of this study is to determine if CMV viremia is associated with development of GVHD.

METHODS: The study is a retrospective observational cohort study that was approved by the Institutional Review Board. Data was collected over a two-year period from 1/1/2006 - 12/31/2007. Qualitative and quantitative CMV (PCR > 600 copies/mL) results, as well as patient demographic data was collected from the medical record. The number of patients who were PCR positive and developed GVHD was compared to those patients who were PCR negative and their incidence of GVHD.

PRELIMINARY RESULTS: There were a total of 106 patients who met the inclusion criteria in 2006. Overall, 25% (26 of 106) of patients had documented CMV viremia. In patients that did not develop CMV viremia, 64% developed GVHD, whereas in patients with CMV viremia, 73% subsequently developed GVHD.

CONCLUSIONS: This project may demonstrate the significance of CMV viremia in the HSCT population. The best method of CMV prevention in these patients is controversial and has been debated in the literature. Extended risk factors associated with development of GVHD beyond donor and recipient histocompatibility have not been determined. If a correlation exists between CMV viremia and the development of GVHD, it could help clarify the best preventative measure in this population.

Learning Objectives:

Describe how infectious priming of T-cell lymphocytes could increase a HSCT patients risk for GVHD.

Explain the controversy regarding CMV prophylaxis strategies in the HSCT population.

Self Assessment Questions:

What is the most common viral infection in transplant recipients?

What is the preferred approach to CMV prevention in HSCT recipients?

THE EFFECT OF STATINS ON RENAL TRANSPLANT OUTCOMES

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Purpose:
The primary objective is to evaluate the effects of statins on graft and subject survival at 1 year. Graft and subject survival will also be assessed at 2-year, 3-year, and 5-years. Additionally, risk factors for graft loss will be determined.

Methods:
A retrospective chart review was conducted of subjects 18 years old and over who received a renal transplant between 2000 and 2006 at University of Illinois Medical Center.

Main variables collected include DOB, age/height/weight at transplant, gender, race, dates of transplant admission, number/type of transplant, cold ischemic time, delayed graft function, cross-match, ABO incompatibility, HIV/CMV/EBV/HCV/HBV, BK PCR post-transplant, number of plasmapheresis sessions pre-transplant, recent/peak PRA, and HLA match/mismatch. Pre-transplant history collected includes type/duration of dialysis pre-transplant and cause/duration of renal failure. History of smoking, diabetes, hypertension, hyperlipidemia, and cardiac/cerebrovascular/peripheral vascular disease was also collected. Subject and graft survival is ascertained by collecting: date last seen and graft function; date of graft loss or death when applicable. Donor information collected includes: age, gender, race, HIV/CMV/EBV/HCV/HBV status, and serum creatinine prior to transplant. Medication-related information collected includes induction drugs, immunosuppressants, and use of hypoglycemics, antihypertensives, non-statin anti-hyperlipidemics, and statins at discharge, annually thereafter, and at last follow up. Acute rejection information collected includes: date, treatment, biopsy result, and serum creatinine 1-month post-acute rejection. At one-year post-transplant, medical data collected includes: cardiovascular/cerebrovascular/peripheral vascular events, cancer, new onset DM, PTLD, mental illness, CMV infection, BK nephropathy, other infection, and acute pyelonephritis. Laboratory data collected includes initial and 1-year weight, blood pressure, lipid profile, and glucose. Serum creatinine and proteinuria were collected at transplant, 1-month, 6-month, 1-year, 2-year, and 3-year, and immunosuppressant levels at discharge, 6-month, and 1-year.

Subjects are grouped for statistical analysis, including regression analysis, by those who received a statin and those who did not.

Preliminary results:
Pending

Conclusion:
Pending

Learning Objectives:

Describe the proposed rationale for the use of statins in renal transplant patients.

Identify the use of statins leads to improved graft and patient survival in the renal transplant population.

Self Assessment Questions:

What are the proposed mechanisms by which statins are thought to prolong graft survival in the renal transplant recipient?

Do the results of this study support the use of statins in the renal transplant population for the purpose of prolonging graft and patient survival?

URINARY TRACT INFECTION RATES ASSOCIATED WITH REUSE OF CATHETERS IN CLEAN INTERMITTENT CATHETERIZATION OF MALE VETERANS.

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Background:
Urinary retention can arise from many different causes and has severe consequences. Clean intermittent catheterization (CIC) is an option for patients who are not able to undergo surgery or those who have failed medical management. The most common complication associated with CIC is urinary tract infection (UTI). Reuse of single-use catheters for CIC is a common practice. At the Jesse Brown VA Medical Center (JBVAMC) catheters are reused for one-week intervals. Frequency of UTI in this patient population has not yet been established.

Purpose:
To determine the frequency of UTI associated with reuse of catheters for CIC at JBVAMC.

Methods:
This study will be a retrospective electronic chart review of JBVAMC patients undergoing CIC from January 1, 2002 to December 31, 2007. Patients will be selected from a computer-generated list of patients receiving red rubber catheters. Criteria for inclusion are male veterans at JBVAMC 18 years of age and older, and use of CIC for at least 3 months. Exclusion criteria are patients taking prophylactic antibiotics, and patients who sought care for catheter management from an outside provider.

Clinician notes and medication records will be reviewed for indication for CIC, number of daily catheterizations, documentation of education regarding clean technique and patient compliance with clean technique, type of provider and rationale for antibiotic use, urinalysis (culture and sensitivity), and antibiotic prescribed and length of treatment.

The primary endpoint of this study will be to determine the frequency of UTI requiring the use of antibiotics in CIC patients at JBVAMC. Secondary endpoints will include analysis of type of provider, individual inserting catheter, indication for antibiotic use, documentation of clean technique education and compliance with clean technique, and number of daily catheterizations.

Results/Conclusion:
Data collection and analysis are ongoing.

Learning Objectives:

Review indications and complications for patients undergoing clean intermittent catheterization.

Describe factors affecting the frequency of urinary tract infection associated with clean intermittent catheterization.

Self Assessment Questions:

True or false. Studies have conclusively demonstrated increased risk of urinary tract infection in patients who reuse catheters for intermittent use.

List two factors that may increase the risk of urinary tract infections in patients who self-catheterize.

IMPROVING HEPARIN SAFETY

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Purpose: Heparin has long been considered a high alert drug and over the past several years heparin has gained further notoriety following well-publicized, fatal drug errors. After these fatal drug errors, several institutions responded by limiting types of heparin products on formulary and improving the labeling of heparin products. At Froedtert hospital, a 450 bed academic medical center, heparin continues to be one of the most frequently reported medications to our adverse drug event reporting system. Even though Froedtert has made several improvements, including the use of point of care barcode scanning and IV smart pumps to administer medications; the safe use of heparin continues to be problematic. The objective of this project is to improve heparin safety in a manner that may be transferable to other institutions.

Methods: This project will assess the current literature on heparin errors. A retrospective review and root cause analysis of heparin errors reported at Froedtert in 2008 will be performed and reviewed for trends and commonalities. Quality improvement tools such as a heparin medication use process map and a failure mode and effects analysis (FMEA) were used to identify risk points and further focus the project in terms of safety improvements necessary. Pharmacy and nursing will collaborate closely on this quality improvement project and review issues and elements including the order entry process and display on the electronic medication administration record (eMAR); eMAR documentation requirements; role of nursing flow sheets to document heparin administration; the use of worksheets to track lab values and dose adjustments; and the use of a double check for heparin administration. Progress to date will be presented.

Learning Objectives:

Explain how quality improvement tools can be used to identify causes and trends related to heparin errors.

Review the importance of working with a multidisciplinary team when working on a quality improvement project.

Self Assessment Questions:

True/False: Heparin is not a high alert medication.

True/False: A Failure Mode and Effects Analysis (FMEA) are used to identify ways a process or design can fail.

DEVELOPMENT AND IMPLEMENTATION OF AN OUTPATIENT DVT PROTOCOL

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Purpose: Each year 0.6 million venous thromboembolic events (VTE) cost the health care system approximately $1 billion. The 2008 CHEST Guidelines published by the American College of Chest Physicians state "In patients with acute DVT we recommend initial treatment with low molecular weight heparin (LMWH) subcutaneously (SC) once or twice daily, as an outpatient if possible (Grade 1C)), or as an inpatient if necessary (Grade 1A), rather than treatment with IV unfractionated heparin (UFH)." The American Association of Family Physicians state that "outpatient treatment of DVT with LMWH is safe and cost-effective for carefully selected patients and should be considered if the required support services are in place." The purpose of this study is to compare the number of hospital admissions, cost, and recurrence rate of outpatient treatment for deep vein thrombosis to the number of hospital admissions, cost, and recurrence rate of inpatient treatment for the same disease state in the previous year.

Methods: This IRB-approved case control study included patients with confirmed uncomplicated deep-vein thrombosis. The control group consisted of patients admitted to St. Ritas Medical Center with a primary diagnosis of DVT in 2008 who would have met criteria for this Outpatient DVT protocol. The experimental group consists of patients meeting criteria of the Outpatient DVT Treatment protocol. Primary outcomes include the number of primary admissions for uncomplicated DVT, recurrence rate, and cost. The secondary outcome is a bleeding event leading to an ED visit or hospital admission. Treatment protocols were created for the Emergency Department and for 23 hour observation with discharge instructions and arrangements for follow up in the Anticoagulation Clinic. All patients are seen in the clinic within 72 hours of discharge from the hospital, while continuing enoxaparin and warfarin therapy.

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

Learning Objectives:

Discuss treatment options for DVT according to the 2008 CHEST guidelines.

Discuss the risks and benefits of treating DVT in the outpatient setting.

Self Assessment Questions:

(T/F) Enoxaparin has a more predictable kinetic profile than heparin.

(T/F) All patients with a DVT should be treated in the outpatient setting.

IMPACT OF AUTOMATED DISPENSING CABINET OPTIMIZATION ON OBSOLETE INVENTORY AND LABOR EXPENSE

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Purpose:
Automated dispensing cabinets offer an excellent opportunity to closely manage inventory. Data analysis of usage reports allows pharmacy administrators to adjust inventory levels in accordance with historical trends. Intensive monitoring and adjustment of inventory quantities allows for appropriate resource allocation and a correlating reduction in obsolete inventory. Positive optimization effects on obsolete inventory reductions may be offset by negative labor impacts due to increased deliveries and stock-outs within the automated dispensing cabinets. The purpose of this project is to reduce the quantity of medications expiring in automated dispensing cabinets by using historical usage data, and to examine the impact on technician labor.

Methods:
Obsolete inventory data will be collected for a four-week pre-implementation period for 14 target medications. The following five-week implementation period will include optimization of these 14 medications with several medications targeted each week. Modifications to current inventory levels will be made based on three-month usage data. This data collected and analyzed will include a daily usage average, total usage and number of stock-outs. Maximum and minimum inventory levels will be adjusted and medications removed based on the three month usage data as necessary. Subsequently, obsolete inventory and stock-out data will be collected and analyzed on a continual basis throughout the five-week implementation period. A four week period of post-implementation data following the last round of medication changes will also be collected. Post-implementation obsolete inventory data will be compared with the four-week period prior to the first round of medication alterations. Measurement of labor impact will occur through post-implementation data analysis to examine the number of stock-outs from the automated dispensing cabinets.

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

Learning Objectives:

To describe a method of automated dispensing cabinet optimization

Review the impact of optimization on obsolete inventory levels

Self Assessment Questions:

T/F Antibiotics are a target for significant reductions in obsolete inventory.

T/F Automated dispensing cabinet optimization can lead to obsolete inventory reductions without impacting technician labor.

DESIGN AND IMPLEMENTATION OF NEONATAL INTENSIVE CARE (NICU) COMPETENCY FOR HEALTH CARE PROFESSIONALS AT A COMMUNITY BASED HOSPITAL

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Purpose: The opening of a new neonatal intensive care unit (NICU) brings to attention the notion of unfamiliarity with neonatal care. Therefore it is important to ensure the competence of health care professionals, such as pharmacists, pharmacy technicians and nursing staff. NICU training is recognized in the pharmacy department as an essential need to ensure safety and quality of care for neonates. This project is designed to build confidence in health care professionals, correct gaps in knowledge, improve communication between health care professionals, and to improve the delivery of safe, effective, and competent care in the NICU at a community hospital.
Methods: Submitted to institutional review board (IRB) and qualified for exemption. A review of existing NICU competencies and learning objectives will be completed. The need for further education will be evaluated based off of findings from the aforementioned review. Furthermore, a survey taken by pharmacists, pharmacy technicians, and nursing staff, will be used to determine specific educational needs. An educational program will be designed based upon survey results. Competencies, specific to the responsibility of each profession, will be built and knowledge will be assessed with a post-competency examination. At the conclusion of the educational period the target population will be re-evaluated with a post-educational survey to assess success and attainment of goals.
Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss and evaluate the importance of an educational program in the delivery of care in the neonatal intensive care.

Identify strategies for enhancing knowledge base and discuss pertinent issues health care professionals face when providing care for a specific patient population.

Self Assessment Questions:

Identify some factors to consider when implementing an educational program for the NICU.

Describe the correlation between an educational program for health care professionals and the effect it has on delivering safe and effective care in a community hospital.

STRATEGIES FOR TREATMENT OF PATIENTS WITH HEART FAILURE AND PRESERVED EJECTION FRACTION: NEGATIVE INOTROPES VERSUS DRUGS AFFECTING THE ANGIOTENSIN SYSTEM

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Background: Evidence-based treatment guidelines exist for the management of systolic heart failure. Although diastolic heart failure is becoming an increasingly prevalent diagnosis, there is a lack of comparative data to indicate which treatment is best for managing patients with heart failure and preserved ejection fraction.

Purpose: The primary objective of this study is to determine if medications affecting the angiotensin system (angiotensin converting enzyme inhibitors [ACEIs] or angiotensin II receptor blockers [ARBs]) or negative inotropes (beta-blockers [BBs] or calcium channel blockers [CCBs]) best prevent hospital readmission or death due to heart failure exacerbation in patients with heart failure and preserved ejection fraction. The secondary objective is to determine which therapy is superior in preventing hospital readmission or death due to other cardiovascular causes including myocardial infarction, angina, stroke, diabetic complications, revascularization procedures, and peripheral arterial disease.

Methods: A list of patients greater than 18 years of age discharged from Methodist Hospital with a diagnosis of heart failure exacerbation was generated. From the list, each randomly selected patient's medical chart was retrospectively reviewed for documentation of preserved ejection fraction and the occurrence of the primary outcome and secondary outcomes. Differences between percentages of patients reaching the primary and secondary outcomes were compared between the following groups: (1) patients receiving either ACEIs or ARBs, vs (2) patients receiving either BBs or non-dihydropyridine CCBs.

Results: To date, of the 480 charts reviewed, 86 have met inclusion criteria for analysis. Preliminary results have shown 71.2% (n=37) of patients in the ACEI or ARB-treated group reached the primary outcome versus 55.9% (n=19) of the patients in the BB or CCB-treated group.

Conclusions: Preliminary data suggests a numerical trend favoring the negative inotrope-treated group. Further data collection is ongoing to assess whether a statistically significant difference between treatment groups exists.

Learning Objectives:

Identify the prevalence of patients with heart failure and preserved ejection fraction.

State the evidence to support the use of medications affecting the angiotensin system or negative inotropes in the management of patients with heart failure and preserved ejection fraction.

Self Assessment Questions:

True or False: Angiotensin-converting enzyme inhibitors are proven to be effective in the management of patients with heart failure and preserved ejection fraction.

Describe the benefit of using negative inotropes in the management of heart failure and preserved ejection fraction.

ASSESSMENT OF VANCOMYCIN MIC AND OUTCOMES FOR MRSA PNEUMONIA

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PURPOSE:
Methicillin-resistant Staphylococcus aureus (MRSA) has become a leading cause of infection in both the community and healthcare settings. Patients with MRSA infections are at an increased risk for mortality and morbidity. Despite apparent in vitro susceptibility, eradication of MRSA infections with vancomycin may be unsuccessful. Recent literature suggests an increased incidence of treatment failure with vancomycin in MRSA bacteremia when vancomycin minimum inhibitory concentration (MIC) values are elevated (≥1.5 mcg/mL). We therefore designed this retrospective study in order to evaluate the efficacy of both vancomycin in patients with MRSA pneumonia with an increased vancomycin MIC.

METHODS:
This is a retrospective case-control study of patients with the diagnosis of pneumonia at Sinai-Grace Hospital. The study population will be identified by querying the microbiology laboratory database for all positive MRSA respiratory cultures. Patients will be included in the study if they have a positive MRSA respiratory culture and meet the Centers for Disease Control and Prevention criteria for pneumonia. Patients will then be categorized into four treatment groups based on vancomycin MIC value and antibiotic received. They are as follows: MIC ≤1mcg/mL and received vancomycin, MIC >1 mcg/mL and received vancomycin, MIC ≤1mcg/mL and received alternative therapy, MIC >1mcg/mL and received alternative therapy. The primary objective of this study is to evaluate the efficacy of vancomycin in MRSA pneumonia with an elevated vancomycin MIC. Secondary objectives include assessing the efficacy of alternative therapies in MRSA pneumonia with an elevated vancomycin MIC, identifying the risk factors associated with an elevated vancomycin MIC in MRSA pneumonia and to assess whether an elevated vancomycin MIC in MRSA pneumonia is associated with negative outcomes.

RESULTS:
This research is in the data collection phase. Final results with conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe current data regarding the efficacy of vancomycin and an elevated MIC

Discuss current antibiotic treatment indicated for MRSA pneumonia

Self Assessment Questions:

True or False: Daptomycin is an alternative to vancomycin in the treatment of MRSA pneumonia.

True or False: Methicillin-resistant Staphylococcus aureus (MRSA) is a common cause of pneumonia.

EVALUATION OF HYPOGLYCEMIA OF HOSPITALIZED MEDICINE AND SURGERY PATIENTS

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Purpose:
Hypoglycemic episodes are problematic and many episodes are preventable. Inappropriate medication prescribing, administration, and adjustment have been related to some hypoglycemic episodes. The objective of this study is to identify and evaluate risk factors of hypoglycemia and to develop and institute strategies to decrease the number of hypoglycemic episodes in hospitalized medicine and surgery patients at this institution.
Methods:
The primary endpoint of this study is identification of risk factors associated with episodes of hypoglycemia at Harper University Hospital (HUH). Any adult patient admitted to the medicine or surgery services at HUH with at least one capillary blood glucose (CBG) level less than 70 mg/dL in May 2008 will be included. Exclusion criteria include any episode in a patient less than 18 years or greater than 89 years, episodes occurring in the Intensive Care Unit, episodes that occurred prior to a patient receiving an antihyperglycemia medication, episodes occurring in a pregnant woman, or any episode occurring in a patient with a current diagnosis of diabetic ketoacidosis. Demographics, possible causes, and known risk factors will be identified for each patient for each episode using the electronic medical record as well as the paper chart. These possible causes and risk factors will include antihyperglycemia medication regimens and timing of medication administration. Management of these hypoglycemic episodes will also be assessed. Upon completion of the chart review, the data will be analyzed to identify the most common causes or related risk factors for hypoglycemic episodes as well as risk factors for repeat episodes. Risk factor specific changes will then be proposed to attempt to modify the risk factors to reduce and minimize future hypoglycemic episodes.
Results: Data collection is ongoing and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the basic physiology of glucose homeostasis.

Describe risk factors for hypoglycemia in diabetes.

Self Assessment Questions:

Normal counterregulatory mechanisms in hypoglycemia include:
a. Increased hepatic glucose production
b. Release of epinephrine
c. Eating
d. All of the above

Antihyperglycemia medications, when used appropriately, will not cause hypoglycemia.
T or F

RENAL DYSFUNCTION IS ASSOCIATED WITH REDUCED WARFARIN MAINTENANCE DOSE AND INCREASED INR INSTABILITY

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Objectives: Despite identification of clinical and genetic factors that influence response to warfarin, approximately 35-45% of inter-patient dosing variability remains unaccounted for. The appreciation that renal dysfunction (RD) also affects hepatically-cleared drugs prompted us to hypothesize that RD influences warfarin dosing; producing lower maintenance doses. Furthermore, we speculated that underlying disease processes in RD promote INR instability.

Methods: Our retrospective chart-review examined 36 matched patients at a pharmacist-managed anticoagulation clinic. To maximize our ability to detect specific RD-related influences, we matched RD patients with controls based on parameters previously established to influence warfarin dose; target INR (2-3), gender, ethnicity, age, and body surface area (BSA). We calculated average weekly dose (WD) used to maintain target INR (assessment period 158-1,281 days). To evaluate INR stability, we determined; (1) percentage of clinic visits requiring any dose adjustment, (2) percentage of visits requiring WD change, (3) days between dose adjustments, (4) days between visits, and (5) INR standard deviation (SD).

Results: Both groups were predominantly African American (94%); mean age 60 years and BSA 2.0 m2. RD patients eGFR was 4717 vs. 10313 mL/min in controls (P<0.0001). RD patients required a 22% lower WD than controls (35.52.6 vs. 45.72.7 mg; P=0.01). Furthermore, RD patients were less stable; indicated by greater proportion of visits requiring dose adjustment (46.63.3% vs. 31.73.1%; P=0.002), twice as many visits requiring WD changes (23.93.0% vs. 10.82.2%; P=0.001), and one month less between dose adjustments (41.35.0 vs. 76.39.9 days; P=0.003). RD patients required shorter between-visit times (16.90.8 vs. 19.70.8 days; P=0.017), equivalent to 3 additional visits/year. These differences were consistent with RD patients increased INR SD (0.690.05 vs. 0.550.04; P=0.03).

Conclusions: We propose that renal dysfunction contributes to previously unaccounted for warfarin dose-response variability. Moreover, INR instability requires more frequent and intensive management, increases healthcare utilization and the risk of thrombosis and bleeding.

Learning Objectives:

Identify factors that influence warfarin dosage requirements.

Describe the proposed consequences of renal dysfunction on warfarin dose-response variability.

Self Assessment Questions:

Which of the following factors contribute 55-65% of the inter-patient dosing variability with warfarin?
a.Age and Ethnicity
b.BSA
c.Genetics
d.Drug interactions and comorbidities
e.All of the above

Which of the following statements are correct with respect warfarin dosing for patients with renal dysfunction?
a.Patients require a significantly lower weekly warfarin dose.
b.Patients require a greater number of dose adjustments and dose
changes.
c.Patients require more frequent follow-up.
d.Patients exhibit INR instability.
e.All of the above are correct.

EVALUATION OF LOW DOSE RASBURICASE FOR THE TREATMENT OR PROPHYLAXIS OF HYPERURICEMIA SECONDARY TO TUMOR LYSIS SYNDROME (TLS)

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Purpose: Rasburicase is a recombinant urate oxidase enzyme generally reserved for the treatment or prevention of hyperuricemia in patients that are at high risk of developing TLS. Rush University Medical Center (RUMC) has established guidelines restricting rasburicase to a single weight based low dose of 0.05mg/kg, additional doses as needed. However, the efficacy has yet to be established for a single low weight based dose of rasburicase at our institution. The primary objective of this study is to evaluate and characterize the outcomes of patients receiving low dose rasburicase for treatment or prophylaxis of hyperuricemia secondary to TLS. Secondary outcomes will evaluate the appropriateness of therapy before and after the implementation of the RUMC formulary guidelines concerning rasburicase use.
Methods: This study will be conducted as a retrospective chart review of adult hematology/oncology patients who received at least one dose of rasburicase. RUMCs electronic medical record system with be used to identify patients who received at least one dose of rasburicase between April 2007 and September 30, 2008. Adult hematology/oncology patients included for analysis must have received a 0.05mg/kg dose of rasburicase for the treatment or prevention of TLS. The following data will be collected to evaluate the primary and secondary outcome measures: patient age, gender, height, weight, past medical history, use of concomitant nephrotoxic medications, type of malignancy, use of additional supportive care, timing of therapy, need for additional doses, dose received, requirement for hemodialysis. In addition pertinent laboratory data will also be evaluated including: serum creatinine, uric acid, lactate dehydrogenase, white blood cell count, blast count, potassium, phosphate, calcium will be collected at baseline, 24, 48, and 72 hours post administration of rasburicase.
Results: Results and conclusions are pending and will be presented at the Great lakes Pharmacy Residency Conference

Learning Objectives:

Identify the risk factors for and consequences of tumor lysis syndrome (TLS)

State the mechanism of action of rasburicase and settings in which its use would be appropriate

Self Assessment Questions:

All of the following laboratory values are increased in tumor lysis syndrome (TLS) EXCEPT:
a.Calcium
b.Phosphate
c.Potassium
d.Uric Acid

A newly diagnosed acute lymphocytic leukemia patient with end stage renal disease is to start Hyper-CVAD today, your team asks you if rasburicase should be given prior to receiving chemotherapy. Baseline labs include: WBC: 258.49, Blasts: 78%, LDH: 8674, Uric Acid: 6.9, Potassium: 5.2, Phosphate: 2.7, Calcium: 10, Creatinine: 8.9. What are the patients risk factors of TLS? What is your response to the team?

CLINICAL WORK FLOW IN THE TRAUMA AND EMERGENCY CENTER BEFORE AND AFTER IMPLEMENTATION OF PHARMACY SERVICES

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Purpose:

The purpose of conducting this work flow study is to help guide the design of pharmacy services in the Gundersen Lutheran Medical Center Trauma and Emergency Center (TEC) by identifying areas where pharmacist interventions will improve work flow and increase patient safety.

Methods:

A survey was administered to TEC physicians and nurses soliciting the opinions of potential roles a pharmacist can offer in the TEC. After administration of the survey, individual nurses and physicians will be shadowed during the course of a patients admission to the TEC. We will observe and analyze the different steps involved in patient care, the time it takes to complete these steps, and the number of times a task has to be repeated because of interruptions or errors. Specifically, we will identify areas and procedures where pharmacist interventions may be able to improve work flow and increase patient safety. These observations will help define the initial role and scope of responsibilities that a pharmacist will assume. After a pharmacist begins staffing in the TEC, a second round of observations will occur looking at the same measurements. A post-survey will also be administered reevaluating the opinions of the role of a pharmacist. We will compare these measurements before and after the implementation of pharmacy services.

Preliminary Results:

Thirty-three percent (33%) of initial surveys were returned. Some of the main responsibilities expected of a pharmacist include answering drug information questions, preparing drips and medications, addressing problems with automated-drug dispensing technology and taking medication histories. TEC staff would prefer to have pharmacy services available directly, face-to-face in the TEC and during the hours of 1200-2000. Observation of work flow is currently in progress.

Conclusion:

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

Learning Objectives:

Describe different responsibilities a pharmacist can hold in the setting of a Trauma and Emergency Center (TEC).

Explain potential benefits of having pharmacy services available in the TEC.

Self Assessment Questions:

According to the results from the initial survey, what is a primary responsibility that TEC personnel view pharmacists taking an active role in fulfilling?
a)Assist in codes activations
b)Developing protocols
c)Answering drug information questions
d)TEC staff education

True or False: Previous studies have shown that employing a pharmacist in the emergency room setting results in a decrease in medication related errors.

EVALUATION OF BLOOD PRESSURE IN HYPERTENSIVE PATIENTS FOLLOWING FORMULARY CONVERSION IN ANGIOTENSIN RECEPTOR BLOCKER

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Purpose: In June 2005, the VA formulary Angiotensin II receptor blocker (ARB) changed from candesartan to losartan or valsartan. Patients with heart failure were converted to valsartan, and patients with other indications including hypertension, renal insufficiency, and diabetes mellitus were converted to losartan. A dosing chart was utilized to convert patients from candesartan to an approximate dose of losartan or valsartan. It was recommended patients be followed up by providers after the conversion. The purpose of this study is to determine if blood pressure was maintained in hypertensive patients when converted from candesartan to losartan.

Methods: This is a retrospective chart review evaluating patients requiring therapy with candesartan and losartan between July 1, 2004 and June 30, 2006 at Edward Hines, Jr. VA Hospital. The inclusion criteria include men and women age 18 years or older, diagnosis of hypertension, at least 2 most recent blood pressure readings at separate visits while on candesartan 6 months prior to and 6 months after the conversion while on losartan. The exclusion criteria include enrollment in a pain clinic or receiving treatment for chronic pain, renal artery occlusion, secondary causes of hypertension, pheochromocytoma, uncontrolled thyroid function, those switched to an angiotensin II converting enzyme (ACE) inhibitor prior to or following conversion. Subjects will be evaluated for the following: demographics, minimum of 2 most recent blood pressure readings 6 months before the conversion, minimum of 2 most recent blood pressure readings 6 months after the conversion, serum creatinine, serum potassium, adverse effects to ARB, changes in ARB dosing following the conversion, and changes in other medications for hypertension 6 months prior to and 6 months following the conversion.

Results: Data collection is currently in process. The results and conclusions of this study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the role of angiotensin II receptor blockers in the treatment of hypertension.

Describe approximate dosing conversion between angiotensin II receptor blockers and emphasize the necessity of patient monitoring.

Self Assessment Questions:

Which of the following is not a complication of untreated or inadequately treated hypertension?
a. Myocardial infarction
b. Heart failure
c. Neuropathy
d. Stroke

True or False: Previous studies have shown a difference in blood pressure readings following conversion from one angiotensin II receptor blocker to the "approximate" dose of another angiotensin II receptor blocker.

EVALUATION OF FLUOROQUINOLONE PROPHYLAXIS IN ADULT ACUTE MYELOID LEUKEMIA (AML) PATIENTS UNDERGOING CONSOLIDATION CHEMOTHERAPY

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Purpose:
Patients who receive myelosuppressive chemotherapy are at high risk for neutropenic fever, which requires hospitalization and intravenous antibiotics. Current literature and recommendations on bacterial prophylaxis in this patient population are conflicting. The hematology/oncology physicians at the Cleveland Clinic have been prescribing bacterial prophylaxis to acute myeloid leukemia patients in consolidation phase treatment for approximately three years. This study has been designed to evaluate rates of hospital admissions due to neutropenic fever before and after the initiation of bacterial prophylaxis with fluoroquinolones at the Cleveland Clinic.

Methods:
This study will be conducted by a non-interventional, retrospective chart review using the electronic medical record. Patients will be included if they meet the following criteria: a diagnosis of AML between 1/1998-12/2008, age ≥ 18, complete remission after induction chemotherapy, received HIDAC (Days 1,3,5) chemotherapy regimen for consolidation phase treatment. Patients will be excluded if they were not discharged from the hospital after consolidation chemotherapy or if they are receiving antibacterial prophylaxis with any antibiotic other than a fluoroquinolone. The following data will be collected from the patients medical record: age, gender, diagnosis, previous chemotherapy, receiving prophylaxis, drug used for prophylaxis, dose and frequency of drug used, allergy to fluoroquinolone, readmission during neutropenia with Tmax > 38 C, day of cycle patient readmitted, absolute neutrophil count (ANC) (from admission to discharge), hospital length of stay, adverse reactions to prophylaxis, indwelling central line, and colony stimulating factor administration. Study data will be entered into a Microsoft Access database and analyzed with descriptive statistics for the primary and secondary outcomes.

Learning Objectives:

Describe the treatment phases of adult acute myeloid leukemia (AML).

Discuss the rationale of prophylactic antibiotics in neutropenic patients.

Self Assessment Questions:

How long is the expected duration of neutropenia following consolidation chemotherapy with high dose cytarabine (HIDAC)?
a.7-14 days
b.14-21 days
c.21-28 days
d.28-35 days

(T or F) The NCCN (National Comprehensive Cancer Network) guidelines advise the consideration of fluoroquinolone prophylaxis in patients with an expected duration of neutropenia (ANC < 1,000 mm3) greater than 7 days.

THE ROLE OF A CLINICAL PHARMACIST IN THE 23-HOUR CLINICAL DECISION UNIT

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Purpose:
The role of a clinical pharmacist has been well established in the inpatient and outpatient settings. The American Society of Health System Pharmacists (ASHP) recently published recommendations defining the role of a pharmacist in the emergency department (ED) setting. However, there is currently no literature defining the role of a clinical pharmacist in the 23-hour clinical decision unit (CDU). This is a unique environment where many different disciplines admit and patients wait for testing or observation. At Henry Ford Hospital (HFH) medication orders are entered and processed by the ED pharmacists. It is at this point in the medication process, that drug related problems are identified and pharmacy interventions are made. These interventions may be made based on limited patient data. Patients in the CDU have the potential to have many medications started or changed and therefore thorough chart review may identify clinical pharmacy interventions to improve medication use and enhance patient education. The primary outcomes include the number and types of interventions and teaching opportunities made by a clinical pharmacist, and the number of drug related questions for pharmacists in the CDU.

Methods:
This was a prospective single-center descriptive analysis. Between the months of December 2008 and January 2009, patients who were over the age of 18 and admitted to the CDU at HFH were eligible to be included in this study. A clinical pharmacist randomly reviewed medication profiles and patient specific data of all included patients. Department of pharmacy clinical practice standards, drug use guidelines, along with national guidelines and evidence-based medicine were used to support all interventions in optimizing patients drug therapy. The pharmacist also identified opportunities to provide education to patients, physicians, and nurses regarding drug therapy.

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

Learning Objectives:

Identify the types of interventions to be made in a 23-hour clinical decision unit of the emergency department.

Identify education opportunities for patients admitted to a 23-hour clinical decision unit of the emergency department.

Self Assessment Questions:

True or False:
The American Society of Health System Pharmacists (ASHP) has recently defined the role of a pharmacist in the emergency department.

True or False:
There may be opportunities for a clinical pharmacist to improve the use of medications in a 23-hour clinical decision unit.

THE IMPACT OF GLUCOSE CONTROL IN NON-INTENSIVE CARE HOSPITALZED PATIENTS

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Background:
A rapidly growing body of evidence supports targeted glucose control in the hospital intensive care unit (ICU) setting with potential for improving mortality, morbidity, and health care economic outcomes. Glucose goals are not aggressively sought in a non-ICU hospital setting due to the risk of hypoglycemia. As glucose control can impact clinically meaningful outcomes in the ICU setting, an examination of the non-ICU setting is warranted.

Methods:
This is a retrospective chart-review of patients admitted to the general medicine service at Hines VA Hospital between 07/01/08 and 09/30/08. A list of veteran patients admitted to general medicine floors was generated and evaluated to determine inclusion in this study. Patient charts were randomly selected using computer generated numbers and accessed via the computerized patient record system (CPRS). Two groups of patients were compared: those with controlled glucose (concentrations >180 mg/dl <10% of the time) and those with uncontrolled glucose (concentrations >180 mg/dl >50% of the time). Patients were included if glucose concentrations were recorded during hospital stay (at least twice per day). Patients were excluded if blood glucose concentrations were >180 mg/dl 10-50% of the time.
Baseline characteristics between groups were assessed. Demographic information collected for each patient includes age, gender, race, admission to general medicine unit from the ICU, and body mass index. Only capillary glucose values were used to evaluate glycemic outcomes. The primary outcome of interest was the hospital length of stay for each patient included. Secondary outcomes of interest included mortality data, transfer to ICU, rates of infections, and occurrence of myocardial infarction.

Results:
Data collection is in process. The results from the study will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

recognize the growing body of evidence supporting targeted glucose control in the hospital ICU setting with the potential for improving outcomes.

Evaluate the impact of glucose control on clinically meaningful outcomes in non-ICU hospitalized patients.

Self Assessment Questions:

T or F: Tight glucose control can lead to improved outcomes in hospitalized ICU patients including increased length of hospital stay.

T or F: The risk of hypoglycemia is a commonly cited reason that prevents healthcare professionals from targeting tight glucose control in non-ICU hospitalized patients.

IMPACT OF PHARMACIST-BASED DISCHARGE MEDICATION COUNSELING

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Background: Nearly 30% of hospital admissions are due to drug-related morbidity, and approximately half of these could be prevented with improved patient education.1,2 Patient education prior to discharge improved medication knowledge, increased compliance, decreased hospital readmissions, and decreased unplanned doctor visits.3,4 Pharmacist-led education improved drug regimens, increased patient knowledge, and improved medication compliance.5 The effect of pharmacist-based education on the rate of hospital readmission has not been elucidated. We hypothesize that a pharmacist-based discharge medication counseling program will decrease 30-day hospital readmission rates by 10%.

Purpose: To assess if a pharmacist-based discharge medication counseling program affects 30-day hospital readmission rates. Medication knowledge and patient satisfaction scores are being assessed as secondary endpoints.

Methodology: This is a single center, prospective, randomized, un-blinded study designed to assess the effects of pharmacist-based discharge medication counseling on hospital readmission rate. The primary endpoint is to demonstrate a 10% change in readmission rate. The control group will receive nurse-based discharge counseling. The study group will be educated by a pharmacist regarding their medications and disease states upon discharge. Readmission rate will be determined using the My Practice/EPIC computer system. Secondary endpoints, including medication knowledge and patient satisfaction, will be assessed during a 30-day follow-up phone call using standard questionnaires. The primary endpoint will be analyzed by Chi square and relative risk calculations. Secondary endpoints and baseline demographics will be analyzed using Wilcoxon rank sum, Chi square, and t-tests.

Results and conclusions: Data collection is currently in progress. Results and conclusions will be reported at the Great Lakes Pharmacy Resident Conference after all data is collected and statistical analysis is finished. A plan for initiation of a pharmacist-based discharge counseling program may be constructed based on the results of this study.

Learning Objectives:

Describe the potential impact of pharmacist discharge medication counseling on hospital readmission rates, patient satisfaction, and medication knowledge scores.

Review the relationship between patient medication education and drug-related morbidity.

Self Assessment Questions:

Pharmacist based discharge medication counseling has been shown to improve patient medication knowledge scores. True or False

What percentage of hospitalizations due to drug-related morbidity could be prevented with comprehensive and appropriate patient education?

EVALUATING THE IMPACT OF A VALUE-BASED INSURANCE DESIGN (VBID) ON MEDICATION ADHERENCE AND GLYCEMIC CONTROL IN A DIABETIC POPULATION

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Purpose: Humana offers a VBID that provides decreased member cost share for diabetes medications. The purpose of this study is to evaluate the impact of VBID on medication adherence and glycemic control for diabetic members.

Methods: A retrospective pre/post study design will be used. Claims data was extracted for an administrative services only group that implemented a VBID. A control group was identified using an employer with a standard 3-tier benefit, from the same region, and with similar member numbers to minimize confounding variables. Members were included if they meet the following criteria during the study period of 1/1/2008 to 12/31/2008: continuously enrolled, between 18-95 years of age, at least 2 fills for an oral diabetic medication; a baseline and follow-up HbA1c. Two key outcomes were measured; diabetic medication adherence and hemoglobin A1c levels. Adherence was calculated using Proportion of Days Covered (PDC). PDC was defined as: (Total days supply/Total number of days evaluated) X 100 (capped at 1.0). The HbA1c and PDC for the VBID group were compared to the control group to determine if adherence and/or diabetic control changed as a result of VBID. Two multivariate analysis of variance models were constructed to compare the two groups on the change scores of each outcome. All analyses were conducted using SAS Enterprise Guide v2.0.

Results: With the introduction of the VBID, an increase in medication adherence and glycemic control is anticipated.

Conclusions: Lowering member cost share through implementation of a VBID has potential to improve adherence, thereby decreasing overall health care costs.

Learning Objectives:

Describe the potential benefits associated with a Value Based Insurance Design.

List the methods for measuring medication adherence.

Self Assessment Questions:

Are there correlations between improved medication adherence and Value Based Insurance Designs.

What are the pro's and con's of using the proportion of days covered (PDC) method of measuring medication adherence.

EVALUATING PRESCRIBING OF ACID SUPPRESSION THERAPY: A PHARMACIST DRIVEN APPROACH

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Purpose:
Stress ulcer prophylaxis (SUP) benefits ICU patients; however this benefit is often extrapolated in clinical practice to all hospitalized patients despite studies failing to show improved outcomes. Acid suppression therapy (AST), generally used for SUP, may therefore be used unnecessarily. The objective of this study is to assess improvement in AST utilization practices following baseline survey and follow up physician education to modify prescribing habits.
Methods:
The Institutional Review Committee approved a three phase study designed to 1) survey baseline AST prescribing patterns, 2) intervene with prescribers to educate on appropriate AST indications, and 3) survey prescribing patterns after the interventions. Patients over 18 receiving scheduled proton pump inhibitor (PPI) or histamine receptor antagonist (H2RA) therapy between January and June 2008 will be eligible for inclusion for the prescribing pattern surveys (phases one and three). Patients taking PPI or H2RA therapy as a home medication and those with incomplete medical records will be excluded. Patients will be assessed for appropriate indications for AST according to ICD-9 codes or laboratory results indicating presence of gastrointestinal bleeding, peptic ulcer disease (active or within the previous 3 months), gastroesophageal reflux disease, mechanical ventilation, or coagulopathy. The following will be collected and evaluated: medication usage, AST indication, admit diagnosis and secondary diagnoses, complete blood count, diet, blood product administration, and occult blood stool results. The intervention (phase two) will consist of prescriber education in addition to review and revisions of standard admission order sets. All data will be maintained in compliance with HIPAA requirements for maintaining confidentiality. The impact on AST prescribing patterns and patient outcomes will be evaluated and reported.
Results and Conclusions:
This project is in the data collection phase. The results and conclusions will be presented and discussed at the conference.

Learning Objectives:

Discuss the recommendations for stress ulcer prophylaxis for the inpatient population.

List risk factors for gastrointestinal ulceration in hospitalized patients.

Self Assessment Questions:

T or F: Published guidelines recommend all hospitalized patients receive stress ulcer prophylaxis.

Use of acid suppression therapy has been shown to increase the risk of which of the following disease states:
a.Pneumonia
b.Osteoporosis
c.Clostridium difficile colitis
d.All of the above

PERCEPTION OF PLAGIARISM AMONG PHARMACY STUDENTS AND FACULTY

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Background: Academic dishonesty has been described in multiple fields of health professional education and has been proposed to lead to unethical behavior among practicing professionals. Although plagiarism is a component of academic dishonesty, few studies specifically address the prevalence of this activity among health professions students and specifically among pharmacy students. A recent study performed by Rabi and colleagues evaluated cheating behaviors among pharmacy students and showed that nearly 50% of pharmacy students either copied from or knew a classmate who copied from a reference or the Internet without citing. While directly copying text from a source without appropriate referencing may be the most blatant form of plagiarism, other, less obvious forms remain to be assessed.

Purpose: The purpose of this study is to determine if pharmacy students and faculty are able to identify instances of plagiarism and to determine the perceived severity of instances of plagiarism.

Methods: A random sample of pharmacy students and pharmacy faculty will be presented with samples of original written information contained in published articles and written samples that restate the original text in various ways. Participants will be asked to identify which, if any, of the restatements constitute an instance of plagiarism. For cases in which a respondent identifies plagiarism, information about the perceived severity of the offense will be collected. Demographic information will also be collected to identify educational background and the placement of education about plagiarism in respondents pharmacy curricula.

Results and Conclusions: Results of this survey will be used to identify methods to improve pharmacy student understanding of plagiarism. Information is pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the current literature available about academic dishonesty and plagiarism among health professions students.

Describe the possible ramifications plagiarism among pharmacy students.

Self Assessment Questions:

True or false: Cheating behaviors among pharmacy students have been previously evaluated.

Plagiarism among pharmacy students may have ramifications that reach into professional practice.

SUSCEPTIBILITY OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS ISOLATED FROM TOPICAL AND INTRANASAL SOURCES TO MUPIROCIN AND RETAPAMULIN

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Purpose:
The primary goal of this study was to establish the rate of mupirocin and retapamulin susceptibility against isolates of MRSA at BMC. The secondary goal was to identify if there is a significant difference in susceptibility rates between mupirocin and retapamulin. The final goal was to identify if there is a difference in the susceptibility rates between nasal colonization MRSA isolates and isolates from infective sources.

Methods:
All primary isolates at BMC of methicillin resistant Staphylococcus aureus recovered from nasal screening swabs and topical sites, such as wounds and surgical incision sites, between November 2008 and February 2009 were analyzed. Eligible isolates were plated on Mueller-Hinton agar along with a 5 mcg mupirocin and 2 mcg retapamulin disk. Plates were then be incubated at 35 ˚C in ambient air for 18 hours. The diameter of the zone of complete inhibition was determined by employing methods recommended by the CLSI. The diameter of the zone of inhibition, including the diameter of the disk, was determined. Results of disk diffusion susceptibility tests were interpreted using recommendations from the manufacturer of the mupirocin and retapamulin disks.

Results:
Ninety-two topical isolates were included in the study. No nasal screening swab isolates were available for analysis. Ninety-one isolates (98.9%) were susceptible to retapamulin. Eighty-eight isolates (95.7%) were susceptible to mupirocin.

Conclusions:
Methicillin-resistant Staphylococcus aureus isolates from topical sites at Borgess Medical Center are susceptible to mupirocin and retapamulin at a rate comparable to nationally reported values. Clinically, there is not a significant difference between mupirocin and retapamulin susceptibility among MRSA topical isolates. Due to a lack of data, no conclusions can be drawn about the difference in susceptibility rates between nasal colonization MRSA isolates and isolates from infective sources.

Learning Objectives:

State the rate of mupirocin resistance among methicillin-resistant Staphylococcus aureus isolates in the United States.

List the FDA approved indication(s) for mupirocin and retapamulin.

Self Assessment Questions:

T or F: Nationally, the resistance rate of MRSA to mupirocin is approximately 90%.

T or F: Retapamulin is approved for intranasal decolonization of methicillin-resistant Staphylococcus aureus.

EVALUATION OF THE EFFECTIVENESS OF CURRENT PHARMACY TO DOSE INSULIN IN THE COMMUNITY HOSPITAL SETTING

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Purpose: To evaluate the effectiveness of current pharmacy to dose protocols vs. non-pharmacy to dose patients on insulin therapy in the community hospital setting.

Methods:This study will be a retrospective chart review to assess the efficacy of inpatient glucose management. The main goal of the chart review is to analyze the effectiveness of our current glucose management with pharmacy to dose insulin therapy versus non-pharmacy to dose patients on insulin therapy.
Data to be collected and reviewed will include basic patient demographics such as age, gender, renal function, blood glucose concentrations of both pharmacy to dose insulin patients and non-pharmacy to dose patients on insulin therapy, start times of pharmacy to dose orders, hemoglobin A1C(if available), length of stay, and whether patients received: steroids, insulin drips, cyclosporine, tacrolimus, and octreotide. The study period will begin in September 2008 and will continue chronologically until the end of December 2008 or until adequate data has been collected to perform the analysis. The data will include all inpatients. The experimental group will be the pharmacy to dose patients and the comparison group is designated as non-pharmacy to dose patients on insulin therapy.
Data collection will be conducted by the pharmacy department and will take into account the following inclusion and exclusion criteria. Inclusion criteria: patients with blood glucose concentrations >180 mg/dL, pharmacy to dose insulin patients who received insulin, non-pharmacy to dose patients who received insulin. Exclusion criteria: patients receiving intravenous insulin drips, cyclosporine, tacrolimus, octreotide, continuous ambulatory peritoneal dialysis (CAPD), and pharmacy to dose insulin patients who did not receive any insulin.
There are no possible patient risks directly due to this study as this is a chart review which will occur after an inpatient stay has been completed.

Results and Conclusions: Data collection currently in progress. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe the components of a pharmacist-managed insulin service.

Identify the obstacles involved in implementing a pharmacist managed inpatient insulin dosing protocol.

Self Assessment Questions:

The American Academy of Clinical Endocrinologists (AACE) Position Statement on inpatient diabetes and hyperglycemia recommend the development of an inpatient management program which include multiple strategies for glucose management. Some of these strategies include:
a. The review of existing methods of glycemic control
b. The formation of a team focused on glycemic control
c. Standardization of protocols
d. Patient and staff education
e. All of the above

True or False. Centers for Medicare and Medicaid services (CMS) have added Manifestations of Poor Glycemic Control to the list of Never Events effective October 1, 2008.

EVALUATION OF ATRIAL ARRHYTHMIAS FOLLOWING NON-CARDIAC THORACIC SURGERY.

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PURPOSE: Atrial arrhythmias (AA) occur frequently after non-cardiac thoracic surgery (NCTS) and may be associated with increased morbidity, mortality, length of stay (LOS), and health care resources utilization. The true incidence and outcomes of AA following NCTS are unknown. Current practice at the University of Kentucky (UK) does not include routine prophylaxis for thoracic surgery patients, thus an evaluation of postoperative AA in patients undergoing a thoracotomy was studied to determine if pharmacotherapeutic intervention is necessary.

METHODS: A retrospective analysis was conducted using the University HealthSystem Consortium (UHC) Clinical Database to identify adult patients who underwent a thoracotomy for excision or diagnosis of lung cancer at UK from January 2001 to June 2008. Patient age, overall mortality, ICU LOS, total LOS, and health care expenditures were analyzed.

RESULTS: Of 820 patients identified, 112 (14%) developed an AA. The average patient age in the AA group was 66.6 +/- 8.14 years compared to 58.3 +/- 14.0 years in the non-AA group ($p < 0.001$). Overall mortality was 7.14% in the AA group and 3.11% in the non-AA group (RR 2.30; 95% CI, 1.060-4.908; $p = 0.035$). Median ICU LOS and total LOS was 4.0 and 7.0 days, respectively, in the AA group and 3.0 and 5.0 days, respectively, in the non-AA group (ICU LOS $p < 0.003$ and total LOS $p<0.001$). Median charge associated with postoperative AA was approximately $37,000 compared to $28,000 in the non-AA group ($p < 0.001$). APACHE II score data collection and analysis is ongoing and expected to be completed by February 2009.

CONCLUSIONS: Preliminary results indicate the development of an atrial arrhythmia following thoracotomy for excision or diagnosis of lung cancer is associated with increased mortality, ICU LOS, total LOS, and health care expenditures. Optimal prophylaxis/treatment strategies for atrial arrhythmias following NCTS remain unknown.

Learning Objectives:

Recognize the morbidity and mortality associated with the development of an atrial arrhythmia following non-cardiac thoracic surgery

Identify the use of perioperative pharmacotherapeutic intervention for the prevention of atrial arrhythmias following non-cardiac thoracic surgery

Self Assessment Questions:

Optimal prophylaxis and treatment strategies for atrial arrhythmias following noncardiac surgery have been identified. T/F

The development of an atrial arrthymias following non-cardiac thoracic surgery is associated with increased mortality, LOS, and health care expenditures. T/F

DIFFERENCES IN CLINICAL OUTCOMES BETWEEN YOUNG AND OLD ELDERLY PATIENTS TAKING WARFARIN

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Purpose:
Several studies have examined the use of warfarin in the elderly; however, they primarily focused on patients with atrial fibrillation and the incidence of bleeding or thrombotic complications, or factors affecting the risk of bleeding. The primary aim of this study is to determine if there is a difference between young and old elderly patients taking warfarin in regard to time-in-therapeutic range (TTR) and the incidence of bleeding and thrombotic complications. Additional aims are to determine if any other factors influence these clinical outcomes.

Methods:
Patients who are at least 65 years old, have been taking warfarin for at least six months, and are seen at one of the participating anticoagulation clinics are eligible for inclusion. During clinic visits, patients will complete the Mini-Cog and answer questions about medication adherence, presence of help with medications, and if bleeding or thrombotic complications have occurred during the past year. Patients clinic records will also be reviewed for information including race, gender, international normalized ratio (INR) values and warfarin doses during the past year, bleeding and thrombotic complications during the past year, and number of chronic medications and conditions. Patients will be divided into three age groups for statistical analysis: 65-74 years old, 75-84 years old, and at least 85 years old. Multiple linear regression will be utilized to determine an association between TTR, age, and other predefined factors. Logistic regression will be used to determine an association between the incidence of bleeding or thrombotic complications and age or other measured factors.

Results and Conclusions:
To be discussed upon completion of data collection.

Learning Objectives:

Identify factors associated with an increased risk of bleeding complications in elderly patients taking warfarin.

Discuss the affect of age on clinical outcomes in elderly patients taking warfarin.

Self Assessment Questions:

In previous literature, which of the following traits was found to be associated with an increased risk of bleeding complications in elderly patients taking warfarin?

a. History of falls
b. Male gender
c. History of TIA or stroke
d. Physical impairment

True or False: Advanced age is associated with an increased risk of bleeding, regardless of whether or not the patient is taking warfarin.

COMPARISION OF INTRAMUSCULAR ANTIPSYCHOTIC MEDICATION: IMPACT ON LENGTH OF STAY, TOTAL UTILIZATION, AND COST

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Background: For non-cooperative patients, treatment with a short-acting intramuscular (SAIM) antipsychotic may be utilized for rapid stabilization of acute agitation. Currently there is a lack of data that directly addresses the impact of acute agitation stabilization on length of stay. Retrospective studies have made general assessments about length of stay in patients receiving SAIM antipsychotics without differentiating between specific agents. In one study, early use of SAIM antipsychotics led to a more rapid stabilization of acute symptoms, reduced hospital resource utilization, and decreased length of stay. In another study, a greater average length of stay was observed in hospitalized patients with schizophrenia or schizoaffective disorder initially treated with SAIM antipsychotics.

Purpose: To determine if there is an association between specific SAIM antipsychotics used for acute agitation and length of stay.

Methodology: This study is a retrospective chart review. Patients with a diagnosis of schizophrenia and schizoaffective disorder admitted to psychiatric units between January 1, 2006 and December 31, 2007 at Akron General Medical Center who were billed for at least one dose of a SAIM antipsychotic were evaluated. Patients were placed in one of four groups based on initial SAIM antipsychotic received. Patient demographic information including age, weight, and sex were collected. Also, select co-morbidities, schizophrenia subtype, admitting Global Assessment of Functioning score, adjunct psychiatric medications, admission source, and disposition were collected. Each patient meeting inclusion/exclusion criteria were assessed for total length of stay and SAIM antipsychotic length of stay. Mean length of stay and SAIM length of stay between the haloperidol group versus other SAIM antipsychotic groups were analyzed with a 2 sample t-test. Average length of stay, SAIM length of stay across all groups, drug utilization, and cost were analyzed with descriptive statistics.

Results and Conclusions: To be presented at conference.

Learning Objectives:

Identify the association between different SAIM antipsychotics and length of stay.

Identify cost differences between different SAIM antipsychotics for use in acute agitation.

Self Assessment Questions:

T/F: Second generation antipsychotics are associated with a lower incidence of extrapyramidal symptoms compared to first generation antipsychotics?

T/F: Olanzapine is associated with greater sedation than aripiprazole?

USING LEAN CONCEPTS TO REDUCE RETURNED/WASTED INTRAVENOUS MEDICATIONS

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Statement of purpose: To reduce the returned/wasted intravenous medications using lean concepts. Lean is a theory of product manufacturing that specifically targets non-value-added activities for elimination. Examining the production process of intravenous medications and eliminating non-value-added activities should increase efficiency and reduce waste. Determine if batching intravenous medication more frequently results in fewer returned/wasted products. Adjusting the time of batches to more directly coincide with physician rounding and medication order changes should reduce the number of discontinued medications prepared. It remains to be seen the impact lean concepts can have on waste and efficiency in the preparation of intravenous medications.

Statement of methods: The Pharmacy Department in conjunction with Business Process Improvement examined the current process of preparing intravenous medications. Currently two 12 hour batches are run, one at 6am and one at 6pm. Approximately 30% of intravenous (IV) medications prepared are returned and must be wasted. This data collection will be completed again after the hospital is fully integrated with a new electronic medical record to establish a new baseline. Workgroups of technicians and pharmacists were established to gather suggestions for process improvement and achieve buy-in. To determine ideal time and frequency of batches, optimization models were completed. The optimization models used parameters of average batch preparation time, average hourly wage, number of doses, and delivery time to determine ideal batch scenarios. These ideal scenarios will be adjusted based on pharmacy staff availability and nursing workflow. After implementing lean concepts, optimal batch times and frequencies, returned/wasted IV medications will be measured and compared to baseline.

Conclusions: Many pharmacies use 12 hour batches to prepare IV medications. Applying lean concepts to IV medication preparation is an opportunity to effectively deliver medications at a reduced cost.

Learning Objectives:

Explain the process of value stream mapping and how it can help identify non-value-added activities.

Identify lean concepts that can be applied to pharmacy operations.

Self Assessment Questions:

True or False: Value stream maps help visualize the process and identify non-value-added activities.

True or False: Lean manufacturing concepts can be applied to pharmacy operations.

IMPLEMENTATION AND EVALUATION OF A COMMUNITY PHARMACY-BASED ADULT IMMUNIZATION PROGRAM

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PURPOSE:
In the United States, approximately 42,000 adults die annually of complications from vaccine-preventable diseases such as influenza, pneumococcal infections and hepatitis B. Healthy People 2010 targeted an immunization rate of 90% for most vaccines. According to the most recent Behavior Risk Factor Surveillance System Survey, the 2007 vaccination rates for influenza and pneumococcus among those over the age 65 were 72% and 67%, respectively. This gap in care provides community pharmacists a unique opportunity to assist in disease prevention efforts. The primary objective of this project is to increase adult vaccination rates through a community pharmacy-based immunization program. The secondary objective is to measure program satisfaction and acceptance by patients, physicians, and pharmacists.

METHODS:
Following the development of an adult vaccine protocol, a pilot immunization clinic will be introduced at seven Meijer pharmacy locations in Lansing, Michigan, between February and March 2009. Five separate populations will be surveyed to evaluate the acceptance of a community pharmacy-based immunization program. Beginning February 1, 2009, a base-line survey will be randomly distributed to patients who visit the pharmacy but do not receive an immunization. The second survey, assessing program satisfaction, will be administered to patients after vaccine administration. The third survey will be mailed to General Practice physicians in the Lansing area to gather general perceptions of the immunization program. The fourth survey will be sent to participating patients physicians to determine acceptance and gather feedback. A final survey will be completed by participating pharmacists at the end of the pilot clinic.

The number of vaccines administered by immunization-certified pharmacists will be compared to Meijer baseline data. Survey results will be analyzed to assess the level of acceptance of a community pharmacy-based immunization program.

RESULTS:
Research in progress.

Learning Objectives:

Describe the role of the community pharmacist in improving access to immunizations

Identify the factors that influence patients to utilize a community pharmacy-based immunization program

Self Assessment Questions:

True or False: Community pharmacists can only promote immunizations by administering vaccines.

What is/are factor(s) that can influence a patient to receive vaccines in a community pharmacy?
a.Out-of-pocket cost
b.Hours of operation
c.Average wait time
d.Type of vaccines provided
e.All of the above

IMPACT OF METFORMIN ON SERUM B12 LEVELS

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IMPACT OF METFORMIN ON SERUM B12 LEVELS

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Purpose:
Several case reports and one retrospective chart review can be found in the literature linking serum vitamin B-12 deficiency to metformin therapy. However, no prospective studies have ever been preformed to determine causality of metformin in inducing the B-12 deficiency. The objective of this study is to determine whether metformin therapy in the treatment of Diabetes Mellitus decreases serum concentrations of vitamin B12.

Method:
This is a prospective study conducted with diabetic patients with new start of Metformin therapy between Nov 1, 2008, and March 1, 2009 at Flower Family Physicians, WW Knight Family Practice Center, and Center for Health Services Adult Internal Medicine Clinic.
Inclusion criteria include: patients for whom metformin is being prescribed for the treatment of diabetes mellitus, age of 18 years or older, who have not taken metformin in the previous year.
Exclusion criteria include: pregnancy, patient receiving metformin for a diagnosis other than diabetes mellitus, serum creatinine >1.5mg/dL in males or >1.4mg/dL in females, age less than 18 years, vegetarian, and metformin therapy within previous year.
Subjects who met the inclusion criteria and signed an informed consent had a baseline vitamin B12 level drawn within seven days of initiating metformin therapy. Levels were then redrawn at three months to determine whether metformin impacted the serum B12 level.
The primary outcome of this study is the serum vitamin B12 level after three months of metformin therapy.

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

Learning Objectives:

To review vitamin B-12 deficiency, associated conditions, and treatment

Describe whether metformin plays a role in vitamin B-12 deficiency

Self Assessment Questions:

B-12 levels below _____ are commonly associated with pernicious anemia?
a. 20mg/L
b. 5g/L
c. 200pg/L
d. 500pg/L

What are common symptoms of B-12 deficiency?
a.Tachycardia, hypertension, and SOB
b.Hypokalemia, nephropathy, and neuropathy
c.Neurologic disturbances, insomnia, symptoms of mania and psychosis, mouth sores, tingling of tongue, migraines, memory loss, SOB without chest pain, and tingling nerve pain on palms of hands
d.Polydipsea, Alzheimers dementia, depression

ASCORBIC ACID COMBINED WITH BETA-BLOCKERS FOR PREVENTION OF POSTOPERATIVE ATRIAL FIBRILLATION

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Purpose: Postoperative atrial fibrillation occurs in 31% of patients undergoing coronary artery bypass graft (CABG) surgery at Saint Joseph Hospital. Postoperative atrial fibrillation (POAF) is associated with increased length of stay, costs, and morbidity. It is thought that ascorbic acid will help attenuate the oxidative stress and electrical remodeling occurring after cardiothoracic surgery. The purpose of this study is to determine if administration of ascorbic acid in addition to beta-blocker therapy decreases the incidence of POAF.

Methods: This is a randomized, open-label, single-center pilot study at a 468-bed community-based hospital that specializes in cardiology. Patients 40 years and older undergoing non-emergent CABG with or without valve replacement or repair will be included in this study. Patients will be excluded for a history of atrial fibrillation, current therapy with class I or III antiarrhythmics or digoxin, any degree of atrioventricular block or bradycardia with a heart rate less than 50 beats per minute, permanent or temporary pacemaker, or end stage renal disease requiring dialysis. Informed consent will be obtained prior to surgery and patients will be randomized to receive ascorbic acid with beta-blockers or beta-blockers alone. Selection of beta-blocker therapy will be determined by the cardiothoracic surgeon for each patient. Patients in the ascorbic acid group will receive 2 grams the night prior to surgery, followed by 1 gram twice daily for 5 days after surgery. Patients will be monitored for POAF throughout the study period. The primary outcome of this study will be incidence of postoperative atrial fibrillation. Secondary outcomes measured are length of ICU stay, length of hospital stay, and cost of stay. This study will seek to enroll 120 patients to detect a 20% decrease in incidence of POAF with 80% power.

Results and Conclusions: Data collection currently in progress. Preliminary results and conclusions to be presented.

Learning Objectives:

Identify risk factors for development of postoperative atrial fibrillation.

Describe the mechanisms for the development of postoperative atrial fibrillation.

Self Assessment Questions:

Which of the following have been studied in the prevention of postoperative atrial fibrillation?
a. Statins
b. Amiodarone
c. Digoxin
d. All of the above

True or False: The incidence of postoperative atrial fibrillation can reach as high as 50% despite optimal preventive measures.

THE EFFECT OF THE THIAZOLIDINEDIONE SAFETY CONCERNS ON OVERALL DIABETIC MANAGEMENT IN THE VA

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Background

On May 21st, 2007, the FDA issued a safety alert for rosiglitazone (Avandia), a Thiazolidinedione, in response to a meta-analysis performed by Nissen et al. Information from several clinical trials showed a possible increase in myocardial infarction and other heart-related adverse outcomes with the use of rosiglitazone. Specifically, the increased risk was noted in patients taking rosiglitazone in combination with either insulin or nitrates. In October 2007, rosiglitazone was officially removed from the VA National Formulary.

Methods

This study was a retrospective analysis of trends in diabetic treatment at Jesse Brown VA Medical Center and its community based outpatient clinics. This analysis examined and compared diabetic treatment strategies and evaluated overall changes in diabetic control after these changes took place. Patients included were diabetics over the age of 18 who have used an oral antidiabetic drug (OAD) and/or insulin between Q1FY07 and Q4FY08. Patients who have never received an OAD or insulin or those greater than 90 years of age were excluded from this analysis. The VA Pharmacy Benefits Management Database was used to generate a report on a quarterly basis from Q1FY07 to Q4FY08. This allowed for trending medication use and cost from one quarter to another. For each medication the number of 30 day prescriptions, total unique patients receiving the medication, total cost, average dosage and average corresponding hemoglobin A1c was collected.

The primary endpoint was a comparison of market share by patient and cost for both OADs and insulin. Additionally, the change in average hemoglobin A1c was evaluated from quarter to quarter. Secondary endpoints included the usage of secondary (non-formulary) OADs/insulin and also a correlation between the average cost per unique patient and average hemoglobin A1c.

Results

Results to be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe how the marketshare of anti-diabetic agents has changed due to the rosiglitazone safety concerns.

Describe how the changes in marketshare of anti-diabetic agents have affected diabetic control and overall costs.

Self Assessment Questions:

Rosiglitazone is still the most widely used anti-diabetic agent in the VA despite the adverse cardiovascular outcomes observed by Nissen et al. True or False

The total costs associated with treating each diabetic patient have more than doubled since the FDA issued the initial safety alert for rosiglitazone. True or False

DEVELOPMENT AND IMPLEMENTATION OF A CODE BLUE TRAINING PROGRAM FOR PHARMACISTS: SIMULATION-BASED VS. TRADITIONAL METHODS

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BACKGROUND:

Pharmacists are playing an increasingly important role in code blue emergencies. Research has shown a decrease in adverse drug reactions and an improvement in hospital mortality rates when pharmacists were part of a multidisciplinary code team. Many different methods have been used to train pharmacists for medical emergencies, including participation in mock codes and orientation to medication crash carts. Recently, studies have demonstrated that training with patient simulators improved clinical trauma skills in medical residents. However, there are no studies evaluating the use of simulation training for pharmacists to respond to code blue emergencies.

PURPOSE:

To determine the effectiveness of a simulation-based code blue training program for pharmacists compared to a traditional training method in a classroom environment.

METHODS:

This study is a pre- and post-test design that will include a select group of pharmacists currently employed at Advocate Christ Medical Center. The training program will require all participants to complete American Heart Association (AHA)-approved Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) courses as well as attend a pharmacology lecture that focuses on ACLS medications. Each pharmacist will be given a written test to assess their baseline knowledge. Participants will then be randomized to practice ACLS scenarios in either a simulation lab or classroom setting, both facilitated by the same instructor. A total of three cases will be completed during each training session, followed by an oral exam to measure their skills. At the conclusion of the study, participants will be given a final written exam, which will be compared to their baseline scores. In addition, a survey will be administered at baseline and after the conclusion of the training sessions to measure the pharmacists comfort level in code blue emergencies.

RESULTS/CONCLUSION:

Data will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

recognize the value of having a pharmacist as part of the code blue team.

Identify the most effective method for training pharmacists in code blue emergencies.

Self Assessment Questions:

True/False. Studies have shown that pharmacist participation in code blue emergencies reduce adverse drug reactions and improve hospital mortality rates.

What are some barriers to incorporating pharmacists as part of the code blue team?

ONGOING MEDICATION USE EVALUATION OF WARFARIN: ASSESSING COMPLIANCE WITH THE JOINT COMMISSION NATIONAL PATIENT SAFETY GOAL 3E

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PURPOSE: Warfarin is the most common oral anticoagulant worldwide, but it is difficult to dose appropriately and prone to significant adverse events. The Joint Commission has mandated National Patient Safety Goal (NPSG) 03.05.01 (formerly 3E) to reduce the likelihood of patient harm associated with the use of anticoagulation therapy. In an ongoing effort to meet this goal, Grant Medical Center formed a multidisciplinary group that has implemented various processes aimed at improving anticoagulant use within our institution. The Grant Medical Center Department of Pharmacy is directly involved in providing education to patients newly initiated on warfarin therapy and monitoring all patients who receive warfarin. Additionally, all practitioners can access online educational material in the form of patient discharge instructions. To assess our facility's adherence to NPSG standards for warfarin therapy prescribing, monitoring, and education, a retrospective electronic medical record review was performed on forty patients who received warfarin between August 1 and September 1, 2008. Provision of warfarin-specific patient education was identified as an area for improvement.

METHODS: This retrospective chart review will assess whether changes in the way patients are identified and pharmacists are notified to provide warfarin education will lead to improvements in the percentage of patients receiving education. Additionally, this review will assess whether automating part of the discharge instruction process will increase the number of patients receiving warfarin-specific discharge instructions.

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

Learning Objectives:

Review the rationale for Joint Commission NPSG 03.05.01.

Identify ways to simplify the provision of warfarin education to patients using technology.

Self Assessment Questions:

Describe three key components of Joint Commission NPSG 03.05.01 that relate to vitamin K antagonists.

T/F: The provision of education to patients and families regarding anticoagulant therapy is not a TJC requirement.

EVALUATION OF THE ANTICOAGULATION THERAPY PATIENT EDUCATION DOCUMENTATION PROCESS

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Purpose: In the 2009 National Patient Safety Goals released by the Joint Commission, requirement NPSG.03.05.01 calls for healthcare providers to "reduce the likelihood of patient harm associated with the use of anticoagulation therapy." Hospitals are required to provide education regarding anticoagulation therapy to patients and their families, including: the importance of monitoring and adherence to the prescribed medication regimen; dietary restrictions; and the potential for drug interactions. Due to the important role of education in reducing patient harm, a study was conducted to evaluate the current warfarin patient education process and make recommendations for improvement.

Methods: Institutional Review Board (IRB) approval was granted prior to commencement of this evaluation. A retrospective chart review of all patients who received warfarin at The Ohio State University James Cancer Hospital and Solove Research Institute (The James) between January 1, 2009 and January 31, 2009 will be conducted. All charts will be reviewed for evidence of anticoagulation education documentation. Patients admitted to The James, age > 18 years, with documentation of warfarin use during their hospital stay will be included in this study. Patients > 80 years old, prisoners, and pregnant women will be excluded.

Additionally, nurses will be surveyed to assess warfarin education and documentation practices. The survey will consist of both Likert Scale questions and open-ended questions. Based on the results of this survey, recommendations will be made to improve the current warfarin patient education process.

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

Learning Objectives:

At the conclusion of this presentation, the pharmacist will state the importance of anticoagulation patient education.

At the conclusion of this presentation, the pharmacist will identify key counseling points to discuss with patients receiving warfarin.

Self Assessment Questions:

1.All of the following are reasons to provide anticoagulation patient education, EXCEPT:
a.Anticoagulation is high-risk treatment
b.After a baseline INR is obtained, patients can manage their own warfarin therapy
c.Without proper monitoring, warfarin therapy can lead to adverse events
d.There are several medications that can interact with warfarin
e.A patients lifestyle can affect warfarin therapy

2.Which of the following counseling points should be discussed with patients receiving warfarin?
a.The interpretation of the International Normalized Ratio (INR)
b.Signs of bleeding
c.Factors that can interfere with warfarins effectiveness
d.Medications that may interact with warfarin
e.All of the above

ANALYZING THE IMPACT OF PHARMACISTS RECOVERED MEDICATION ERRORS IN THE EMERGENCY DEPARTMENT OF AN ACADEMIC MEDICAL CENTER.

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Purpose: The Emergency Department (ED) presents a unique opportunity for medication errors to occur. Recently there is growing interest in the effect of pharmacist interventions to reduce medication errors in the ED. The objective of this study was to analyze the impact of pharmacists recovering medication errors within different levels of patient care within the ED at the University of Wisconsin Hospital.

Methods: This prospective observational study was conducted at a regional tertiary care teaching hospital that is a level one trauma center. Over four months clinical pharmacists in the ED were observed for a total of 200 hours with documentation of recovered medications errors. These errors were recorded by observers, along with details of the event including the level of patient care and a harm score. The Health Sciences Institutional Review Board approved this study prior to initiation.

Results: During the observation period, 78 recovered medication errors were recorded. The majority occurred in the general care setting (55 errors, 70.5%), although a substantial number of errors were recovered in the trauma/critical care setting (13 errors, 16.7%) and patients boarding in the ED for admission (10 errors, 12.8%). Few recovered errors in the general care setting were rated as having a harm score of C or greater (5 of 55, 9.1%) whereas a larger proportion of recovered errors in the trauma setting had a harm score of C or greater (4 of 13, 30.8%).

Conclusion: Pharmacists have an impact on the recovery of medication errors in all settings within the ED. While the majority of errors are recovered in the general care setting, errors recovered in the trauma/critical care setting are likely to be more serious and supports the greater focus of pharmacist involvement in the critical care population of the ED over general care patients.

Learning Objectives:

Describe the specifics of a recovered medication error and its significance in the patient care setting.

Identify the impact the pharmacist may have in the emergency department setting.

Self Assessment Questions:

How can a pharmacist be best utilized within an emergency department to assist in reducing medication errors?

How does the severity of the recovered medication errors relate to the patient care level within the emergency department?

COMPARING CONVENTIONAL VANCOMYCIN DOSING IN HEMODIALYSIS PATIENTS TO SCHEDULED INTERVAL DOSING IMMEDIATELY AFTER EACH HEMODIALYSIS SESSION

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PURPOSE: Vancomycin dosing in hemodialysis (HD) patients has become more complicated since the implementation of high-flux dialysis, which removes larger molecules. High-flux HD has been shown to remove anywhere from 25-50% of vancomycin from the blood. At this time, small studies have been completed trying to find reliable dosing regimens and timing of drug concentration monitoring. Currently, there are two different dosing approaches used by the clinical pharmacy staff at Parkview Hospital. The intent of this study is to find the dosing regimen resulting in the most consistent therapeutic vancomycin levels and the least lab draws for the patient.

METHODS: This study was a prospective, open-label, comparative trial that was submitted and approved by the Institutional Review Board prior to initiation. All inpatients at Parkview Hospital who were at least 18 y/o, treated with HD, and prescribed vancomycin with pharmacy to dose were included. Patients received either conventional vancomycin dosing or scheduled interval vancomycin dosing. The conventional vancomycin-dosing group was administered one 15mg/kg dose (max of 2 grams), with random vancomycin concentration taken at the clinical pharmacists discretion. When the concentration fell below 15mcg/ml the patient received another 15mg/kg dose. In the scheduled interval vancomycin-dosing regimen, the patient was administered a loading dose of 20mg/kg (max of 2 grams) after the first HD session and maintenance doses (MD) of 500mg after each subsequent HD session. Vancomycin concentration monitoring was limited and drawn based on a set algorithm. Data was collected on patients age, gender, post-HD (dry) weight, indication for vancomycin use, chronic/acute HD, days of HD sessions, length of HD session, blood flow rate, dialyzer filter, duration of therapy, vancomycin levels obtained with each draw and vancomycin doses.

RESULTS/CONCLUSION: Data is still being collected. Results and conclusion will be presented at the conference.

Learning Objectives:

Describe the impact different dialysis membranes have on the dosing vancomycin.

Identify the dosing regimen with the most consistent therapeutic vancomycin concentrations.

Self Assessment Questions:

True or False: Rates of invasive Methicillin-Resistant Staphylococcus aureus infections are 100 times higher in dialysis patients than in the general population.

Which of the following are factors affecting vancomycin dosing in HD patients?

a. Development of high flux HD filters
b. Residual renal function
c. Obesity
d. Changes in bacterial resistance patterns
e. All of the above

MEDICATION USE EVALUATION OF THE COMPLIANCE WITH INTRAVENOUS IMMUNE GLOBULIN GUIDELINES

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Background:
Intravenous immune globulin (IVIG) has been approved for nearly 30 years and is used for various indications. Several IVIG formulations are available, each with distinct differences in pH, electrolyte and sugar content. These characteristics, as well as the rate of infusion, dose and clinical condition can lead to variability in the incidence of adverse events. Sucrose containing formulations in particular, have been reported to be associated with renal complications, including osmotic nephrosis and death, leading to a black box warning from the FDA.

Carimune NF and Privigen are the two primary formulations at The Ohio State University Medical Center (OSUMC). Per approved product selection criteria, Carimune NF is intended for general patient use as it is a sucrose based product. Privigen because it has no sugar content, a lower pH, and osmolality, is intended for higher risk patient populations such as patients older than 65, and those at risk of acute renal failure or thrombosis.

Purpose:
The primary purpose of this study is to determine the utilization and compliance with product selection criteria for both IVIG products. A secondary study purpose is to project the number of patients eligible for Privigen .

Methods:
Prior to collecting data, Institutional Review Board (IRB) approval was granted. A retrospective chart review of all patients receiving an IVIG product from January 1, 2008 through December 31, 2008 will be conducted. The data to be collected will include IVIG brand, patient weight, clinical indication, length of treatment, dose, infusion rate, pre-medication, co-morbid conditions, incidence and severity of adverse events. Data will be collected from patient charts, through OSUMCs electronic medical record (EMR), and through the IVIG Adverse Event Monitoring form developed by the Department of Pharmacy.

Results:
Data are currently being collected. Results will be presented at the conference.

Learning Objectives:

To recognize the impact of the differences in pharmaceutical characteristics between products on appropriate product selection.

Identify the criteria determining patients at higher risk for adverse events.

Self Assessment Questions:

T/F All IVIG formulations are the same and therefore is easily interchangeable

T/F Privigen is the only sucrose containing product currently marketed in the United States.

EVALUATION OF AMIODARONE MONITORING AT THE MADISON VA HOSPITAL

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Purpose:
Amiodarone is one of the most widely used antiarrhythmic medications, yet specific guidelines outlining its monitoring are largely undefined. Due to this, and because adverse effects are common and can be serious, this study aims to define reasonable monitoring parameters and assess how the Madison VA is meeting these expectations. Secondarily, it hopes to identify the incidence of adverse effects.

Methods:
Records from the electronic hospital database will be used to identify patients with an active amiodarone prescription from August 1, 2006 though July 31, 2007. Patients were excluded from consideration due to therapy discontinued prior to 1 month of therapy and prescriptions for post-operative atrial fibrillation prophylaxis. In these 344 patients, each chart will be reviewed only once to assess compliance with the following monitoring parameters: pulmonary function test (including DLCO) at baseline and for any unexplained report of worsening dyspnea or cough; chest x-ray at baseline and then yearly; thyroid panel: TSH, free T4, and total T3 at baseline and every 6 months; liver function tests at baseline and every 6 months. Monitoring was tracked for a maximum of two years. Due to the retrospective nature of this study, if outcomes are found, no interventions will be made on behalf of specific patients.

Results/Conclusions:
Results and conclusions are pending.

Learning Objectives:

List compliance with amiodarone monitoring at the Madison VA Hospital.

Identify ways to implement system tools to increase monitoring compliance.

Self Assessment Questions:

True or False: There are clear guidelines outlining monitoring of amiodarone therapy.

True or False: Only hypothyroidism, not hyperthyroidism, can results from amiodarone therapy.

EVALUATION OF AGREEMENT BETWEEN THE DRUG INTERACTION PROBABILITY SCORE (DIPS) AND NARANJO SCALE (NS) FOR DRUG INTERACTION-INDUCED ADRS IN WARFARIN PATIENTS

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Purpose: This study examined the agreement between the NS and DIPS tools in determining the probability that warfarin ADRs resulted from drug interactions. While the NS was introduced over 20 years ago and is considered a gold standard for causality evaluations, it was not designed to assess drug interactions. The DIPS was recently developed for this purpose, though there is no direct comparison to systematically validate the NS. Evaluating concordance between the two will help identify the most reliable tool for recognizing ADR trends, causality, and preventability in accordance with the Joint Commission 2008 National Patient Safety Goals.
Methods: Warfarin ADRs documented in our institutional, spontaneous ADR reporting database from January 2002 to June 2008 were reviewed for drug interactions. Data included patient demographics, precipitant and object drugs, and determination of Naranjo/DIPS scores and probabilities. Final analysis will include descriptive statistics and the degree of agreement between the NS and DIPS, reported as a weighted kappa statistic.
Results: Approximately 100 ADRs due to warfarin interactions are under review. Demographics for the first 25 ADRs include average patient age of 63 years, 64% male, and 24% critically ill. The most common interacting drugs were fluoroquinolones (32%), NSAIDs (16%), and sulfamethoxazole/trimethoprim (16%), leading to an increased INR in 84% of patients and bleeding in 52%. Probability scores are 4.7 and 4.5 for the NS and DIPS, respectively (p=0.387), indicating possible/probable causality. Statistically significant, moderate agreement was found using the weighted kappa statistic (ĸ=0.52) with 74.4% overall agreement (p<0.0001).
Conclusions: Preliminary analysis demonstrates that the NS and DIPS tools yield comparable results. As the DIPS tool was developed to examine the probability of a drug interaction precipitating an ADR, our results thus far indicate that it is a valuable tool in this form of causality evaluation.

Learning Objectives:

Identify the utility of the Naranjo and DIPS probability scales in predicting event causality

Describe the value of causality predictions in the investigation and prevention of future ADRs

Self Assessment Questions:

Both the Naranjo and DIPS probability scales are considered to have little potential for inter-rater variability. T/F

Unlike the Naranjo scale, the DIPS tool may be used to determine definitive causality in drug interaction-induced ADRs. T/F

LEVETIRACETAM VERSUS PHENYTOIN FOR SEIZURE PROPHYLAXIS IN NEUROSURGERY PATIENTS

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Purpose: To evaluate the efficacy, safety, and cost of levetiracetam versus phenytoin for seizure prophylaxis following traumatic brain injury (TBI) or subarachnoid hemorrhage, and make a recommendation regarding optimal antiepileptic drugs (AED) for seizure prophylaxis.

Methods: Retrospective chart review of patients admitted to the neurosurgery service who received levetiracetam or phenytoin/fosphenytoin for seizure prophylaxis following TBI or subarachnoid hemorrhage was performed. Primary endpoint was the number of documented seizures during AED prophylaxis. Secondary endpoints assessed the number of patients with subtherapeutic or supratherapeutic phenytoin concentrations, the number of times the initial AED was changed or another AED was added, drug-drug interactions between the AED and other medications, and cost analysis including cost of AED and monitoring.

Results: One of 29 patients (3.4%) in the phenytoin/fosphenytoin group and no patients in the levetiracetam group had a documented seizure. Nineteen patients had phenytoin concentrations drawn. In 63.2% of patients, at least one concentration was subtherapeutic, and in 5.3% at least one concentration was supratherapeutic. Of patients on phenytoin/fosphenytoin monotherapy, 10.3% were changed to levetiracetam monotherapy. Another AED was added to the monotherapy of 10.3% of the phenytoin/fosphenytoin patients. No patients on levetiracetam monotherapy received AED change or addition. Twenty-four of 29 patients (73.7%) on phenytoin/fosphenytoin had a potentially clinically significant drug interaction versus none in the levetiracetam group. The least expensive course of therapy was fosphenytoin, followed by phenytoin then levetiracetam at 1.3 and 2.9 times the cost of fosphenytoin, respectively.

Conclusions: Preliminary results show the percentage of patients with documented seizures was 3.4% in the phenytoin/fosphenytoin group and 0% in the levetiracetam group. This is lower than the incidence demonstrated in previous literature, which is reported between 4 and 25%. The cost analysis showed the least expensive course of therapy was fosphenytoin, followed by phenytoin, followed by levetiracetam.

Learning Objectives:

recognize the current literature and recommendations for the use of antiepileptic drugs for seizure prophylaxis following traumatic brain injury.

Describe the advantages and disadvantages of using phenytoin/fosphenytoin versus levetiracetam for seizure prophylaxis following traumatic brain injury.

Self Assessment Questions:

What is the recommended duration of antiepileptic drug therapy for seizure prophylaxis following traumatic brain injury?

What are the advantages and disadvantages of using phenytoin/fosphenytoin versus levetiracetam for seizure prophylaxis following traumatic brain injury?

EFFECT OF AGE, GENDER, AND WEIGHT ON THE INCIDENCE OF OVER-ANTICOAGULATION WITHIN TWENTY-FOUR HOURS OF INITIATION OF HEPARIN THERAPY FOR THE TREATMENT OF VENOUS THROMBOEMBOLISM

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Purpose: Continuous infusion unfractionated heparin is often the anticoagulant of choice in the treatment of venous thromboembolic events such as deep vein thrombosis and pulmonary embolism. Weight-based dosing nomograms aim to adjust for some of the differences that exist between patients receiving heparin therapy, but still may not be sufficient in all cases. It has been suggested by some that age and gender should also be accounted for when devising a dosage regimen scheme for the treatment of venous thromboembolism with intravenous unfractionated heparin. Our institution has implemented a weight-based heparin dosing nomogram for the treatment of venous thromboembolism. The primary goal of this study is to determine what influences gender, age, and/or weight have on the incidence of over-anticoagulation.
Methods: Data was collected from this institutions electronic medical record to aid in identifying patients who began intravenous unfractionated heparin therapy for the treatment of venous thromboembolism while in hospital and who have had at least one supra-therapeutic aPTT value, based on this institutions reference range, within 24 hours of initiation of heparin therapy. Both physical and electronic chart review was then conducted to ensure the dosing nomogram was followed during infusion therapy and to extract the following data: patient age, gender, weight, initial heparin infusion dose, time initiated, recorded aPTT values, any dosing adjustments made, and final heparin infusion dose after twenty-four hours of therapy.
Results: Two hundred and thirty six patients were started on this institutions standard protocol for the treatment of venous thromboembolism between the dates of May 1, 2007 and November 15, 2008. Mean age and weight were 61.4 years and 95.0 kg, respectively, and 53.4% were women. Results other than baseline patient characteristics are still pending.
Conclusions: Data analysis is still in progress. Final conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize current trends in the dosing of continuous infusion intravenous heparin therapy for the treatment of venous thromboembolism.

Identify interindividual patient differences that may play a role in the risk of becoming over-anticoagulated during the treatment of venous thromboembolism with continuous infusion intravenous heparin.

Self Assessment Questions:

Continuous infusion intravenous heparin therapy is the most commonly chosen therapy for the treatment of venous thromboembolism.
a) True
b) False

Which of the following patient characteristics has been proven to effect incidence of over-anticoagulation with continuous infusion intravenous heparin therapy?
I. AgeII. Weight
III. GenderIV. Height
a) I only
b) II only
c) III only
d) I and II
e) I, II and III
f) I, II, III, and IV

EVALUATION OF THE EFFECT OF A CO-PAYMENT ON SMOKING CESSATION QUIT RATES WITH VARENICLINE IN A VETERANS AFFAIRS (VA) POPULATION

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Purpose: Cigarette smoking is the leading cause of preventable death in the United States, causing an estimated 438,000 deaths each year. Within the VA, patients are required to try nicotine replacement therapy and/or bupropion (and/or combination therapy), or have a medical contraindication to these medications before they are approved for varenicline use. Research indicates that offering full coverage for smoking cessation treatments is an effective means of improving utilization and quit rates; however, there are no studies evaluating the impact of full coverage for varenicline within a VA population. The primary objective of this study is to evaluate the effect of a co-payment on smoking cessation quit rates with varenicline in a VA population.
Methods: The study will be a retrospective study of veterans at the Roudebush VA Medical Center who were prescribed varenicline between the dates of June 30, 2007 and July 1, 2008. Patients will be divided into two groups: those who were required to pay a co-payment and those who were exempt. The survey will include questions on demographics, current smoking status, duration of varenicline treatment, motivations and barriers for quitting, previous quit attempts, and adherence to therapy. Inclusion criteria include any veteran who was prescribed varenicline for smoking cessation between the specified dates. Exclusion criteria include patients who had previously been prescribed 24 weeks of varenicline therapy, patients who were prescribed any concurrent pharmacotherapy for smoking cessation, patients who could not be reached by telephone, patients receiving their care at a community-based outpatient clinic (CBOC), and patients who have passed away. Demographic data will be analyzed using descriptive statistics. Logistic regression analysis will be used to determine the effect of a co-payment on quit rates after controlling for differences in baseline demographic characteristics between the two groups.

Results and conclusions to be presented.

Learning Objectives:

Describe the various factors that could affect smoking cessation quit rates.

Identify pros and cons of offering full coverage for smoking cessation treatments.

Self Assessment Questions:

True/False - The most common side effect of varenicline is exacerbation of depressive symptoms.

True/False - Research has shown full coverage for smoking cessation treatments improves utilization and quit rates.

EVALUATION OF NARCOTIC CONTROL SYSTEMS IN AN AMBULATORY PHARMACY SETTING WITHIN AN ACADEMIC MEDICAL CENTER

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Purpose: The University of Wisconsin Hospital and Clinics (UWHC) is an integrated health system that owns and operates 15 ambulatory pharmacies that dispense over 670,000 prescriptions annually. An event involving narcotic diversion prompted further investigation into the current ambulatory pharmacy practices at UWHC for narcotic surveillance and control. The main purpose of this study is to systematically identify all possible sources of narcotic diversion throughout the distribution process in UWHC ambulatory pharmacies and to develop detailed recommendations for routine double-checking and auditing systems to readily prevent and detect methods of diversion.

Methods: A task force will be established to evaluate the narcotic distribution process including purchasing, receiving, storage, filling, and dispensing to identify current gaps in control that may allow for diversion. This will involve assessing current prevention and audit systems and the development of new controls for a more secure narcotic surveillance system.

Results: Project results will be presented as a gap analysis.

Conclusions: To Be Determined

Learning Objectives:

Explain the medication distribution process for controlled substances in an ambulatory pharmacy.

Describe best practice standards designed to prevent diversion of controlled substances.

Self Assessment Questions:

At what points in the distribution process of controlled substances is diversion most likely to occur in an ambulatory pharmacy?

Identify two ways computer software can be utilized to improve controlled substance surveillance systems.

REVIEW OF INTRAVENOUS ACETYLCYSTEINE THERAPY AT UNIVERSITY OF LOUISVILLE HOSPITAL AND THE DEVELOPMENT OF A PROTOCOL FOR ACETAMINOPHEN TOXICITY

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Purpose: Acute acetaminophen toxicity is associated with the risk of severe hepatic necrosis and fatal hepatic failure. Intravenous acetylcysteine therapy is commonly used to prevent the risk of hepatoxicity but its use is commonly associated with adverse events and increased cost to the patient. The objective of this study is to determine the frequency and overall cost of inappropriate intravenous acetylcysteine (Acetadote) usage at University of Louisville Hospital for acute acetaminophen toxicity.

Methods: The health systems electronic medical record system was used to identify patients who, from June 1, 2005 until August 1, 2008, have received intravenous acetylcysteine for acute acetaminophen toxicity. Patients over the age of 18 years who received intravenous acetylcysteine for acute acetaminophen toxicity were included in the study. Data collection included: patient age, gender, weight, date and time of admission to the hospital, date and time of acetaminophen ingestion, formulations of acetaminophen ingested, dosages of acetylcysteine ordered and times given, serum acetaminophen levels and liver function tests collected, adverse effects experienced after infusion, and if patient had an underlying liver disease. All data will be recorded without patient identifiers and maintained confidentially. The data collected will be charted on the Rheumack-Matthew nomogram to chart risk of hepatotoxicity and determine if intravenous acetylcysteine use was warranted. The overall cost of inappropriate acetylcysteine use and adverse effects will be calculated.

Results and Conclusions: Data collection currently in progress and will be presented at the conference.

Learning Objectives:

Review the appropriate treatments for acute acetaminophen toxicity.

Discuss the implications of inappropriate intravenous acetylcysteine use for acute acetaminophen toxicity.

Self Assessment Questions:

True or false: Acetylcysteine should be given to every patient who has acute acetaminophen toxicity.

True or false: Intravenous acetylcysteine use for acute acetaminophen toxicity is more efficacious than the oral formulation.

EVALUATION OF VANCOMYCIN USE FOR GROUP B STREPTOCOCCUS PROPHYLAXIS IN OBSTETRIC PATIENTS

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Purpose:
To reduce the incidence of neonatal sepsis, the Centers for Disease Control and Prevention (CDC) recommends antibiotic prophylaxis for pregnant women colonized with Group B Streptococcus (GBS). The treatment algorithm recommends penicillin or ampicillin as first-line agents. Penicillin-allergic patients should receive cefazolin if they are at a low risk of anaphylaxis. Patients at high risk for anaphylaxis should receive clindamycin or erythromycin if culture and sensitivity results indicate sensitivity to these antibiotics. Vancomycin should only be given if the above antibiotics are contraindicated.

Of the aforementioned antibiotics, vancomycin is the least desirable due to its high molecular weight and recommended two-hour duration of infusion. These properties may reduce therapeutic concentrations in the fetus, resulting in potentially inadequate prophylaxis to the baby. Vancomycin also has the potential for adverse effects including "Redman Syndrome" and injection site injury due to extravasation.

The purpose of this investigation is to evaluate the use of vancomycin for GBS prophylaxis at The Ohio State University Medical Center based on the CDC guidelines for the prevention of perinatal Group B Streptococcus.

Methods:
This was a retrospective chart review that received IRB-exempt approval. All patients that received vancomycin on the labor and delivery unit for a 26-month period were analyzed. Only those patients that received vancomycin for GBS prophylaxis prior to vaginal delivery were included in the study. Data collection included the type of allergy to penicillin, the sensitivity of GBS to clindamycin and erythromycin, and the choice of antibiotic. From this data, the number of patients that could have received penicillin, ampicillin, cefazolin, clindamycin, or erythromycin rather than vancomycin will be determined.

Results and Conclusions:
Data collection and analysis is currently ongoing. The results will be completed and presented at GLPRC in April.

Learning Objectives:

To recognize the CDC guidelines for appropriate antibiotic selection for Group B Streptococcus prevention in obstetric patients

List the most effective and safe antibiotic for Group B Streptococcus given in a penicillin-allergic patient

Self Assessment Questions:

Based on the CDC guidelines, which antibiotic is most effective for a patient that has a penicillin reaction but it is not at high risk for anaphylaxis:
a.Ampicillin
b.Erythromycin
c.Vancomycin
d.Cefazolin

Which of the following is considering by the CDC as true anaphylaxis reaction?
a.Rash
b.Throat swelling
c.Urticaria
d.Two of the above are correct
e.All the above are correct

ASSESSMENT OF STUDENT PHARMACISTS PERCEPTIONS ON PARTICIPATING IN CLINICAL SERVICES IN THE COMMUNITY PHARMACY SETTING

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PURPOSE: Both pharmacists and student pharmacists have demonstrated interest in providing clinical services in the community pharmacy setting, yet a discrepancy exists between this expressed desire and the development and implementation of these services. Studying the perceptions of student pharmacists regarding the provision of clinical services in community pharmacy practice may reveal reasons for these inconsistencies. The primary objective of this research is to assess the perceptions of student pharmacists in their final year of pharmacy education on providing clinical services in the community pharmacy setting.

METHODS: An anonymous Web-based survey was administered via e-mail to student pharmacists in their final year of pharmacy education attending an Accreditation Council for Pharmacy Education (ACPE)-accredited pharmacy school in the United States. The survey was available for completion for two months, at which time the investigator retrieved the responses for data analysis. The information collected from the survey included the following: 1) student demographics, 2) intended practice setting upon graduation, and 3) student perceptions of providing clinical services in the community pharmacy setting, including perceived opportunities for and importance of these services, readiness to provide services, and perceived barriers. Descriptive and comparative statistics will be performed using SPSS. Data will be analyzed to identify factors that correlate with student pharmacists intent to provide clinical services after graduation.

RESULTS: Thirty-nine pharmacy schools agreed to distribute the survey and 1,024 student pharmacists completed the survey. Data analysis is underway and results will be presented at the Great Lakes Pharmacy Resident Conference.

CONCLUSIONS: Information obtained from this survey of student pharmacists will identify unrecognized barriers to the provision of clinical services in the community pharmacy setting. This information may be used to find ways to overcome these barriers, better prepare students to provide clinical services, and further develop and implement clinical services in community practice.

Learning Objectives:

Identify student pharmacists perceived barriers to providing clinical services in the community pharmacy setting.

Identify the relationship between student pharmacists demographic information and intent to provide clinical services after graduation.

Self Assessment Questions:

True/False. Student pharmacists perceive lack of time and lack of pharmacy support staff as the two most significant barriers to pharmacist participation in clinical services.

True/False. Student pharmacists who have participated in clinical services in work-related or educational experiences have a greater interest in providing these services after graduation.

DEVELOPMENT OF A PROCESS TO ADDRESS FORMULARY MEDICATIONS WITH BLACK BOX WARNINGS AT AN ACADEMIC MEDICAL CENTER

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Background: A black box warning is the strongest labeling requirement issued by the FDA and is intended to alert prescribers to the high risks associated with a medication. The definition provided by the FDA is located in the Code of Federal Regulations as it relates to the mandatory format and content of prescription drug labeling. In the warnings section, the regulation states that "special problems, particularly those that may lead to death or serious injury, may be required by the Food and Drug Administration to be placed in a prominently displayed box. The boxed warning ordinarily shall be based on clinical data, but serious animal toxicity may also be the basis of a boxed warning in the absence of clinical data." Due to the limited information provided by the FDA on how to address these warnings, many institutions do not have a defined process in place for reviewing and considering the impact of a black box warning upon their release.

Objective: The purpose of this project is to develop a process to systematically address black box warnings, both those already in existence and newly released warnings, by clearly delineating the associated risks and recommending enhancements, as necessary, to the medication use process.

Methods: A list of all medications that have black box warnings was compiled and compared to the institutions formulary in order to determine which formulary medications carry black box warnings. A checklist was developed and will be used as a guide to determine which step(s) in the medication use process the black box warning impacts and what precautions, if any, should be taken. Recommendations for improvement will be presented to the Medication Safety Committee for review and approval.

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

Learning Objectives:

recognize the significance of black box warnings.

Describe a process that systematically addresses black box warnings at an academic medical center.

Self Assessment Questions:

True/False: The FDA provides clear directions for institutions on how to address black box warnings.

Which of the following is the strongest labeling requirement issued by the FDA?
a.Medication Safety Alert
b.Black Box Warning
c.Medication Guide

IDENTIFICATION OF REALIZED AND POTENTIAL ADVERSE DRUG REACTIONS IN POLYPHARMACY PATIENTS WITHIN THE HUNTINGTON VA MEDICAL CENTER.

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Statement of Purpose: Polypharmacy is an established, widespread problem in healthcare, contributing to poor medication regimen compliance and a high likelihood of critical drug-drug and drug-disease interactions. These negative effects may result or contribute to hospitalization, emergency room (ER) visitation, and/or mortality. Moreover, duplicate drug therapies and avoidable complications contribute significantly to high medical costs. A better understanding of the risk to patients receiving complex drug regimens may reduce the incidence of polypharmacy-related adverse effects, simplify complex regimens, and ease medical costs. The primary objective of this study is to investigate the incidence of ER visits, hospital admissions, and/or mortality due to a polypharmacy drug regimen. The secondary objectives of this study are to examine the incidence of critical drug-drug and drug-disease interactions in patients receiving polypharmacy.

Statement of Methods: Medical charts for patients with complex medication regimens will be retrospectively reviewed to attempt to link ER visits, hospital admissions, and mortality to a polypharmacy-related issue. Inclusion criteria include patients of the Huntington VAMC receiving greater than 15 medications. One hundred forty-two patients were identified as receiving polypharmacy at our facility. The following data will be collected and used for analysis: number of active VA-prescribed medications; number of documented adverse drug reactions, number of critical drug-drug and drug-disease interactions, as defined by the VA drug interaction screening program; ER visits and hospitalizations linked to a polypharmacy issue, including the date of and reason for the visit/hospitalization; mortality linked to polypharmacy regimens, and cause of death; and relevant abnormal laboratory values linked to polypharmacy use.

Results: Research is currently in the data collection phase. Final results with conclusion will be reported at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the impact of complex drug regimens on patients in terms of morbidity and mortality.

To identify pharmacological agents and drug classes that may place patients receiving polypharmacy at an increased risk for morbidity and/or mortality.

Self Assessment Questions:

The greatest concern for patients receiving polypharmacy is the increased potential for drug interactions.

What classes of medications are most heavily implicated in medication associated adverse events in the elderly?

PHARMACISTS MAKING A DIFFERENCEA SURVEY OF PRESCRIBERS, NURSES AND PHARMACISTS

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Purpose: Pharmaceutical care is the direct, responsible provision of medication-related care for the purpose of achieving definite outcomes that improve a patients quality of life. The American Society of Health-System Pharmacists (ASHP) states that pharmaceutical care is fundamental to the professions purpose of helping make the best use of medications. The objectives of this survey are to evaluate the perceived value of clinical pharmacist services provided at NorthShore University HealthSystem (NorthShore), identify areas of improvement, and determine priority areas for future clinical pharmacist services.

Methods: A committee was created to determine priority areas, conduct the Pharmacist Making a Difference survey, and implement resulting practice changes. A panel of co-investigators (pharmacists and research experts) designed the survey using evidence-based resources. The survey process included two weeks of testing for validity and reliability after which the co-investigators made changes and clarifications. Pharmacists, physicians, nurse practitioners, physician assistants, and nurses were surveyed to gather the perceived value of pharmacist services. Respondents assessed 32 areas of clinical pharmacy services for involvement and level of importance. Survey respondents also selected the top five services they would like to see the pharmacist involved in. The survey was distributed both electronically and on paper.

Results/Conclusion: A total of 376 surveys distributed both electronically and on paper were completed. Analysis of results is ongoing, and includes survey demographics, overall importance, and top five services. The analysis will include stratification by site, profession, and specialty. Agreement between groups will be analyzed. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the process of conducting survey research

Discuss the clinical services physicians valued as important

Self Assessment Questions:

T/F Pharmaceutical care is the direct, responsible provision of medication-related care for the purpose of achieving definite outcomes that improve a patients quality of life.

T/F There is agreement between prescribers, pharmacists, and nurses on perceived importance of clinical services

ASSESSING THE IMPACT OF HEALTH LITERACY IN A VA PATIENT POPULATION WITH DIABETES: A PILOT PROJECT

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Purpose: Studies have shown that low health literacy is associated with poorer health status, higher mortality, increased hospitalizations and higher health care costs. Low health literacy can be particularly problematic in diabetic populations because these patients have many responsibilities in managing their disease state. The purpose of this study is to determine if endpoints including HgA1c, retinopathy, nephropathy, blood pressure, lipids, hospitalizations or Emergency Department visits within the past year relate to current level of health literacy in VA patients with diabetes.

Methods: This is an observational pilot project to determine if level of health literacy affects health outcomes in veteran patients with diabetes. Patients with Type 2 diabetes who are at least 18 years of age will be enrolled through pharmacy-run ambulatory care clinics at the Madison VA. Patients will be excluded if they have had a recent CVA (within the past 6 months,) documented dementia, blindness, psychosis, or a severe cognitive disorder. Health literacy will be assessed using a validated multiple-choice question administered in a face-to-face interview. Level of health literacy will be classified based on response to the question, "How confident are you filling out medical forms by yourself?" Response options will be multiple choice including, "A. Extremely" "B. Quite a bit" "C. Somewhat" "D. A little bit" or "E. Not at all". Patients will be categorized into "adequate" (A&B), "marginal" (C) and "inadequate" (D&E) health literacy. The most recent diabetes related outcomes (including HgA1c, retinopathy, nephropathy, blood pressure, lipids, hospitalizations or Emergency Department visits within the past year) will be collected retrospectively using the Computerized Patient Record System. Differences in endpoints will be compared between groups. Results will be adjusted for confounding variables that may affect diabetes health outcomes, including tobacco use, alcohol use, diabetes medications, years with diabetes, and previous diabetes education.

Results/Conclusions: Pending

Learning Objectives:

Identify and classify patients with adequate, marginal or inadequate health literacy using a validated instrument used to assess health literacy.

Discuss if diabetes-related health outcomes are related to level of health literacy.

Self Assessment Questions:

True or False. Health literacy can be measured quickly and effectively by using a validated one-question multiple-choice test.

Low health literacy has been associated with which of the following:

A. Increased hospitalizations
B. Poorer health status
C. Increased mortality
D. Increased health care costs
E. All of the above

PRESCRIBING PATTERNS OF NICOTINE POLACRILEX GUM AND LOZENGES AND SMOKE-FREE OUTCOMES BY PHARMACIST-RUN SMOKING CESSATION CLINIC AND OTHER PRESCRIBING SERVICES IN A VETERANS ADMINISTRATION MEDICAL CENTER

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Background:
Tobacco use is the most widespread preventable cause of premature death in the United States, with more than 45 million smokers currently. Approximately 70% of adult smokers in the U.S. express a desire to quit, however, only 2% actually succeed. Studies have shown that success rates are higher in people who use nicotine replacement therapy (NRT) and who have a support system than in patients who use NRT without frequent consultation.

Purpose:
The purpose of this study is to compare the percentage of patients who successfully quit smoking using NRT gum or lozenges between the pharmacist-run smoking cessation clinic and other outpatient prescribing services at Jesse Brown VA Medical Center (JBVAMC).

Methods:
This is a retrospective, electronic chart review of patients who received NRT monotherapy with either gum or lozenges. The patient population was identified by extracting all prescription fills for either NRT gum or lozenges from March 1, 2007 through March 1, 2008. Patients were excluded from the study if they received any additional smoking cessation therapies, including NRT patch, buproprion, and/or varenicline within a 90 day period prior to or after the initial fill date of the gum or lozenge. Patients receiving monotherapy of gum or lozenges from the pharmacy smoking cessation clinic will be compared to patients receiving therapy from other outpatient prescribing services. The primary endpoint is to compare the number of patients who achieved smoke-free status in the smoking cessation clinic to those who received the medication from another prescribing service. Patient outcomes will be categorized as smoke-free, reduced by 50%, or unchanged. Secondary endpoints include assessing the number of prescriptions written and filled for NRT gum or lozenges, as well as assessing the total prescription dollars spent between the pharmacist-run smoking cessation clinic and other prescribing services.

Results:
This study is currently in the data collection phase. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the different pharmacological agents to aid in smoking cessation.

Review non-pharmacological techniques to improve smoking cessation success.

Self Assessment Questions:

True or False. Nicotine replacement gum has a significantly higher quit rate at one year compared to other smoking cessation therapies.

True or False. Patients should be counseled to limit the number of pieces of nicotine replacement gum or lozenges used within the first week to improve smoking cessation rates.

APPROPRIATE SURGICAL SITE ANTIBIOTIC PROPHYLAXIS IN THE VA SETTING

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Surgical site antibiotic prophylaxis is a confounding problem in most VA surgical settings. Enough antibiotic must be given to the patient to ensure infection does not occur. However, care must be taken to provide the most beneficial antibiotic in the correct amount. It must also be discontinued within the appropriate time frame in order to discourage antimicrobial resistant organisms. The Surgical Care Improvement Project (SCIP) measures the performance of VA sites with regard to surgical care. Additionally, it is a goal of SCIP to discontinue antibiotics after surgery in a timely manner. The purpose of this study is to determine by what percent North Chicago VA Medical Center adheres to certain measures concerning antibiotic surgical prophylaxis. A goal of SCIP is to use antibiotics which are appropriate for the site, safe and cost-effective. The study examines the percentage of time appropriate antibiotics are used and correctly discontinued.

Methods: This is a retrospective chart review of a maximum of 100 surgical charts during the period from December, 2006 to December, 2008. The surgeries audited will be hip and knee replacements in veterans. These are surgeries which are frequently done at the North Chicago VA Medical Center. The time period involved for review will begin 1 hour before surgery and continue for 23 hours after surgery ends.

Preliminary Results: The number of patients who are properly and adequately prophylaxed with antibiotics will be compared to those who are not. Percentages will be assigned to both groups. The results and conclusions of this study will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the percentage of patients properly prophylaxed according to VA SCIP criteria.

List the reasons for inadequate prophylaxis.

Self Assessment Questions:

Antibiotics should continue for 3 days post procedure regardless of whether infection is present. True/False

Every patient waiting for surgery should receive at least two doses of prophylactic antibiotic before surgery to obtain appropriate blood levels during surgery. True/False

EFFECT OF PRE-EXISTING DIABETES VERSUS DEVELOPMENT OF POST-TRANSPLANT DIABETES (PTDM) ON KIDNEY FUNCTION AND GRAFT SURVIVAL IN KIDNEY TRANSPLANT RECIPIENTS

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Purpose: Improved immunosuppression regimens have decreased the incidence of rejection and improved short term graft survival. However, some of these regimens have led to the development of long term complications such as PTDM. The frequency ranges from 2% to 53% with potential complications of increased rejection, increased loss of graft, increased infection, and decreased survival. Other microvascular and macrovascular complications seen in non-transplant associated diabetes mellitus are also observed in PTDM. We aim to evaluate the effect of PTDM on graft function and survival versus that of patients with pre-existing DM or no DM.

Methods: A retrospective review of 180 consecutive adult kidney transplants from Jan 2004 through Dec 2005 at the University of IL-Chicago Medical Center.

Preliminary Results: Of the 180 patients evaluated 85 (47.2%) were AA and 61 (34.9%) were Hispanic. 15 (8.3%) developed PTDM while 70 (38.9%) had pre-existing DM. When these groups were compared to those patients who never had DM there was no difference found in pre-transplant demographics of race, donor type, or BMI as well as the immunosuppression regimen used with >70% of all patients receiving a thymoglobulin, tacrolimus, MMF and steroid avoidance regimen. Rejection rates as well as 1, 2 and 3 year graft survival did not differ between the groups. MDRD at 1, 2, and 3 years was 58.5, 58.8 and 53.1ml/min respectively in the PTDM group, 57.9, 55.2 and 52.7ml/min in the no DM group and 60.9, 56.5 and 59.2ml/min in the pre-txp DM group (p=NS).

Conclusions: With relatively short follow up to date, the development of PTDM does not significantly affect kidney outcomes out to 3 years when compared to patients with pre-existing DM nor those who never develop DM. Analysis with follow up out to 7 years is ongoing.

Learning Objectives:

Identify risk factors associated with development of PTDM.

Describe, based on immunosuppressive regimen, the decreased risk of rejection versus increased incidence of PTDM.

Self Assessment Questions:

Which of the following are associated with developing new onset PTDM?
A.Cytomegalovirus (CMV)
B.Ethnicity
C.Immunosuppression
D.All of the above

True or False. Based on the data presented today, PTDM adversely effects graft function.

INCIDENCE OF VENOUS THROMBOEMBOLISM FOLLOWING TOTAL KNEE OR HIP REPLACEMENT SURGERY AMONG DIFFERING THROMBOPROPHYLACTIC REGIMENS

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Purpose: To evaluate the incidence of DVT and PE in the total knee and hip replacement patients with the thromboprophylactic regimens of fixed dose low molecular weight heparin and adjusted dose warfarin.

Methods: This study is a retrospective chart review of total knee and hip replacement surgeries occurring between January and August 2008 at The Jewish Hospital in Cincinnati, Ohio. Data will be obtained from inpatient records at the hospital and outpatient records from physicians offices to include six weeks of follow-up after surgery. Patient charts will be chosen after meeting inclusion criteria. Criteria for study inclusion are: age greater than 18 years, not receiving therapeutic anticoagulation before surgery, and no known hypercoagulable disorders (ie. Factor V Leidens, Protein C or S deficiency, lupus anticoagulant, malignancy). Patient demographics, thromboprophylactic regimens, occurrence of venous thromboembolism (VTE) (including DVT and PE), and any bleeding episodes will be collected using a standardized data collection form. The difference in VTE incidence among the two study groups is hypothesized to be about four percent, leading to a desired sample size of 100 patients in each treatment group (total n = 200). Demographic data will be expressed as means (standard deviation, SD) and the primary outcome data will be expressed as mode (%). P-values less than 0.05 will be considered statistically significant.

Results: Data collection and analysis are in process. The final results of this study will be presented at the Great Lakes Pharmacy Resident Conference. The results from this study will help evaluate the safety and efficacy of thromboprophylactic regimens used in a subset of orthopedic patients at The Jewish Hospital. Additionally, utilization of practice guidelines and standards of care will be noted to identify possible areas of improvement.

Learning Objectives:

Review the process of clot formation and recognize why orthopedic surgery patients are at risk for thromboembolic disease.

Discuss the current guidelines and consensus statements regarding thromboprophylaxis in orthopedic surgery patients.

Self Assessment Questions:

What are the three parts of Virchows Triad and what risk factors do orthopedic surgery patients have to develop thromboembolic disease?

What are appropriate agents and what is the recommended duration of therapy for thromboprophylaxis following both total knee and total hip replacement surgeries according to the 2008 Chest Guidelines?

FISH OIL EFFECTIVENESS WITH RESPECT TO LOWERING TRIGLYCERIDES IN A VETERAN POPULATION: A RETROSPECTIVE REVIEW

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Background:
According to the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATPIII), there are over 105 million people over the age of twenty with a total cholesterol level of >200 mg/dL. High cholesterol serves as an additive factor with non-lipid risk factors to contribute to coronary heart disease (CHD). Elevations in triglycerides are commonly associated with low HDL levels. This combination serves as a major predictor of CHD.1
Identification of elevated triglycerides, despite normal total cholesterol may provide a stepping stone to patient evaluation of metabolic syndrome. Guidelines recommend the use of fibric acid derivatives and/or niacin to lower triglycerides. At this time, fish oils, also known as omega-3 fatty acids, have not been recommended in treatment guidelines.1 Various studies have shown benefit at lowering triglycerides using manufacturer formulated fish oils. 1,2,4-6
Purpose:
The purpose of this study is to determine the effect that the addition of traditional fish oils has on elevated triglycerides in a veteran population.

Method:
This study will be a retrospective, electronic chart review of patients who received a new prescription for fish oils in order to treat elevated triglycerides. Patients will be stratified based on their current cholesterol treatment regimen and on any changes that were made to their cholesterol treatment regimen throughout the study period. Medication compliance will be assessed by obtaining prescription fill dates for the fish oils at regular intervals as determined by the day supply of capsules the patients were prescribed. Data will be collected and analyzed for trends in total cholesterol, LDL, HDL, and triglycerides. Compliance will be assessed by dividing the actual number of fills by the ideal number of fills.

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

Learning Objectives:

Describe the percentage of change on triglycerides after the addition of fish oil

Describe the percentage of change on LDL, TC and HDL after the addition of fish oil

Self Assessment Questions:

True or False: Fish oils only available in one standard ratio formulation

True or False: LDL values are typically lowered with fish oil therapy

EVALUATION OF CLINICAL AND ECONOMIC BENEFITS OF EXTENDED INTERVAL DOSING OF PIPERACILLIN-TAZOBACTAM (ZOSYN) VERSUS CONVENTIONAL DOSING AGAINST PSEUDOMONAS AERUGINOSA IN THE TREATMENT OF PNEUMONIA.

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Background:
Pseudomonas aeruginosa is one of the leading pathogens in pneumonia patients. The proper treatment of pneumonia caused by p. aeruginosa in the hospital setting has become a challenging issue to many healthcare providers. The wide spread use of piperacillin-tazobactam has also been associated with increased levels of the MIC for the drug. Recently, new evidence suggests using extended piperacillin-tazobactam infusion of 3.375 or 4.5 gm administered over 4 hours every 8 hours for the treatment of P. aeruginosa shows a better clinical outcome compared to the traditional intermittent dosing regimen of 3.375 or 4.5 gm administered 30 minutes every 6 hours. In order to optimize the therapeutic outcome of patients with P. aeruginosa, in April 2008 our institution adopted the new extended infusion protocol. Although the new dosing protocol has been implemented in our hospital, there is limited data comparing the two dosing regimens. The objective of this study is to evaluate the use of the extended infusion protocol to determine whether the regimen reduces the time a patient spends in the hospital as well as the total cost to treat the patient to a successful clinical outcome.
Method:
Retrospective, single-center, medication use evaluation study. The data collection on this study will include all MCW patients > 18 years of age, diagnosed with p. aeruginosa pneumonia and were treated with piperacillin-tazobactam. Patients treated with the extended infusion piperacillin-tazobactam protocol after its implementation in April 2008 will be compared to control patients who were treated with the conventional piperacillin-tazobactam protocol prior to April 2008. The data will be collected 10 months before and after the implementation of the protocol from electronic chartmaxx. Demography, culture results, antibiotic administration, white blood cells count, temperature and length of hospital stay (to include time spend in ICU) will be collected for every patient diagnosed with p. aeruginosa and treated with piperacillin-tazobactam during this time.
Results/Conclusion:
Data collection in progress.

Learning Objectives:

Describe the potential benefit of extended interval dosing of piperacillin-tazobactam (Zosyn).

Describe the relationship between beta lactam dosing and its bactericidal activity.

Self Assessment Questions:

True/False: All beta lactams exhibit concentration dependant antibiotics activity that is why free drug concentration has to be above the MIC level 50% or greater.

True/False: Beta lactams antibiotics can be dosed as a continuous infusion over 24 hours

IMPACT OF DAILY PHARMACIST-DIRECTED EVALUATION OF CONTINUOUS SEDATION IN THE INTENSIVE CARE UNIT

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Purpose:
Prior studies have shown that pharmacist-involvement in the management of continuous sedation results in a significant decrease in the duration of mechanical ventilation, length of stay in the intensive care unit (ICU), and mortality. The purpose is to identify benefits and barriers associated with having daily pharmacist evaluation of continuous sedation in the medical ICU.

Methods:
This will be designed as a retrospective historical control model. All patients admitted to the ICU on continuous infusions of sedatives and/or analgesics will be included. An algorithm was developed for pharmacy staff to use to help guide recommendations for continuous sedation. Baseline information was collected prior to implementation of the algorithm into practice. This consisted of subjective physician assessments of sedation, pain, and delirium. After implementation of the algorithm, pharmacy will work with the nursing staff to assess each patients sedation, pain and, delirium each morning. These assessments will be applied to the algorithm to make recommendations to the critical care physician. Recommendations obtained from the algorithm may direct providers to interrupt or decrease infusion rates, reassess sedation at a later time, or treat acute agitation, pain, or delirium. Assessment of withdrawal from mood altering medications used prior to admission will also be completed. Subjective physician assessment of patient sedation, pain, and delirium management will be collected following implementation of algorithm-guided recommendations. Post-implementation outcome measurements will also include: number of recommendations made/accepted; adverse outcomes after accepted recommendations; how often sedation is interrupted or tapered when the patient meets criteria for this; and how often patients are transitioned to pain or delirium treatment. Surveys will be completed by pharmacy, nursing, and physician staff at the conclusion of the study to assess perception of benefits and barriers of the implemented process.

Results/Conclusions:
Data collection and evaluation are ongoing and will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

State two reasons why compliance with a "daily awakening" protocol may be poor.

Describe the impact of pain or delirium on the management of sedation.

Self Assessment Questions:

True/False: Sedation protocols utilizing downward titration of sedative infusions have not been associated with benefits seen with "daily awakening" protocols.

A patient with a history of chronic pain managed with oxycodone prior to admit is admitted to the intensive care unit. The patient develops respiratory distress secondary to sepsis and is intubated and sedated on propofol. Despite titrating the propofol drip up to 30 mcg/kg/min, the patient is significantly agitated with cares. State one alternative treatment strategy to continuing to increase the propofol drip rate.

ASSESSMENT OF MEDICATION RELATED INFORMATION RECEIVED BY PATIENTS REGARDING THEIR ORAL CHEMOTHERAPY MEDICATION

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Purpose: Oral chemotherapy agents (OCA) offer many advantages to patients including increased patient convenience and satisfaction. However, several challenges exist with the use of OCA including patient adherence, education of the patient and provider, and obtaining the medication. Based on the potential obstacles for treatment, a multidisciplinary team at the the Arthur G. James Cancer Hospital developed an oral chemotherapy education action plan to ensure that patients receive accurate, comprehensive information about their OCA. The action plan has been implemented at 1 of the 3 James outpatient clinic sites and is anticipated to commence at the at the remaining 2 outpatient clinics in the spring of 2009. This is a pilot study to assess the information currently provided to patients receiving OCA using a survey that evaluates oral chemotherapy education, access to oral chemotherapy, health care provider follow up, and OCA adherence.

Methods: Institutional Review Board (IRB) approval will be granted prior to commencement of this evaluation. Patients treated at the James outpatient clinics, > 18 years old, and receiving oral chemotherapy for at least 2 weeks, will be identified by the clinical pharmacists at the treatment sites for study inclusion. The first phase of this pilot study will compare the patients OCA experience between 50 subjects from the clinic where the action plan has been implemented (Group 1) to 50 subjects from the remaining outpatient clinics where the action plan has not been implemented (Group 2). During the second phase of the pilot study, the action plan will be implemented at the remaining outpatient clinics. The survey will be administered to 50 additional patients at those clinics (Group 3) and the results will be compared to Group 2. The results from the survey will determine if further amendments to the action plan are necessary.

Results/Conclusions: Will be presented at Great Lakes Residency Conference

Learning Objectives:

List the potential advantages and disadvantages of OCA.

Describe the appropriate medication information patients should receive in order to properly manage and obtain their OCA

Self Assessment Questions:

T/F. Potential barriers to treatment with OCA include adherence, education of the patient and provider, food and drug interactions, adverse reactions, and obtaining the medication.

Which of the following information should be provided to patients when counseling them on their OCA?
a.Common side effects and how to mange side effects
b.How to properly handle and dispose of their OCA
c.Potential food and drug interactions
d.Methods to increase adherence, ie medication calendars
e.Assistance available for obtaining their medication
f.All of the above

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF PREPRINTED PHYSICIAN CHEMOTHERAPY ORDERS

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Background:
The National Comprehensive Cancer Network (NCCN) has developed multiple evidence-based chemotherapy order templates for specific chemotherapy regimens. These templates include the regimen dosing, supportive care recommendations, monitoring and holding parameters, safety precautions, and other regimen-specific instructions. Research has proven that well-designed preprinted orders can reduce errors and increase guideline compliance.

Purpose:
The purpose of this project is to develop preprinted physician chemotherapy orders to be used by oncologists at Riverside Methodist Hospital for the following chemotherapy regimens: R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone), FOLFOX (fluorouracil, oxaliplatin, leucovorin), and carboplatin/paclitaxel. The NCCN order templates will be used as a guide to develop these preprinted orders to ensure accurate drug selection, appropriate supportive care, and increase the confidence and competence of order entry for pharmacy personnel. A checklist will also be developed for pharmacists to utilize during order entry and final product verification.

Methods:
A retrospective chart review of patients receiving the above regimens from January 1, 2008 to December 31, 2008 will be performed to determine the number of errors that occurred using the current chemotherapy order form. Additionally, a survey will be distributed to oncologists, nurses, and pharmacists to determine their level of comfort and satisfaction with the current chemotherapy order forms. Preprinted physician orders for R-CHOP, FOLFOX, and carboplatin/paclitaxel will be developed, as well as a checklist to aid pharmacists in verifying chemotherapy preparation prior to dispensing. Education will be provided to the oncologists, nurses and pharmacists regarding the developed order sets and their components. Following a pilot, an error analysis will be performed, and the survey will be redistributed.

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

Learning Objectives:

Discuss the literature that supports using well-designed preprinted physician orders.

Evaluate the impact of preprinted chemotherapy orders on comprehensive patient care.

Self Assessment Questions:

T/F: Benefits of utilizing preprinted physician orders include evidence-based medicine, improved safety features, legibility, and uniform content.

T/F: It is acceptable to use 5-FU as the name of a component of the FOLFOX regimen.

IMPLEMENTATION OF ANTICOAGULATION SAFETY PRACTICES: A NATIONAL PATIENT SAFETY GOAL

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Purpose: Implementation of safety practices to improve patient safety for patients receiving anticoagulation medications for therapy. The safety initiatives implemented moved Aurora Health Care into compliance with the National Patient Safety Goal to reduce the likelihood of patient harm associated with anticoagulation therapy.

Methods: A previous resident conducted a gap analysis of anticoagulation best practices for all 13 Aurora Health Care hospitals. The gap analysis identified areas in which Aurora Health Care could improve consistency of best practices throughout the health care system. Identified areas were incorporated into a plan to meet the Joint Commission timetable for implementation of National Patient Safety Goal 03.05.01 (formerly known as 3E). Working with clinical leaders in the Aurora Health Care Metro Region, an anticoagulation medication monitoring process was developed and documented as a policy. The pharmacist role in the process includes review of baseline laboratory values for anticoagulation medications, ordering necessary lab monitoring, ongoing monitoring and assessment for bleeding risk and appropriate intervention. The process was communicated with pharmacists, physicians and nurses. Collaborative work with site pharmacists for problem solving and process improvement was conducted. Dietary notification of warfarin therapy was assured. Educational materials provided by nursing to patients and their families were reviewed. Evaluation of the monitoring process effectiveness will be conducted through medication incident reports as well as trending the number of patients with an INR value greater than 4.0.

Results: Implementation of an anticoagulation medication monitoring process. Data evaluation and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify objective end points that could be used to measure successful implementation of an anticoagulation safety monitoring process.

Evaluate risks for supratherapeutic anticoagulation and develop intervention priorities.

Self Assessment Questions:

What are two objective outcome measures that could be used to assess therapeutic anticoagulation?

What are two reasons for supratherapeutic INR values other than supratherapeutic dosing?

COMPARISON OF ADHERENCE TO THE GLOBAL INITIATIVE FOR CHRONIC OBSTRUCTIVE LUNG DISEASE (GOLD) GUIDELINES AMONG ADULT INTERNAL MEDICINE PATIENTS BEFORE AND AFTER IMPLEMENTATION OF AN ORDER SET.

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BACKGROUND: Chronic Obstructive Pulmonary Disease (COPD) is one of the most common causes of hospitalization, morbidity, and mortality in the United States. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) publishes guidelines for the management of COPD, including recommendations for the treatment of exacerbation in hospitalized patients. Pharmacist involvement in developing an order set for treating COPD exacerbation has the potential to optimize patient care and decrease length of hospital stay and readmission rates.

PURPOSE: Compare current prescribing practices with the GOLD guidelines for treating COPD exacerbation and evaluate mean length of hospital stay and 30 day readmission rates before and after implementation of an order set.

METHODS: A retrospective chart review was conducted for 50 randomly selected internal medicine patients with a discharge diagnosis of COPD exacerbation. Each chart was evaluated for appropriateness of therapy based on the GOLD guidelines. Mean length of hospital stay and 30 day readmission rates were also evaluated in the phase I analysis. In phases II and III, an order set will be developed and a post-implementation analysis will be conducted to examine the effects on adherence to the GOLD guidelines and mean hospital length of stay.

PHASE I RESULTS: Current prescribing practices reflect adherence to the GOLD guidelines with respect to short-acting beta-agonists, anticholinergics, and corticosteroid use. However, corticosteroids dosages often exceeded recommendations. Only 61% of patients had documented smoking cessation counseling. Immunization rates were also low; 38% percent of patients received the influenza vaccine and 64% percent received the pneumococcal vaccine. The mean length of hospital stay was 4.2 2 days (mean SD). Only one patient was readmitted within 30 days of discharge.

CONCLUSIONS: Implementation of a COPD exacerbation order set would optimize patient care and potentially decrease mean length of hospital stay.

Learning Objectives:

Recall the pharmacological treatments for managing acute COPD exacerbation in the hospitalized patient as recommended in the GOLD guidelines.

Discuss appropriate corticosteroid dosages for managing acute COPD exacerbation in the hospitalized patient.

Self Assessment Questions:

True/ False: Short-acting inhaled beta-2 agonists are usually the preferred bronchodilators for the treatment of COPD exacerbations.

True/ False: Influenza vaccines can reduce serious illness and death in COPD patients by 50%.

COMPARISON OF ECONOMIC AND CLINICAL OUTCOMES IN PATIENTS STARTED ON INSULIN DETEMIR OR INSULIN GLARGINE AT A VETERANS AFFAIRS MEDICAL CENTER

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PURPOSE:
At least three trials comparing insulin detemir to insulin glargine have shown that patients on detemir used a higher daily dose compared to glargine, based on units/kg/day, but this has only been evaluated as a secondary outcome. The objective of this study is to evaluate the difference in doses used for veteran patients treated with insulin detemir versus patients treated with insulin glargine.

METHODS:
This study is a retrospective chart review of patients with either active, discontinued, or expired prescriptions for insulin detemir or insulin glargine issued from November 2006 through October 2008. Patients not on NPH before treatment with detemir or glargine, pregnant patients, patients not completing six months of therapy, and patients who came to the facility already on insulin detemir or insulin glargine are excluded from the study. Insulin detemir patients are matched to insulin glargine patients in a one-to-one ratio based on age range (10 years), gender, use of any oral diabetic agents, and use of rapid or intermediate-acting insulin. The sample size is intended to be approximately 140 patients total, with about 70 patients from each group. The primary outcome of the study is dose/kg/day at six months after initiation of basal analogue insulin. Secondary outcomes include percent of patients on twice daily doses, reported symptomatic hypoglycemia without hospitalization or ER visit, hypoglycemia requiring hospitalization or ER visit, weight gain, other adverse effects, change in glycosylated hemoglobin, and cost per patient per six month period. The study will be powered to detect a difference in doses of greater than 50 percent.

RESULTS/CONCLUSIONS:
Research is in the data collection phase. Final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

To explain the different dosing strategies used for the basal analogue insulins and their potential effects on the total dose used per day.

To identify potential differences between insulin detemir and insulin glargine with respect to patient outcomes.

Self Assessment Questions:

True or False: Both insulin glargine and insulin detemir are FDA approved for twice daily dosing.

Which of the following patient outcomes may be potentially impacted by basal analogue insulin therapy?
a.Hypoglycemic episodes
b.Hemoglobin A1c
c.Weight
d.Fasting blood glucose
e.All of the above

IMPLEMENTATION OF NEW INSULIN INFUSION PROTOCOL IN INTENSIVE CARE UNIT

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Purpose: The purpose of this study is to implement an insulin infusion protocol in the ICU setting to increase the percentage of blood glucose values within the target range 100-140mg/dL without increasing hyperglycemic or hypoglycemic events.
Methods: Preliminary data was collected on ICU patients, including ICU length of stay, diagnosis upon admission, blood glucose values while in ICU, diabetic medication regimen, and source of nutrition. Inclusion criteria for the preliminary patient population consisted of the following: ICU status on one of the three days selected for data collection, ICU stay greater than 3 days, at least 18 years of age, and at least one episode of hyperglycemia (blood glucose >160 mg/dL). An insulin infusion protocol will be implemented in a medical/surgical ICU. All patients admitted to the ICU will get finger-stick blood glucose checks every 6 hours for 72 hours. If a patient has at least two blood glucose readings >160 mg/dL, a Glucommander-managed continuous insulin infusion protocol will be initiated. The protocol will titrate to a target blood glucose range of 100-140 mg/dL. Data will be collected on the follow-up patient population and compared to that of the preliminary group regarding ICU length of stay, percentage of blood glucose values within target range, hyperglycemic events (blood glucose > 160 mg/dL) and hypoglycemic events (blood glucose < 70 mg/dL).
Results: Seventy-seven patients met inclusion criteria for the preliminary patient population. The average ICU length of stay for this group was 7.56 days. Of 2931 blood glucose readings, approximately 35.5% were within target range, while 37.6% were greater than 160 mg/dL.
Conclusions: The preliminary data collected provide an opportunity for improvement of glycemic control. A new continuous insulin infusion protocol will be implemented in an effort to increase the number of blood glucose readings within target range.

Learning Objectives:

List the complications associated with hypoglycemia and hyperglycemia.

Describe a treatment plan to improve glycemic control in an ICU patient.

Self Assessment Questions:

True or False. Hyperglycemia has been associated with increased morbidity and mortality, increased infection, prolonged wound healing and poorer outcomes in acute myocardial infarction and stroke patients.

What challenges are prevalent in the implementation of a new insulin infusion protocol?

ADHERENCE TO HIGH DOSE ATORVASTATIN AFTER ACUTE CORONARY SYNDROMES AND PREDICTORS OF DISCONTINUATION

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Purpose: Clinical evidence supports the use of intensive lipid lowering therapy (LLT) with statins due to decreased rates of reinfarction and secondary stroke compared to more mild or moderate doses of LLT following acute coronary syndromes (ACS). High dose atorvastatin (80 mg per day) is one of the preferred modalities of intensive LLT due to both its potency as well as extensive clinical data supporting its use in the ACS setting. However, little is known about the how often a patients statin therapy is modified based on extemporaneous factors or due to adverse events. This study is a prospective, observational cohort trial designed to assess post-discharge adherence in a population of 100 patients with recent ACS.
Methods: Patients (age > 18) will be enrolled in this study if they are admitted to the inpatient cardiology service at the University of Kentucky with a diagnosis of ACS, and are prescribed atorvastatin 80mg daily at discharge. The primary outcome is to determine the rate of adherence to high-dose atorvastatin at one and three months post-discharge. Secondary outcomes of the study are to determine independent predictors of atorvastatin discontinuation. Outcomes and reason for discontinuation will be collected using a telephone questionnaire at one and three months post-discharge. The questionnaire is designed to measure adherence, cost of medication (cash or co-pay), and change to alternative statin (including dose) or other anti-hyperlipidemic agent. Patients who cease therapy due to intervention from primary care provider, patient self-discontinuation, and any perceived adverse event will also be identified.
Results and Conclusions: Nine patients have been enrolled and one month data collected from one patient (100% adherence). Enrollment in this trial is ongoing and partial or full results will be presented at the meeting.

Learning Objectives:

Recall the rates of adherence to high-dose atorvastatin (80mg daily) at one and three months post discharge.

Recall independent predictors for discontinuation of high dose lipid lowering therapy (atorvastatin) therapy.

Self Assessment Questions:

Patients prescribed high-dose lipid lowering therapy (LLT) with atorvastatin 80mg daily have their therapies modified 50% of the time at one and three months post-discharge. T/F

Cost of high-dose lipid lowering therapy (atorvastatin 80mg daily) is a predictor for discontinuation of pharmacotherapy post-discharge. T/F

DESIGN AND IMPLEMENTATION OF A PHARMACY DEPARTMENT SCORECARD.

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Purpose: A scorecard is a strategic planning and management tool that is used to align business activities to the vision and strategy of the organization, improve internal and external communications, and benchmark organizational performance against strategic goals. The scorecard will provide a snapshot view of high performance indicators on a number of important clinical, operational, quality, safety, and financial measures. The goal of this project is to create a department scorecard with a maximum number of automated reports. The design and implementation of a pharmacy department scorecard will allow pharmacy managers to present pharmacists with opportunities to improve both the quality and efficiency of care to patients and demonstrate the value of pharmacists as part of the health care team. The scorecard will also be used for internal director-level monitoring of department performance.

Methods: The scorecard will have three different views: department, manager, and staff. The Director of Pharmacy will utilize the "department view" to track financial performance, benchmark with other hospitals, and monitor compliance with organizational goals. The managers will utilize the "manager view" to track medication errors, monitor pharmacist clinical services (e.g., pharmacokinetic services, warfarin dosing, etc.), and see a "snapshot" of individual staff performance to provide additional objective feedback during performance evaluations. The "staff view" will be presented at department meetings to demonstrate how the department is performing financially, the number of conducted medication histories, and highlight areas for improvement. The scorecard will be aligned with the high-level organizational goals, as well as the more focused pharmacy departmental goals. The scorecard will be designed with feedback from the Director of Pharmacy, pharmacy managers, and pharmacy staff. After implementation of the scorecard, the management group will provide feedback on the indicators evaluated and the scorecard will be revised throughout the year.

Results/ Conclusion: Data collection is in progress. Results and conclusion will be presented at the conference.

Learning Objectives:

Identify the benefits of a scorecard that provides an snapshot view of high performance indicators on a number of important clinical, operational, and financial measures.

Describe the importance of designing and implementing a pharmacy department scorecard to present pharmacists with opportunities to both improve quality and quantity of care to patients and demonstrate the value of pharmacists as part of the health care

Self Assessment Questions:

T/F: The scorecard is a strategic planning and management system that is used to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organizational performance against strategic goals.

T/F: The ultimate purpose of the scorecard is to provide an annual progress report of the departments achievements and growth.

TARGETED ANTIFUNGAL PROPHYLAXIS WITH CASPOFUNGIN FOR PREVENTION OF INVASIVE FUNGAL INFECTIONS AFTER LIVER TRANSPLANTATION: A RETROSPECTIVE ANALYSIS

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Background: Invasive fungal infection (IFI) is a well-documented and potentially life-threatening complication following orthotopic liver transplantation (OLT). At Rush University Medical Center, OLT recipients with at least one of the following risk factors for IFI are considered high risk and receive caspofungin for antifungal prophylaxis: hemodialysis or mechanical ventilation pre-transplant, renal replacement therapy post-transplant, allograft failure requiring re-transplantation during the same admission, and re-exploration within 7 days of transplantation. Prophylactic treatment is continued for the course of the intensive care unit stay, a total of seven days post transplant on the floor, or until a proven invasive fungal infection occurs.

Objective: The objective of this study is to determine the impact of prophylactic caspofungin on the incidence of invasive fungal infections in orthotopic liver transplant recipients at high risk for developing an IFI. Other objectives include assessing compliance with the caspofungin protocol instituted at Rush and reviewing the accuracy of selection of caspofungin candidates.

Methods: Prior to study commencement, this study was submitted to The Rush University Medical Center Investigational Review Board. This retrospective chart review evaluated orthotopic liver transplant cases performed between June 2007 and October 2008. Each patient was assessed for accuracy of identification as high vs. low risk and response to caspofungin prophylactic therapy. Patients were excluded if the liver transplant could not be completed due to surgical complications. Data collection of patient characteristics included medical record number, age, weight, gender, past medical history (including cause for liver transplant), allergies, risk factors for IFI, caspofungin regimen, concomitant antibiotic therapy, immunosuppressive therapy, location, primary service, length of stay, positive cultures, source and site of infection, adverse drug events, and outcome (i.e. development of IFI).

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

Learning Objectives:

Identify factors that increase the risk of invasive fungal infection in orthotopic liver transplant patients

Describe the effect of caspofungin prophylaxis on the development of an invasive fungal infection in orthotopic liver transplant patients

Self Assessment Questions:

Which of the following may increase the risk of invasive fungal infection in an orthotopic liver transplant patient?
a. Hemodialysis pre-transplant
b. Mechanical ventilation pre-transplant
c. Allograft failure requiring re-transplantation during the same admission
d. All of the above

True or False. Advantages to caspofungin over other antifungals for the prevention of invasive fungal infections in orthotopic liver transplant patients include Candida and Aspergillus coverage, once daily dosing and a relatively favorable safety profile.

THE HEMODYNAMIC EFFECTS OF VITAMIN D IN HEART FAILURE

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Purpose:
Recent data has suggested that vitamin D and the vitamin D receptor may play a pivotal role in the pathogenesis of heart failure. In rat models, vitamin D deficiency, or absence of the vitamin D receptor, has been linked to activation of the renin-angiotensin-aldosterone system, cardiac hypertrophy, cardiac fibrosis, and inflammatory cytokine activation. These concepts have also translated to humans, with lower levels of vitamin D seen in heart failure patients compared to controls, and lower vitamin D levels being associated with more severe heart failure. Genetic variation in the vitamin D receptor has been documented in several genes. Specific sequence variations can affect the functionality of the receptor, specifically the presence of the BB genotype of the BsmI polymorphism. This study will be the first to evaluate hemodynamic and cytokine elevation in regard to vitamin D levels and receptor polymorphism. It will provide preliminary data to support the future study of vitamin D and heart failure, particularly the issue of supplementation and outcomes.

Methods:
Adult patients with a diagnosis of systolic heart failure scheduled to undergo a right heart catheterization will be eligible for enrollment. After obtaining informed written consent, blood samples will be collected during the catheterization to determine the 25-hydroxyvitamin D level, tumor necrosis factor alpha (TNF-α) concentrations, and the genotype of the BsmI vitamin D receptor polymorphism. Hemodynamic measurements that will be obtained during the right heart catheterization include cardiac index, pulmonary capillary wedge pressure, and systemic vascular resistance. Hemodynamic measurements and TNF-α concentrations will be compared between patients with low 25-hydroxyvitamin D levels and those with sufficient levels. Hemodynamic measurements and TNF-α concentrations will also be compared between patients with the BB genotype of the vitamin D receptor and those without the BB genotype.

Learning Objectives:

List the metabolism and physiologic actions of vitamin D

Recall the pathogenesis of vitamin D deficiency as it relates to heart failure

Self Assessment Questions:

Vitamin D deficiency likely contributes to cardiovascular disease due to which of the following?
a. Hypocalcemia
b. Decreased bone mineral density
c. Activation of the renin-angiotensin system
d. All of the above

The primary organ involved in the formation of the activated form of vitamin D is
a. Skin
b. Kidney
c. Liver
d. Gastrointestinal tract

DEVELOPMENT AND IMPLEMENTATION OF A WARFARIN PRE-PRINTED ORDER SET

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Purpose:
Warfarin is a commonly prescribed anticoagulant in the inpatient setting for the prevention of venous thromboembolism. One of the biggest challenges is achieving the international normalized ratio (INR) in an efficient time period so as to not further prolong hospital stay either due to insufficient anticoagulation or over-anticoagulation. Currently, there are various protocols widely used in practice; however, at The Toledo Hospital (TTH), there is no documentation of a consistent approach to treatment initialization, monitoring, over-anticoagulation, and patient education. The purpose of this project is to determine the efficacy of a pre-printed order set (PPO) in the inpatient practice setting. The PPO is designed to standardize treatment initialization, dose modification, and monitoring based upon the patients disease state, drug interactions and indication for warfarin.

Methods:
Data will be collected and analyzed on patients receiving warfarin over a minimum two-week period. Patients will be identified by performing an audit within the GE Centricity system. Data to be collected includes: indication for warfarin, time to reach goal INR, adverse drug reactions, INR and dose at time of discharge, documentation of patient education, and use of an anticoagulation flowsheet that has been developed for chart documentation of anticoagulation therapy.

Results:
Data is currently being collected and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

To review the mechanisms of warfarin anticoagulation.

Discuss the benefits of a warfarin pre-printed order set, anticoagulation flowsheet, and anticoagulation reference guide in providing a coordinated approach to anticoagulation.

Self Assessment Questions:

Vitamin K is the only method used in treating a supratherapeutic INR. T or F

Which of the following vitamin-K dependent clotting factors is affected first after warfarin administration?
a) protein S
b) factor X
c) factor IX
d) factor VII
e) all of the above are affected simultaneously

EFFICACY AND SAFETY OF PERIOPERATIVE EPIDURAL ANESTHETIC ANALGESIC DRUG COMBINATIONS

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Background:
Epidural analgesia is superior to parenteral opioids for perioperative pain management. It is known epidural analgesia attenuates the stress response and potentially reduces complications, morbidity, and mortality postoperatively. Conversely, epidural use carries the risk of epidural abscess, hematomas and other adverse drug reactions. The current practice in epidural regimens includes an analgesic alone or in combination with a local anesthetic. At present, little evidence exists regarding the optimal drug dose and regimen to prevent complications.

Objective:
The primary outcome of this study is to determine the mean effective dose and epidural drug combination with minimal hemodynamic adverse effects. Secondary outcomes include correlations between the dose and epidural placement site or patient variables, hospital and/or intensive care unit (ICU) length of stay, and incidence of medical complications.

Methods:
This is a prospective, observational study, evaluating the efficacy and safety of epidural formulations used perioperatively at 3 hospitals within the Detroit Medical Center over a two-year period. Patients were included if age ≥ 18 years, received epidural analgesia, and underwent various surgical procedures or trauma. Obstetrics and patients who only received a nerve block were excluded. Patients were case-matched according to surgery specialty and compared according to the epidural drug(s) used. Safety was evaluated by monitoring the blood pressure 30 minutes prior to entering the operating room (OR), then every 15 minutes while in the OR and post anesthesia care unit or ICU. Baseline information collected include demographics, comorbid conditions, social history, medications prior to admission, and patient physical status and severity of illness as determined by the Acute Physiology and Chronic Health Evaluation (APACHE) II, American Society of Anesthesiologists (ASA) Physical Status, and Physiologic and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM) scores.

Results and Conclusion:
Final results will be presented at the conference.

Learning Objectives:

State the benefits of epidural analgesia for perioperative pain management.

Identify the advantages and disadvantages of using certain epidural anesthetic analgesic drug combinations.

Self Assessment Questions:

True or False. Epidural anesthesia and analgesia has shown to benefit the following organ systems: neurologic, cardiovascular, coagulation, pulmonary, and gastrointestinal physiology.

The benefit of using a combination of local anesthetics and opioids for epidural analgesia include:
a.Synergy
b.Reduced adverse drug effects
c.Preservation of motor function
d.All of the above

APPROPRIATE USE OF STRESS ULCER PROPHYLAXIS IN GENERAL MEDICINE PATIENTS

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Purpose: This study compared the appropriate use of stress ulcer prophylaxis in general medicine patients before and after physician education.
Methods: For a one month period, 122 patient medical records were reviewed to determine if the utilization of acid suppressive therapy (AST) to prevent stress ulcers was appropriate. A didactic lecture given by a registered pharmacist was then provided to the Saint Louis University (SLU) Family Practice Residents outlining risk factors, recommended treatment options, and potential complications of AST as it relates to stress ulcer prophylaxis based on the American Society of Health-System Pharmacists guidelines and a review of published medical literature. Following the educational intervention, 54 patient medical records from a one month period were evaluated to assess the appropriateness of AST for stress ulcer prophylaxis. The charts reviewed were those of patients admitted to the general medicine floors at a 498-bed community hospital receiving care from the SLU medical teams and given histamine-2 antagonists or proton pump inhibitors. Appropriate stress ulcer prophylaxis before and after physician education was compared using the Chi-square test (alpha = 0.05).
Results: During the month prior to the educational intervention, 72 patients were prescribed AST for stress ulcer prophylaxis and 10 patients (13.9%) met criteria for stress ulcer risk. Following a didactic lecture, 16 patients were prescribed AST for stress ulcer prophylaxis with 6 patients (37.5%) meeting criteria for high risk. The number of patients appropriately receiving AST for stress ulcer prophylaxis significantly improved after physician education (p=0.0268).
Conclusions: By expanding this type of pharmacist-driven educational programming to target the misuse of other medications, the intervention can potentially prevent unnecessary medication cost, polypharmacy, drug-drug interactions, drug-disease interactions and adverse effects.

Learning Objectives:

Describe the risk factors for developing stress-related mucosal damage.

Discuss the impact that a pharmacist-delivered educational intervention has on the use of stress ulcer prophylaxis in general medicine patients.

Self Assessment Questions:

What are the two independent risk factors for developing stress ulcers?

How quickly can a patient at risk for stress ulceration develop mucosal damage?

COMPLIANCE WITH ANTIMICROBIAL DOSING RECOMMENDATIONS FOR SURGICAL SITE INFECTION PROPHYLAXIS

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Purpose: The primary objective of this study was to evaluate compliance rates with weight based antimicrobial dosing recommendations for surgical site infection (SSI) prophylaxis prior to and after the implementation of institutional guidelines and a dose optimization program. Secondary measures included the impact of pharmacist intervention on dosing compliance and the impact of compliance on SSI rates. In order to promote compliance with weight based dosing recommendations, this study also aimed to identify and target any barriers to compliance.

Methods: This IRB-approved retrospective analysis reviewed antimicrobial prescribing in adult surgical patients at the University of Michigan three months (Apr-June 2008) prior to and three months (Sept-Nov 2008) after implementation of dosing guidelines and a dose optimization program. Antimicrobial use data was obtained from the Department of Anesthesiology peri-operative documentation system, the computerized physician order entry system, and infection control. Patients with a documented weight of ≥ 80 kg requiring SSI prophylaxis were included in the analysis. Patients weighing < 80 kg, those without a weight documented or those who underwent procedures not requiring antimicrobial prophylaxis were excluded.

Results: A total of 4024 procedures were evaluated (1909 from Apr-June, 2115 from Sept-Nov). After implementation of institutional guidelines and a dose optimization program, compliance with published weight based dosing recommendations for SSI prophylaxis increased from 45.1% to 74.8% ($P < 0.001$). Pharmacy dose optimization accounted for nearly 20% of compliant orders. SSI rates and barriers to dosing compliance are currently being evaluated.

Conclusion: Implementing institutional guidelines and a pharmacy managed dose optimization program significantly increased compliance rates with weight based dosing recommendations for SSI prophylaxis. After identification of barriers to compliance, modifications to current practices will be implemented to further increase compliance rates. The impact of dose optimization on SSI rates is yet to be determined.

Learning Objectives:

Describe the importance of adequate surgical site infection prophylaxis

Review the weight based dosing recommendations published by the National Surgical Infection Prevention Project

Self Assessment Questions:

True/False: Surgical site infections are considered one of the most common nosocomial infections.

True/False: The Centers for Medicare and Medicaid Services reimburses hospitals for health care costs associated with mediastinitis following coronary artery bypass grafting.

EVALUATION OF IPRATROPIUM UTILIZATION FOR ACUTE ASTHMA EXACERBATIONS IN AN INPATIENT PEDIATRIC POPULATION

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Background: Ipratropium bromide is a quarternary anticholinergic bronchodilator that, until August 2007, was included in the National Heart, Lung, and Blood Institutes guidelines for the management of asthma as adjunctive treatment for acute exacerbations after patients had been hospitalized. Updates to the most recent guidelines, however, state that ipratropium is no longer recommended for the hospital management of acute exacerbations. Ipratropium may still be recommended in the emergency department in an effort to prevent hospitalization, but once admitted, ipratropium has not been shown to provide additional benefit in the treatment of an acute asthma exacerbation.

Purpose: To evaluate the current utilization of ipratropium in pediatric patients admitted for an acute asthma exacerbation.

Methods: This study is a retrospective chart review of patients, aged 1 to 18 years old, who were admitted to the general pediatric floor at Bronson Methodist Hospital with a primary diagnosis of an acute asthma exacerbation between October 2007 and October 2008. Data collected will include patient demographics, admitting service, home asthma medications, asthma severity, previous hospitalization/emergency room visits for asthma, asthma medication/oxygen use in the hospital, and duration of hospitalization. Rates of ipratropium use will be calculated and factors associated with use will be identified using regression analysis. Specific outcomes (inpatient asthma medication use, oxygen utilization, and length of hospitalization) for patients who received ipratropium will be compared to those patients who did not.

Results/Conclusion: Data collection and analysis is ongoing, with preliminary results to be presented at the Great Lakes Conference.

Learning Objectives:

Describe the current recommendations for the management of pediatric patients presenting with an acute asthma exacerbation.

Discuss the role of ipratropium bromide in the management of pediatric patients with an acute asthma exacerbation.

Self Assessment Questions:

True or False. The repetitive or continuous administration of short-acting beta2-agonist is the most effective means of reversing airflow obstruction.

True or False. Ipratropium is no longer recommended in the emergency department in an effort to prevent hospitalization.

COMPARING POSTOPERATIVE PAIN MANAGEMENT IN ADULT ORTHOPEDIC SURGERY PATIENTS WITH OR WITHOUT A CONTINUOUS PERIPHERAL NERVE BLOCK

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Purpose: Perineural analgesia with local anesthetics is emerging as the treatment of choice over traditional analgesia with systemic opioids for postoperative pain management following orthopedic surgeries at our rural 500-bed community teaching hospital. Previous research evaluating perineural analgesia for orthopedic surgeries usually failed to show statistical significance, as only a small number of patients were included. Furthermore, only one type of orthopedic surgery was studied, thereby limiting the generalizability of the results.

Objectives: The primary objective of this study is to compare the postoperative opioid consumption in adult orthopedic surgery patients receiving perineural analgesia versus traditional analgesia. The secondary objectives are to compare pain scores, adverse events, lengths of stay, and patient charges between groups.

Methods: An IRB exemption form was submitted to the Institutional Review Board. A randomized, retrospective chart review was conducted to compare the postoperative pain management of 200 adult patients that underwent an orthopedic surgery between 2007 and 2008. The traditional group was defined as those patients that did not receive a continuous peripheral nerve block postoperatively and the perineural group was defined as those patients that did receive a continuous peripheral nerve block postoperatively. Patients that had a chronic scheduled opioid preoperatively, a hemiarthroplasty, or a revision arthroplasty were excluded. A subgroup analysis of postoperative pain management will further categorize patients according to the type of orthopedic surgery: total knee, hip, or shoulder arthroplasty. Data is being collected on patient demographics, preoperative opioids, orthopedic surgeries, anesthetic procedures, postoperative opioids (intravenous morphine equivalents), pain scores, adverse events, length of stay, and patient charges. The data will be analyzed to identify any potential correlations between postoperative pain management and patient outcomes.

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

Learning Objectives:

Describe the potential benefits and risks of using local anesthetics for postoperative pain management.

Compare and contrast the most common adverse events associated with local anesthetics and systemic opioids.

Self Assessment Questions:

True/False: Potential complications of local anesthetics include hematomas, nerve damage, and systemic toxicity.

Which adverse event(s) occur more commonly with local anesthetics than systemic opioids?
a. Nausea/Vomiting
b. Pruritis
c. Motor/Sensory Block
d. b and c
e. All of the above

EVALUATION OF STRESS ULCER PROPHYLAXIS USE IN NON-ICU PATIENTS

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Background: Medications used for stress ulcer prophylaxis, including proton pump inhibitors (PPIs) and H2-receptor antagonists, are among the most commonly prescribed drugs in the hospital setting. Stress ulcer prophylaxis in non-critically ill patients is questionable due to the low risk of bleeding associated with this patient population. The overuse of stress ulcer prophylaxis medications has been associated with increased costs to the patient and the institution. Excess PPI use has been associated with complications such as community-acquired pneumonia and Clostridium difficile-associated infections. Prescribing protocols for stress ulcer prophylaxis in ICU patients have helped reduce hospital costs while decreasing inappropriate prophylaxis. Implementing similar prescribing protocols on non-ICU floors and educating physicians regarding proper use of stress ulcer prophylaxis could improve prescribing habits, decrease healthcare costs, and reduce the number of patients discharged on PPIs and/or H2-receptor antagonists.

Study Design and Methods: Data collection will be obtained from two general medicine floors in the hospital from November 23, 2008 through April 10, 2009. Patient eligibility will be determined by using a predefined set of exclusion criteria. A worksheet with these criteria and other general information will be used to record data. During Phase I, data was collected until a minimum of 228 patients were evaluated. Recommended prescribing practices for stress ulcer prophylaxis use on these same floors will be presented to two internal medicine groups within the hospital to minimize PPI and H2-antagonist use in patients without a true indication for prophylaxis. Following physician education, Phase II data collection will commence on these floors during February 2009 through April 10, 2009. Results will be compared to stress ulcer prophylaxis use from Phase I data and during the same time period from one year ago.

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

Learning Objectives:

Recall stress ulcer prophylaxis use in non-ICU patients and determine when prophylaxis in this patient population is necessary.

Describe a cost-effective analysis to determine if cost savings is associated with appropriate stress ulcer prophylaxis prescribing practices in general medicine patients.

Self Assessment Questions:

1.True/False: Patients who are taking a proton pump inhibitor are at risk of developing community-acquired pneumonia (CAP) and C. difficile infections.

2.True/False: According to the ASHP Stress Ulcer Prophylaxis guidelines, patients who are on mechanical ventilation > 48 hours and have a coagulopathy should be on stress ulcer prophylaxis.

EXTENDED-INTERVAL AMIKACIN DOSING FOR THE TREATMENT OF MYCOBACTERIUM INFECTIONS

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Purpose:
There are limited data to support an optimal dosing strategy of amikacin for the treatment of nontuberculous Mycobacterium (NTM) infections. Amikacin doses for Mycobacterium infections are loosely based on the strategies employed for the treatment of Gram-negative bacterial infections. For these infections, sufficient data support large, intermittent doses compared to multiple daily doses with regard to efficacy and toxicity. Considering Mycobacterium replicate at a considerably slower rate than other pathogenic bacteria, the dosing of amikacin for these infections has been modified, using a daily, five times weekly, thrice-weekly, or twice-weekly regimen. It is unclear if this is the most efficacious and least toxic dosing regimen for the treatment of NTM infections. The objective of this project was to develop treatment guidelines to ensure a consistent approach when utilizing amikacin to treat NTM infections at Froedtert Hospital.

Methods:
This project assessed historical and contemporary literature regarding aminoglycoside dosing, efficacy, and toxicity specific to NTM infections. IRB approval was obtained. Retrospective data were collected via chart review of all patients who received amikacin between June 2004 and July 2008. The organism, susceptibilities, and previous treatments, including amikacin, were recorded. The amikacin dose, frequency, duration, adjustments, and corresponding kinetic data such as peaks, troughs, and random levels were also recorded, as well as the individual daily serum creatinine, white blood cell count. The dosing variations and correlating efficacy data will be analyzed, with consideration to the pharmacoeconomic and pharmacokinetic parameters of each regimen. This project will contribute to the development of hospital-specific treatment guidelines for the use of amikacin to treat NTM infections.

Summary of Preliminary Results:
Fifty-seven patients were identified as having been treated with amikacin for NTM infections during the four year data collection period. Analysis is ongoing and results will be presented.

Learning Objectives:

Identify the epidemiology and pathology of NTM infections and which patient populations are at risk.

Identify the treatment and dosing options of antibiotics used for NTM infections.

Self Assessment Questions:

According to the ATS/IDSA guidelines for the treatment of NTM infections, when should amikacin be considered for the treatment of Mycobacterium avium complex?

According to the ATS/IDSA guidelines, what dosing options of amikacin are recommended for the treatment of Mycobacterium abcessus?

EXAMINATION OF VITAMIN D ANALOG DOSING IN END STAGE RENAL DISEASE PATIENTS IN AN OUTPATIENT DIALYSIS CENTER.

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Purpose
Vitamin D analog supplementation can ameliorate mineral and parathyroid hormone (PTH) imbalances in patients with severe chronic kidney disease (CKD) that may otherwise lead to osteitis fibrosa. Alternatively, overly aggressive supplementation can profoundly alter calcium, phosphorus, and PTH levels increasing the risk of cardiovascular complications and adynamic bone disease. Administration of vitamin D analogs is governed by a Kidney Disease Outcomes Quality Initiative (KDOQI)-based physician approved protocol at our institution. Approximately one year ago, the responsibility for application of the protocol was shifted from nursing staff to a team of dieticians who work closely with the nephrology staff. The purpose of this review is to determine if this shift in responsibility has resulted in increased adherence to the protocol and what impact physician preference plays in vitamin D analog dosing.

Methods
This is a retrospective review of the execution of a physician approved vitamin D analog dosing protocol in adult patients with end stage renal disease (ESRD) who have received dialysis at our main dialysis clinic for at least 4 consecutive months from July 2007 to August 2008. Sixty patients were included in the analysis. Electronic medical records were reviewed to obtain serum calcium, phosphorus, albumin, PTH levels, and Vitamin D analog dosages. The analysis will compare dose adjustments actually made to adjustments that should have been made per protocol for six months of nursing and six months of dietician driven dosing. Further, rate of protocol based adjustments will be compared among the different nephrologists.

Results/Conclusions
Data processing is ongoing. Final results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify goal calcium, phosphorus, and parathyroid hormone levels for dialysis dependent patients.

Review drug therapy utilized in end stage renal disease to prevent renal osteodystrophies and potentially reduce cardiovascular mortality.

Self Assessment Questions:

What is the goal parathyroid hormone level for patients with chronic kidney disease stage V?

What laboratory values should be factored into vitamin D analog dosing?

THE USE OF NICOTINE REPLACEMENT THERAPY IN A NEUROSURGERY CARE UNIT

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Purpose: Nicotine may provide a benefit in patients with neurological injury. The objective of this study is to evaluate the effects of transdermal nicotine replacement therapy (NRT) on discharge disposition in patients admitted to the neurosciences intensive care unit (NSICU) at the University of Illinois Medical Center at Chicago.

Methods: Electronic medical records, NSICU admission logs, and pharmacy dispensing records will be used to identify patients admitted to the NSICU between January 2001 and August 2008. Eligible patients will be placed into three groups: smokers that received NRT, smokers that did not receive NRT, and non-smokers. Patients who expired within 3 days of admission to NSICU, received NRT after 7 days of admission to NSICU, or are younger than 18 years of age are excluded. Data will be analyzed to determine the effect NRT has on discharge disposition. Discharge disposition will be recorded and classified as favorable (home or outpatient rehab) or unfavorable (inpatient rehab, nursing home, hospice, or death). Overall mortality, length of hospital and NSICU stay, and rates of SAH rebleed, ischemic stroke, ICH, and angiographic vasospasm after the first clinical event will also be analyzed. Power analysis via SAS 9.1 indicates a sample size of 113 in each group will have 80% power to detect a 30% reduction in unfavorable outcomes, based on current unfavorable outcomes rate of 70%, using a Pearson chi-square test with a Bonferroni-corrected, two-sided significance level at 0.017. In addition, a logistic regression analysis will be performed. Results will be presented at the Great Lakes Pharmacy Resident Conference. Data will be collected and analyzed without patient identifiers to maintain confidentiality. Institutional Review Board approval was obtained prior to data collection.

Learning Objectives:

State the pharmacological effects of nicotine

Describe the potential benefits of nicotine in patients with neurological injury

Self Assessment Questions:

Recent studies suggest that the cardiovascular and hematological effects of tobacco may be due to:
a.Nicotine
b.Nicotine withdrawal
c.Excipients in tobacco smoke
d.All of the above

Epidemiological studies and animal studies have shown a potential benefit of nicotine for:
a.Parkinsons Disease
b.Cerebral ischemia
c.Neurotrauma
d.All of the above

EVALUATION OF FIXED-DOSE COMBINATION DRUG RECOMMENDATIONS FOR DIABETES AND CARDIOVASCULAR CONDITIONS IN A MEDICATION THERAPY MANAGEMENT PROGRAM

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Background: One component of a medication therapy management (MTM) program is a comprehensive medication therapy review. A recommendation made by pharmacists in the final assessment is to encourage the switch from two medications to a fixed-dose combination drug (FDCDs). FDCDs are advantageous for members requiring more than one medication to control chronic conditions, such as diabetes and cardiovascular conditions. Switching to FDCDs can help members decrease their pill burden and improve medication adherence.

Purpose: The primary objective is to determine the success rate of members who switched to an FDCD upon intervention by MTM pharmacists. The secondary objectives are to calculate the recommendation rate and identify alternate recommendations that were made for qualifying members who did not receive recommendations to switch to FDCDs.

Methods: The study was a retrospective analysis of de-identified claims data from one Medicare Part D client enrolled in an MTM program managed by clinical pharmacists in a pharmacy benefit management (PBM) setting. Members were included if they took two medications with daily doses that were equivalent to the available strengths of FDA-approved FDCDs on an assessment date in 2007. Cases that met the inclusion criteria were reviewed for documentation of an FDCD recommendation to determine the success rate and recommendation rate. Cases without an FDCD recommendation were further analyzed for clinical decisions as to why an FDCD product was not recommended.

Results and Conclusion:
Pending data collection and analysis

Learning Objectives:

Describe the benefits of switching drug therapy regimens to include fixed-dose combination drugs (FDCD) for patients.

Discuss how other medication-related problems may interfere with the ability for a pharmacist to recommend a switch to an FDCD.

Self Assessment Questions:

Which of the following is(are) true for patients taking FDCDs?
a.FDCDs allow patients to take two separate medications as one, convenient formulation.
b.FDCDs may help patients improve their adherence by reducing the number of medications taken per day.
c.FDCDs allow the patient to pay one copay for the FDCD instead of two copays for two separate medications.
d.all of the above.

Which of the following is or are example(s) of other types of recommendations that may be made by pharmacists providing medication therapy management consultations?
a.a therapeutic interchange
b.a change in therapy due to a drug-drug interaction
c.a switch from a brand to generic medication
d.all of the above

EVALUATING THE EFFICACY AND TOLERABILITY OF STATIN RECHALLENGE IN VETERAN PATIENTS WITH A DOCUMENTED ADVERSE DRUG REACTION

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Background:
Statins are the most effective lipid lowering medication for reducing low density lipoprotein (LDL) cholesterol. They are usually very well tolerated; however, they can cause muscle related symptoms and increase liver transaminases which may warrant discontinuation of therapy. Rechallenge with an alternative statin may be necessary in order for patients to attain their goal LDL. However, there are no consistent recommendations as to which statin and dose may be optimal as a rechallenge in this subset of patients.

Purpose:
The purpose of this study is to evaluate how well patients with a history of statin-induced myopathy or statin-induced elevations in serum transaminase are able to tolerate treatment when rechallenged with a statin. Additionally, the percentage of patients who were able to attain their LDL goal will be assessed.

Method:
This study will be a retrospective electronic chart review of patients at the Jesse Brown Veterans Affairs Medical Center (JBVAMC). Patients included in the study will be those greater than the age of 18 with a documented muscle or liver related adverse drug reaction to a statin and were rechallenged with the same statin or different statin between January 1, 2007 and December 31, 2007. Patients will be excluded from the study if they have an underlying muscle disorder (e.g. muscular dystrophy, Guillian Barr Syndrome, viral illnesses and/or severe dyskinesia) or have elevated CK and/or serum transaminase at baseline from any other causes. Patients will be followed for up to 6 months after rechallenge with a statin. The primary outcome is the number of patients who remained on the rechallenged statin at 6 months to follow up.

Results:
This research is in the data collection phase. Final results with conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe risk factors for the development of statin-induced myopathy or statin-induced elevations in serum transaminase.

Discuss if patients with a history of statin-induced myopathy or statin-induced elevations in serum transaminase are able to tolerate treatment with a rechallenged statin.

Self Assessment Questions:

True or False: Patients who are unable to tolerate a statin may be successfully rechallenged with an alternative statin.

True or False: Combination therapy with fenofibrate/niacin with statins can increase the risk of myopathy.

ASSESSMENT OF BMD SCREENING AND SUBSEQUENT THERAPEUTIC INTERVENTIONS IN PATIENTS AT RISK FOR OSTEOPOROSIS

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Purpose: The aim of this study is to determine if DXA scans are performed in a timely manner in patients who meet the criteria for bone mineral density screening and does such assessment improve the quality of life in patients with osteoporosis/osteopenia by allowing appropriate treatments to be initiated promptly.

Method:
This is a retrospective chart review in which patients charts from UIC Family Medicine Clinic will be reviewed between the dates 8/31/03 to 9/1/08 to identify if recommendations for DXA scans are made in the required patient population. Additionally if DXA scans are performed we are to determine if the results are recorded in the charts. And finally to record and assess interventions, if any, that are made.
The following data will be collected from the patients chart: Patient demographics - Age, gender, weight, BMI, race ; Social history - Tobacco use, alcohol; Age at menopause and use of hormone replacement therapy; Personal and family history of fractures; Disease states associated with osteoporosis such as rheumatoid arthritis and hyperparathyroidism; History of oral steroid use ever; Documentation of DXA scan performed ; Past medication history; Medication compliance by reviewing patients chart. Upon collecting the patients past medical history it will be determine if patients have met the criteria for a DXA scan and such results will be documented on the data collection sheet. In addition the patients FRAX scores will be calculated and recorded after data collection.

Results:
Pending

Learning Objectives:

Discuss if DXA scanning has been recommended and completed in patients who meet the criteria for osteoporosis/osteopenia by reviewing patient medical records.

Discuss if DXA scores (T /Z scores) are reported in patients charts and if treatment is initiated based solely on those scores

Self Assessment Questions:

What are the criteria for performing DXA scans

What are the most common treatment options prescribed for patients with osteoporosis/osteopenia

CLINICAL EVALUATION OF TOBACCO CESSATION RATES AT A VETERANS AFFAIRS MEDICAL CENTER

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Purpose: Evaluate tobacco cessation rates after implementation of a smoking cessation order set for all providers at the Huntington Veterans Affairs Medical Center in Huntington, WV.
Method: An evaluation of pharmacist follow up regarding tobacco cessation and pharmacological agents was reviewed to determine whether patients stopped using tobacco or experienced any side effects from the medications. The primary endpoint was smoking cessation at one, three, and six months. Secondary endpoints were rate of side effects and adverse events associated with therapy. An evaluation of cost-effectiveness and a measurement of pharmacist workload were also made.
Results: Preliminary results of the 158 patients that are being followed show a tobacco cessation rate at one month of 14.5% for all patients (23 of 158). Of the patients that were able to be reached by telephone (49.4%, 78 of 158), there was a tobacco cessation rate of 29.6% (23 of 78). Data collection is still in progress for the three and six month follow up. The pending results for tobacco cessation rates and all other secondary endpoints will be presented at the Great Lakes Pharmacy Residency Conference.
Conclusion: The preliminary results appear to represent quit rates similar to other larger smoking cessation trials. The order set implementation appears to be a useful tool for providers in assisting patients with tobacco cessation. Final results with conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Discuss the utility and efficacy of the newly implemented tobacco cessation order set.

Define the cost effectiveness of providing smoking cessation products and pharmacist involvement in a smoking cessation program.

Self Assessment Questions:

What are the advantages/disadvantages encountered with the tobacco cessation order set implementation?

Is it cost-effective to continue providing this service to our veterans?

EVALUATION OF MEDICATION RECONCILIATION AT THE TIME OF PROGRESSIVE CARE UNIT ADMISSION AND DISCHARGE

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Purpose: In accordance with the 2008 Joint Commission on Accreditation of Healthcare Organizations National Patient Safety Goals, hospitals across the country have implemented medication reconciliation systems to minimize the impact of medication errors. At the Louis Stokes Cleveland Veterans Affairs Medical Center (LSCVAMC), a pharmacist-driven medication reconciliation program was implemented on August 18, 2008. Three full-time positions were created for medication reconciliation pharmacists to ensure appropriate medication use. The primary objective is to determine whether the creation of a new position for a Progressive Care Unit (PCU) medication reconciliation clinical pharmacist has enhanced the medication reconciliation process at admission and discharge. Changes made on admission will be analyzed to identify common discrepancies between physician- and pharmacist-completed medication reconciliation. The number of medications on admission and discharge, the number and types of interventions documented by the clinical pharmacist and the appropriateness and cost of medications continued upon discharge will be evaluated.

Methods: This is a retrospective chart review to compare patients who have or do not have the medication reconciliation process completed by a pharmacist. To qualify for the study, patients must be over 18 years of age, admitted to the PCU from September 1 through October 31, 2008 and spend at least 24 hours inpatient. Patients will be excluded from the study if they do not take any outpatient medications or use a different VAMC as their primary site for medical care. Patients admitted from or discharged to a long term care facility, nursing home or other institution will not be included. Patient charts will be randomly selected for analysis, and a data collection form was created for the purpose of collecting information from chart reviews.

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

Learning Objectives:

recognize the steps pharmacists can take to complete medication reconciliation in the inpatient setting and subsequently communicate discrepancies to care providers.

Identify common discrepancies found on medication reconciliation by a pharmacist, and discuss the benefits of and barriers to pharmacist-driven medication reconciliation processes.

Self Assessment Questions:

In accordance with JCAHOs NPSG #8 to "accurately and completely reconcile medications across the continuum of care," transitions in care include changes in:
a. Setting
b. Service
c. Practitioner
d. Level of care
e. All of the above

Upon discharge, as long as the patients next provider of care is given an updated copy of the patients medication list, there is no reason to give the patient a copy as well:
a. True
b. False

DEVELOPMENT AND EVALUATION OF A PHARMACIST-MANAGED INPATIENT ANTICOAGULATION SERVICE AT A VETERANS AFFAIRS MEDICAL CENTER

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Background: Warfarin is a widely used and highly effective oral anticoagulant for the primary and secondary prevention of thromboembolic events. Despite its widespread use, warfarin remains a high-risk medication given its narrow therapeutic index and variable dose-response relationship among patients. The Joint Commission has identified anticoagulation therapy as a significant risk to patient safety and consequently established National Patient Safety Goal 3E with the aim to minimize patient harm associated with the use of anticoagulation therapy.

Purpose: The purpose of this residency project is to develop and implement a pharmacist-managed inpatient anticoagulation service to comply with National Patient Safety Goal 3E. After implementation, a retrospective, cohort study will be conducted to evaluate the impact of the service on clinical outcomes in patients receiving warfarin.

Methods: Development of this service involved gaining support from pharmacy and medical staff, obtaining P&T approval of the anticoagulation policy, and educating and training staff pharmacists. The service was first implemented on one hospital ward with additional wards added over the course of three weeks. The service encompassed all inpatient units by January 1, 2009. The study received Institutional Review Board approval prior to commencement. Clinical outcomes will be compared between 200 consecutive inpatients receiving warfarin prior to implementation and 200 consecutive inpatients receiving warfarin after implementation. Primary outcome measures will include: the proportion of patients with an INR value greater than 5 (critical value at our institution), the proportion of patients who experience thromboembolic or hemorrhagic complications, and the proportion of patients who receive at least one dose of vitamin K classified by route of administration for reversal of therapeutic anticoagulation. A secondary outcome measure will include changes in staff pharmacist satisfaction before and after implementation based on results from survey.

Results/Conclusions: In progress.

Learning Objectives:

Describe the steps and processes involved in creating and implementing a hospital-wide service.

Describe the importance and potential benefit of an inpatient pharmacist-managed anticoagulation service.

Self Assessment Questions:

True or False: One of the expectations from the Joint Commissions 2008 National Patient Safety Goal 3E is the implementation of a defined anticoagulation management program in the outpatient and inpatient setting.

True or False: Several studies comparing pharmacist-managed inpatient anticoagulation service to anticoagulation management by individual physicians have demonstrated the clinical and economic benefit that pharmacists have in the management of anticoagulation therapy.

EVALUATION OF PARENTERAL NUTRITION PRESCRIBING AT A COMMUNITY HOSPITAL

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PURPOSE: St. Margaret Mercy (SMM) is an 800+ bed, 2 campus community hospital located in Hammond and Dyer Indiana. Parenteral nutrition with electrolyte management prior to study was customized for each patient by the clinical pharmacists. A literature review supports standardization of parenteral nutrition to reduce variation among clinicians and improve clinical appropriateness. The purpose of this study was to evaluate the current prescribing practices of parenteral nutrition at SMM and develop standardized parenteral nutrition formulas.

METHODS: Study was approved by institutional IRB Committee. A retrospective chart review of parenteral nutrition monitoring sheets was performed on 50 patients from each campus. Patients were included if they were 18 years or older and received parenteral nutrition for greater than 5 days. A data collection form was developed to record the following: age, indication, goal protein and calories, infusion rate, line site, and time until nutritional goals were met. The parenteral nutrition formula for the first 7 days of therapy was recorded for each patient.

RESULTS: Parenteral nutrition was appropriately prescribed in 97% of patients. Goal calories and protein were achieved by day 4 in 52% and 77% of patients, respectively. Reasons for not achieving goal calories were due to initiation of oral nutrition, osmolarity constraints and elevated blood glucose. Osmolarity constraints and hepatic intolerance was cited as the reasons for not achieving protein goal. The average duration of total parenteral nutrition (TPN) was 9.4 days (range 5-28days). The average duration of peripheral parenteral nutrition (PPN) was 6.9 days (range 5-13 days). Evaluation of parenteral nutrition formulas revealed trends in prescribing which supported the use of standardized nutritional formulas.

CONCLUSION: A recommendation was made to develop standardized parenteral nutrition formulas. Formulas were approved by P&T committee and implemented for use via standard order form.

Learning Objectives:

Identify disease states which warrant the use of parenteral nutrition.□□

List common limitations of providing parenteral nutrition.

Self Assessment Questions:

The maximum concentration of protein the can be given peripherally is:
A. 3%
B. 4%
C. 10%
D. There is no limit

All of the following are examples of patients who should receive parenteral nutrition except:
A. Patient who is refusing to eat
B. Patient who just had a colon resection
C. Patient who is not tolerating their enteral feeding
D. Patient who has intractable vomiting

IMPROVING BARCODE MEDICATION ADMINISTRATION (BCMA) THROUGH ROUTINE DATA REPORTING

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The purpose of this project was to optimize barcode medication administration (BCMA) data reports for process improvement decision-making.

Baseline BCMA data were assessed using existing reports generated by the health systems electronic data reporting system. In collaboration with Information Services and Nursing representatives, recommendations were made for optimizing existing data reports for BCMA decision-making. After implementation of the modified reports, a routine schedule for continued BCMA data monitoring and reporting to the health systems Medication Safety Committee will be planned. BCMA data users will be identified and specific roles will be assigned. Users will have access to all of the full reports. The report data identified as most valuable for routine decision-making will be made available in summarized format via a simple computer dashboard menu. Target areas for routine assessment will likely include scanning compliance and near miss rates. Correction strategies will be planned and implemented by Nursing and the BCMA Steering Committee in collaboration with the Medication Safety Committee.

Recommendations for optimizing BCMA reports have been submitted to the health systems Alerts and Reporting Team. Major report modifications cannot be completed at this time due to insufficient software capabilities, but will be readdressed once new software code is available.

Technological barriers to the successful implementation of improved BCMA reporting were encountered during the course of this project. Although major report modifications will not be made at this time, opportunities for using existing reports, with minor modifications, for process improvement decision-making have been identified and will be pursued in the coming months.

Learning Objectives:

Define BCMA and describe its role in the medication use process.

List two types of reports that may be useful for routine BCMA monitoring.

Self Assessment Questions:

What is BCMA and what are two potential barriers to its successful implementation?

Give two examples of electronic medical record tasks that cannot be scanned.

IMPLEMENTATION OF AN INPATIENT ANTICOAGULATION TEACHING SERVICE

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Purpose: The Joint Commission on Hospital Accreditation National Patient Safety Goal 03.05.01 includes the provision that a hospital provides education regarding anticoagulation therapy to prescribers, staff, patients, and families. The purpose of this study is to evaluate if an inpatient anticoagulation teaching service, in addition to current educational methods, improves documented education rates in patients being discharged home on warfarin, low-molecular weight heparin, or fondaparinux.

Methods: To determine baseline rates of education under the current methods, a retrospective chart review was conducted to asses the number of patients receiving documented anticoagulation education by pharmacists prior to discharge from Harper University Hospital. Patients were included if they were > 18 years of age being discharged home on warfarin, low-molecular weight heparin, or fondaparinux between July 1 and November 30, 2008. Subsequently, in January 2009, an anticoagulation teaching service was developed and implemented to improve the percentage of patients who receive anticoagulation education prior to discharge. Clinical pharmacists or clinical pharmacy specialists contact the teaching service to provide the required patient education if they are not able due to workload or time constraints. A chart review will be used to asses the impact of the teaching service on rates of education. The review will include patients > 18 years of age discharged home on warfarin, low-molecular weight heparin, or fondaparinux from Harper University Hospital between January 1 and February 28, 2009. Data collection includes: baseline demographics, education provided, documentation of education, education provider, anticoagulation medication, and patients previous anticoagulation history. In addition, a department survey will be conducted to assess department satisfaction with the service.

Preliminary Results: Of 208 patients between July and November, 2008, 43.7% received anticoagulation education prior to discharge. Data collection for January through February 2009 is on-going.

Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss inpatient anticoagulation teaching practices as they relate to efficacy and safety.

Identify effective methods of delivering inpatient anticoagulation education to meet Joint Commission patient safety standards.

Self Assessment Questions:

Recommendations for patient education on anticoagulation have been made by

a)The American College of Chest Physicians
b)The Joint Commission
c)A and B
d)None of the above

T/F Based on studies of adverse events occurring in patients after discharge from the hospital, preventable causes of adverse events include lack of patient education regarding discharge medications.

EFFECTIVENESS OF HIGH DOSE HEPATITIS B REVACCINATION VERSUS STANDARD DOSE VACCINE AMONG ADULT HIV-INFECTED PATIENTS

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Purpose. Human immunodeficiency virus (HIV) is associated with a high incidence of hepatitis B virus (HBV) co-infection resulting in increased rates of morbidity and mortality. Guidelines for the prevention of opportunistic infections associated with HIV recommend that all patients without evidence of prior exposure to HBV receive vaccination. Studies have demonstrated that a significant proportion of HIV-infected patients do not achieve seroconversion when administered standard dose HBV vaccine. High dose revaccination is one of several strategies employed to improve response rates among HIV-infected patients. The objectives of this study were to compare the rate of seroconversion among HIV-infected patients receiving revaccination with high dose (Engerix-B or Twinrix 40 mcg) versus standard dose (Engerix-B or Twinrix 20 mcg) vaccine and to identify risk factors that may predict lack of immunologic response.

Methods. Institutional review board approval was obtained for this retrospective study. HIV-infected patients followed through the University of Michigan HIV/AIDS Treatment Program between 1997-2008, who were > 18 years during the study period, and received three-doses of the standard HBV vaccine were included. Patients were excluded if they were seropositive indicating past infection or active disease prior to vaccination, if they had not completed the 3 dose series of HBV vaccine, or if serology or documentation was incomplete.

Results. 147 patient charts were included; 33 patients received high dose revaccination after failing to seroconvert following standard dose vaccination. Preliminary analysis demonstrated a 32 percent response rate for those receiving the standard dose series and 66.7 percent for patients receiving the high dose revaccination. A regression analysis will be completed to identify risk factors for lack of seroconversion.

Conclusion. Revaccination with a high dose HBV vaccine series appears to be a feasible strategy to achieve seroconversion among HIV-infected patients that have previously failed to respond to the standard dose vaccine.

Learning Objectives:

Review hepatitis B vaccine seroconversion rates in HIV-infected patients and discuss methods that may improve response

List the factors that may predict poor response to the hepatitis B vaccine in HIV-infected patients

Self Assessment Questions:

The rate of seroconversion among HIV-infected patients receiving the STANDARD dose hepatitis B vaccine is _____?

a.75-90%
b.90-100%
c.17.5-50%
d.5-12%

Which of the following factors may predict a poor response (lack of seroconversion) to the hepatitis B vaccine in HIV-infected patients

I.High viral load
II.Low CD4 count
III.Previous opportunistic infection

a.I and II
b.II and III
c.I and III
d.I, II, and III

MAXIMIZING COMPENSATION FROM PHARMACEUTICAL CARE SERVICES IN AN OUTPATIENT PHARMACY

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BACKGROUND: Pharmaceutical care (PC) is the responsible provision of drug therapy for the purpose of achieving positive patient outcomes. One approach to provide pharmaceutical care is through medication therapy management (MTM) services. Medication therapy management programs focus on a patient-centered rather than a product-centered process of care. Pharmacists can use PC and MTM opportunities to improve patient care, establish meaningful patient relationships and reduce costs to both the payor and patient.

PURPOSE: To maximize compensation from current PC programs, including MTM services, in Aurora Pharmacy- St. Lukes Medical Center and implement new programs as they become available.

METHODS: Education of staff on PC programs and identifying eligible patients will be crucial to the success of the program. Baseline data will be collected regarding how many billable PC opportunities occurred in a week compared to what is actually being submitted for compensation in October. The most common payors will be identified. Information about pharmaceutical care programs for different payors will be researched and organized into a comprehensive binder. The binder will include information about different PC programs including patient eligibility, documentation requirements, compensation rates and submission guidelines. A pharmacist and technician training program will be implemented in December. Ten pharmacists and seven technicians will be trained. After the training, continuing education, feedback and tools will be used to continue to improve the number of PC opportunities billed. In April, data will again be collected regarding how many billable PC opportunities occurred in a week compared to what is actually being submitted for compensation. In May, patient satisfaction with PC programs will be evaluated.

RESULTS/ CONCLUSIONS: Preliminary results from October show that the pharmacy is currently identifying and billing only <10% of eligible PC claims. More detailed results and analysis will be presented at the Great Lakes Regional Pharmacy Conference.

Learning Objectives:

Recognize the impact that pharmaceutical care may have on patients, payors and the pharmacy profession.

Identify methods for increasing compensation from the provision of pharmaceutical care programs.

Self Assessment Questions:

Describe how patients, payors and the pharmacy profession could benefit from implementing pharmaceutical care programs.

List three ways to educate pharmacy staff in order to increase compensation from pharmaceutical care programs.

TREATMENT OF ENTEROCOCCUS BACTEREMIA IN A HEMATOLOGY- ONCOLOGY POPULATION

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Background/Purpose:

Infection is the leading cause of mortality in cancer patients with neutropenia. The increasing prevalence of multidrug-resistant gram positive bacteria coupled with potent immunosuppressives and chemotherapy have created new treatment challenges. Enterococcal infections are an emerging cause of invasive infections in hematology-oncology patients. Increases in mortality associated with vancomycin resistant enterococcus (VRE) have been attributed to resistance mechanisms, limited antimicrobial treatment options, and an immunocompromised host. The purpose of this study is to compare the outcomes of vancomycin susceptible enterococcus (VSE) to VRE bacteremic hematology-oncology patients to determine if our current treatment strategy is effective.

Methods:

A retrospective comparative cohort evaluating patients with a hematologic or oncologic disease and either primary VSE or VRE bacteremia. Patients have been identified by querying a proprietary database, MedMined. The query included the following data input terms: "All inpatients", "All bloodstream isolates", "Acquired >48 hours after admission" and only "Enterococcus" isolates. These patients with be hospitalized at Indiana University and Methodist Hospital-Clarian Health between January 1, 2008 and November 30, 2008.

Results and Conclusions:

Data analysis and results are ongoing and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain what factors contribute to the development of enterococcal antibiotic resistance in a neutropenic patient.

Discuss various treatment options for VRE and VSE bacteremia in a febrile neutropenic patient

Self Assessment Questions:

T/F Multiple confounding factors lead to enterococcal bacteremia and greater mortality in the neutropenic population

T/F Vancomycin resistant enterococcus bacteremia is commonly seen in the neutropenic population in part due to the repetitive use of antibiotics.

HYPERURICEMIA AND ITS EFFECT ON GRAFT SURVIVAL IN PEDIATRIC RENAL TRANSPLANT PATIENTS

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Background: Hyperuricemia and gout are common complications of renal transplantation in the adult population; however, there is limited information in pediatrics. It has been associated with increased mortality and development of cardiovascular and renal diseases. Hyperuricemia is commonly seen in patients with metabolic syndrome, where high serum uric acid levels are associated with insulin resistance, hypertension, dyslipidemia, endothelial dysfunction, and renal impairment. These correlations make it unclear whether hyperuricemia is the cause of these diseases, or the result. The lack of clarity as to the understanding of the role of hyperuricemia in patients further confounds whether practitioners should empirically treat hyperuricemia to prevent complications.

Purpose: The aim of this retrospective analysis is to evaluate hyperuricemia and its effect on graft survival in pediatric renal transplant patients and whether there are correlations with use of immunosuppressive and antihypertensive therapy. Analysis will investigate whether there is a relationship between treatment of hyperuricemia and improvement in graft function.

Methods: This will be a retrospective chart review and include all children, adolescents, and adults aged 0-22 years having received a kidney transplant at the University of Illinois Medical Center at Chicago from January 1, 2000 through June 30, 2008. Patients will be excluded if they have a history of cancer. Patient information will be retrieved through electronic medical records and include demographics, serum uric acid levels, estimated creatinine clearance, and concurrent medication use.

Results and Conclusions:
A total of 72 potential patients have been identified. Data collection has been completed for 25 patients while 17 have been excluded based on preliminary screening. Of these patients, 13 are females and three have received more than one transplant. The average serum uric acid level is 4.93mg/dL and serum creatinine is 1.1mg/dL. Fourteen, three, and eight patients received living related, living unrelated, and cadaveric renal transplants, respectively.

Learning Objectives:

Recognize risk factors that contribute to the development of hyperuricemia.

Describe the potential consequences of hyperuricemia.

Self Assessment Questions:

Which of the following medications has NOT been shown to contribute to the development of hyperuricemia?
a.Cyclosporine
b.Furosemide
c.Labetalol
d.Hydrochlorothiazide

Which of the following is a complication associated with hyperuricemia?
a.Hypertension
b.Cardiovascular disease
c.Renal disease
d.All of the above

IMPACT OF PHARMACIST REVIEW OF PATIENTS WITH PRESUMED HEPARIN-INDUCED THROMBOCYTOPENIA AND THE USE OF DIRECT THROMBIN INHIBITORS AND FONDAPARINUX

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Purpose:
At our institution, heparin-induced thrombocytopenia (HIT) diagnosis and management is clinician dependent. Thus, clinical assessment and laboratory evaluation for the possibility of HIT may be inconsistent and incomplete leading to unnecessary anticoagulation therapy. A recent retrospective chart review at our institution reviewed the HIT diagnosis and subsequent treatment in 59 patients with presumed HIT. Analysis revealed that drug therapy with either argatroban, lepirudin or fondaparinux was frequently provided to patients who did not meet criteria for the American College of Chest Physicians (ACCP) clinical diagnosis of HIT. The investigators of this retrospective chart analysis concluded that a portion of patients with presumed HIT did not have characteristics consistent with the diagnosis of HIT despite continued therapy with anticoagulants. Thus, a protocol for the diagnosis and management of HIT may be beneficial. The purpose of this project is to develop a computerized provider order entry (CPOE) order set and algorithm driven protocol for the diagnosis and management of HIT and evaluate its effect on argatroban, lepirudin and fondaparinux drug costs and the unnecessary use (defined as does not meet criteria for the ACCP clinical diagnosis of HIT) of these drug agents.

Methods:
Institutional review board approval has been obtained for this study. This research project will consist of two phases. Phase I patients will serve as a historical control and outcomes will be compared with Phase II patients who received the HIT protocol intervention. We will include all inpatients at our institution who are 18 years or older and receive argatroban, lepirudin, or fondaparinux for HIT during the study periods. HIT drug therapy per overall hospital days and per patient with HIT and the unnecessary use of HIT drug therapy before and after protocol implementation will be compared and reported.

Learning Objectives:

State the parameters of the 4Ts Clinical Scoring System.

Identify the drug therapies FDA approved for the prophylaxis and treatment of heparin-induced thrombocytopenia.

Self Assessment Questions:

True/False. The 4Ts Clinical Scoring System evaluates Timing, Thrombosis, Thrombocytopenia, and the absence of oTher apparent causes to explain platelet reduction.

Which of the following drug agents are FDA approved for the prophylaxis and treatment of heparin-induced thrombocytopenia?

I. Argatroban
II.Lepirudin
III.Bivalirudin
IV.Fondaparinux

a.I alone
b.I and II
c.I, II, and III
d.I, II, III, and IV

INTERVENTIONS MADE BY CLINICAL PHARMACISTS IN A PEDIATRIC PRIMARY CARE CLINIC

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Purpose:
A clinical pharmacists presence in adult primary care clinics is well perceived by other healthcare professionals, but the need for a clinical pharmacist in pediatric primary care clinics has not been justified. The primary objective of this study is to estimate the number of interventions and cost-savings made by the clinical pharmacist per year in a pediatric primary care clinic. Secondary objectives are to estimate the cost-savings per year for specific interventions and to determine the patients parents/guardians and healthcare professionals perceptions of a clinical pharmacists presence in a pediatric primary care clinic.

Methods:
The study protocol was submitted to the Institutional Review Board at Nationwide Children's Hospital for approval prior to commencement. The clinical pharmacists documented their daily interventions using Pharmacy OneSources Quantifi, which is an internet-based documentation program that associates a cost with each intervention. The cost savings were calculated using the values in Pharmacy OneSources Quantifi. Parents/guardians were given pre-visit surveys in the primary care clinic waiting room prior to their childs physician visit. The survey assessed how familiar a patients family is with the role of a clinical pharmacist in the clinic. Post-visit surveys were conducted via telephone for those patients seen by a clinical pharmacist during the visit. These surveys reassessed their perception of a clinical pharmacist in clinic. Additionally, an anonymous electronic survey was sent to ambulatory practitioners, including attending physicians, medical residents and nurse practitioners, practicing within the pediatric primary care network, using the online survey tool, Survey Monkey. This electronic survey was used to assess healthcare professionals perceptions of a clinical pharmacists role and contribution to the healthcare team.

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

Learning Objectives:

To identify and describe interventions made by clinical pharmacists in a pediatric primary care clinic.

To identify the parents/guardians and healthcare professionals perceptions of having a clinical pharmacist in a pediatric primary care clinic.

Self Assessment Questions:

What is the most common intervention made by clinical pharmacists in the pediatric primary care clinic?

True/FalsePatients expect pharmacists to know the most about medications.

EVALUATION AND IMPROVEMENT OF A PHARMACY THERAPEUTIC INTERCHANGE PROGRAM

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Purpose: The purpose of this project was to implement process improvements within the Inpatient Pharmacy related to automatic therapeutic substitutions (where a pharmacist is authorized to dispense a therapeutically similar medication in place of the one ordered by the prescriber). The improvements were evaluated to determine their impact on compliance with the therapeutic substitution policy and the time required to perform a therapeutic substitution.

Methods: The inclusion criteria were all inpatient medication orders where a therapeutic substitution was made, or should have been made, by a pharmacist. A subset of medications from the therapeutic substitution policy included Angiotensin-converting enzyme inhibitors, Hmg-CoA reductase inhibitors, injectable corticosteroids, post-operative cefazolin and clindamycin, proton pump inhibitors, and albuterol inhalers. The study was conducted in three phases. During Phase 1, medication orders where a therapeutic substitution was indicated were reviewed by the primary investigator. The orders were assessed for compliance with the automatic therapeutic substitution policy, as well as the time required to process each order. During Phase 2, systems-based changes were designed and implemented to improve compliance with the policy. During Phase 3, medication orders were again reviewed to determine any improvement in compliance with hospital policy, as well as to assess the time required to process each order.

Results: Phase 1 revealed that substitutions occurred 54% of the time they were indicated; the correct medication was always selected, but the equivalent dose was correct only 74% of the time. Phase 3 revealed significant improvements in these areas; medications that were not substituted when it was indicated decreased to 7.2% ($p<0.001$), equivalent dose selection improved to 100% ($p<0.001$), and overall compliance with hospital policy also significantly increased ($p<0.001$). Additionally, the intervention did not increase the time needed to process orders requiring therapeutic interchange as it remained the same between the two phases.

Learning Objectives:

Describe the rationale of implementing a therapeutic interchange policy.

Discuss the conditions that make a therapeutic interchange policy appropriate and effective.

Self Assessment Questions:

The rationale for implementing a therapeutic interchange policy includes which of the following?
a. The rapid expansion of drugs on the market
b. A need to control healthcare costs
c. To give pharmacists more authority in clinical practice
d. A and B
e. All of the above

Which of the following are necessary aspects of a therapeutic interchange policy?
a. State certified technicians and a narcotics vault
b. A functioning formulary system and pharmacy & therapeutics committee
c. Automated robotics and medication dispensing cabinets

COST-ANALYSIS OF USING DOXYCYCLINE VERSUS AZITHROMYCIN FOR COMMUNITY ACQUIRED PNEUMONIA

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Purpose
At the Detroit Medical Center (DMC), ceftriaxone plus doxycycline is the preferred regimen for the treatment of community acquired pneumonia (CAP) in patients admitted to non-intensive care units (ICU). Doxycycline is preferred over azithromycin for the empiric treatment of atypical organisms (Mycoplasma pneumoniae, Chlamydia pneumoniae and Legionella sp.) associated with CAP. However, azithromycin continues to be prescribed instead of doxycycline for non-ICU patients. This results in a potential cost-disadvantage for the institution as azithromycin tends to be more expensive than doxycycline.
The objective of the study is to assess whether there are cost-savings associated with the use of doxycycline over azithromycin as part of the treatment of CAP in non-ICU patients.

Methods
Study investigators promoted adherence to current DMC recommendations for treatment of CAP. They generated daily antibiotic reports and identified patients initiated on azithromycin for CAP. If a patient met criteria for using doxycycline, then an investigator contacted the prescriber and recommended switching from azithromycin to doxycycline. Subsequently, total costs for all formulations of both azithromycin and doxycycline were generated from pharmacy database from 2005-2009 for Detroit Receiving Hospital and from 2006-2009 for Harper University Hospital during the months between October to February. Total costs of azithromycin and doxycycline were standardized based on 2009 purchasing prices. Cost-analysis was performed by comparing the total costs of azithromycin and doxycycline used pre- and post- implementation of the DMC recommendations.

Results and Conclusion
To be presented at the 2009 Pharmacy Resident Great Lakes Conference

Learning Objectives:

Review epidemiology and etiology associated with CAP

Describe a potential cost-saving initiative using doxycycline over azithromycin as part of the empiric treatment for CAP

Self Assessment Questions:

According to the 2007 IDSA/ATC guidelines, which of the following regimen(s) can be routinely recommended for the empiric treatment of CAP in patients admitted to non-ICUs?
A] Respiratory fluoroquinolone
B] -lactam + macrolide or/ doxycycline
C] -lactam monotherapy
D] Macrolide monotherapy
E] A and B

In which patients should macrolides not be recommended as monotherapy for the empiric treatment of CAP?
A] Healthy patients with no underlying risk factors for drug-resistant S. pneumoniae
B] Patients with history of co-morbidities, such as chronic heart, lung, liver, or renal disease, diabetes mellitus or use of immunosuppressive drugs
C] Patient residing in regions where there is a high rate (>25%) of macrolide-resistant S. pneumoniae isolates (MIC ≥16 mcg/ml)
D] B and C

INAPPROPRIATE USE OF MEDICATIONS IN THE GERIATRIC POPULATION: IDENTIFICATION OF SETTING & FREQUENCY IN OCCURRENCE AND THE ASSESSMENT IN THE INCIDENCE OF FALLS/ADVERSE EVENTS

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Purpose: In geriatrics, multiple medications are necessary for the treatment of chronic diseases. Inappropriate prescribing is a common cause of morbidity and mortality in geriatrics. About 30% of all hospitalizations in patients' ≥65 years old are due to adverse drug reactions or drug toxicities. One of the leading causes of injuries, both fatal and non-fatal, in patients ≥65 years old are due to falls. A strong correlation exists between falls and the use of inappropriate medication in geriatrics. The newest criteria that identifies inappropriate medications for use in elderly patients is known as STOPP/START - Screening Tool of Older Persons Potentially Inappropriate Prescriptions/Screening Tool to Alert MD of the Right, which is used to determine inappropriate medication use in this study. The objectives of this study are to 1) assess the frequency of inappropriate medication use in the elderly population upon admission, discharge, and at initial follow-up outpatient clinic appointment, 2) determine if adequate documentation for rationale of medication use is included, 3) assess the incidence of falls and adverse events in geriatrics receiving these identified medications.

Methods: This is a retrospective chart review over a 6 month period of patients ≥70 years of age being admitted to the Madison VA hospital for period of >3 days. The hospital database was searched to determine the total number of patients hospitalized from 4/1/08 to 9/30/08 meeting the study's inclusion criteria. For each patient, the chart was reviewed to determine the number of inappropriately prescribed medications upon hospital admission, at hospital discharge, and initial outpatient clinic follow-up. The incidence of adverse events and falls will be collected and assessed to determine if there is a pattern with inappropriate prescribing based on location of setting.

Results/Conclusion: Evaluation/assessment of inappropriate medication use is ongoing. Results will be presented at the Great Lakes Residency Conference..

Learning Objectives:

Recall the importance in preventing incidence of falls and adverse events associated with the use of certain inappropriate medications in the geriatric population.

Describe if a clinical pharmacist would have a vital role in providing critical interventions in prescribing practices in the geriatric population serving on an interdisciplinary team.

Self Assessment Questions:

Where is the incidence of inappropriate medication prescribing the highest among the geriatric patient population? A. At Hospital Admission B. At Hospital Discharge C. Initial Clinic Follow-up Post-Discharge

True/False: A clinical pharmacist could be incorporated in an interdisciplinary team approach to ensure the best care in the geriatric patient population.

GLYCEMIC CONTROL AND INCIDENCE OF ADVERSE EVENTS AFTER THERAPY CONVERSION FROM NPH INSULIN TO INSULIN GLARGINE IN TYPE 2 DIABETICS

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Background: With the addition of insulin glargine to the national Veterans Affairs formulary on May 2008, providers have been granted access to another option for basal insulin therapy. Existing studies evaluating glargine insulin with insulin NPH have suggested fewer episodes of hypoglycemia with glargine, while the evaluation of overall glycemic control with NPH versus glargine insulin has yielded varied results. Another potential adverse effect of insulin therapy, weight gain, has also yielded varied results when assessed for NPH versus glargine insulin. This study evaluates the glycemic control and incidence of adverse effects with glargine insulin compared to NPH insulin.

Purpose: The primary objective is to evaluate the effect on glycemic control, as evidenced by HbA1c values, in patients previously being treated with NPH insulin and subsequently converted to glargine insulin. The secondary objectives include incidence of adverse effects, as documented by episodes of hypoglycemia (BG<70 mg/dL), severe hypoglycemia (BG<50 mg/dL), nocturnal hypoglycemia, and weight gain before and after conversion from NPH to glargine therapy.

Methods: Patients will be selected from a pharmacy-generated database of patients who received an initial prescription for glargine insulin from May 2008, the time glargine was added to the VA National Formulary, through September 2008. Eligible patients include type 2 diabetics between the ages of 18-80 receiving primary care and insulin dosing adjustments from the Chalmers P. Wylie VA Ambulatory Care Center. To be included in the study, patients will have received at least six months of NPH insulin followed by at least three subsequent months of glargine insulin. Patients will be excluded from the study if they are noncompliant with insulin therapy, as evidenced through refill history or chart review, have a history of drug or alcohol abuse, or insufficient laboratory data. Approximately 200 charts will be reviewed for this study in effort to include data from 124 patients meeting inclusion criteria.

Results: Pending
Conclusions: Pending

Learning Objectives:

Determine the effect on overall glycemic control in patients converted from NPH insulin to glargine insulin.

Discuss the incidence and severity of adverse effects with NPH versus glargine insulin, and explain how the two formulations of insulin contribute to these adverse events.

Self Assessment Questions:

T/F: Glargine insulin was shown to improve overall glycemic control in type 2 diabetic patients within this study.

T/F: Patients converted to insulin glargine had a significant improvement in incidence of nocturnal hypoglycemia.

OPTIMIZING CEFEPIME PHARMACODYNAMICS IN PATIENTS WITH VENTILATOR-ASSOCIATED PNEUMONIA: STANDARD VS. EXTENDED-INFUSION IN A SURGICAL AND TRAUMA INTENSIVE CARE UNIT

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Background: To improve antibiotic efficacy and decrease the development of resistance, researchers have evaluated dosing strategies that exploit the pharmacodynamic properties of antibiotics. Of particular interest are beta-lactam antibiotics, which display time-dependent bactericidal effects. Extending the duration of beta-lactam infusion time is one strategy shown to increase the time that free drug concentration exceeds the bacterial minimum inhibitory concentration (MIC). Recently, the surgical/trauma intensive care unit (STICU) at The University Hospital, Cincinnati, OH, adopted an extended-infusion cefepime dosing strategy for the treatment of ventilator-associated pneumonia (VAP). The aim of this retrospective study is to demonstrate the non-inferior effectiveness of extended-infusion cefepime dosing compared to traditional 30-minute infusion in critically ill patients with VAP.

Methods: All STICU patients 18 years of age and older who received cefepime as part of the STICU VAP protocol for greater than 48 hours between January 2007 and May 2009 will be identified. Subjects will be divided into two treatment groups: extended-infusion utilizing 2g IV infused over 6 hours Q12 hours and standard infusion with 2g IV infused over 30 minutes Q8 hours. To be included in the final analysis patients must have clinical signs of infection with or without positive respiratory cultures. Pneumonia response will be assessed daily during definitive antibiotic therapy using the clinical pulmonary infection score (CPIS). The primary non-inferiority outcome is the difference in absolute change in CPIS from VAP diagnosis day to the end of definitive antibiotic therapy between groups. Secondary endpoints include VAP relapse/recurrence; mechanical ventilation duration; ICU and hospital lengths of stay; in-hospital mortality; total cefepime drug costs; and duration of cefepime therapy.

Results: Institutional Review Board approval has been obtained and data collection is currently under way.

Conclusions: To be presented (as available) at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the pharmacodynamic principles of beta-lactam antibiotics.

Discuss the role of extended-infusion antibiotics in the critically ill patient population.

Self Assessment Questions:

Beta-lactam antibiotics demonstrate what kind of bacterial killing?
a) Concentration-dependent (Peak/MIC)
b) Dose-dependent (Dose/MIC)
c) Time-dependent (%T> MIC)
d) Duration-dependent (Days>MIC)

The pharmacodynamic principles of beta-lactams can best be optimized by which of the following?
a) Decreasing the interval between doses
b) Giving larger doses at longer intervals
c) Extending the time of drug administration
d) A & C
e) B & C

THE EFFECT ON CLINICAL OUTCOMES OF THE INTEGRATION OF CLINICAL DECISION SUPPORT TOOLS INTO PHARMACIST MONITORING WORKFLOWS

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Purpose: NorthShore University HealthSystem implemented an electronic medical record (EMR) and computerized physician order entry in 2003. The current pharmacy practice model is a single tier, integrated staffing system. Currently available technology allows us to automate some of the technical steps of the patient monitoring processes the pharmacists use. Improving the accuracy and efficiency of pharmacists assessment by changing the current practice model will benefit patient safety and provide opportunities for pharmacists to aide the health system in meeting current practice standards. The purpose of this study is to implement a system identifying patients with acute status changes in order to prioritize patient assessment by the pharmacist and evaluate the effect on clinical outcomes. Initial implementation of this system will occur in the area of antimicrobial monitoring to establish a proof of concept prior to incorporation of all clinical services.

Methods: A system within the EMR will be developed and implemented to prioritize patient assessment and monitoring for pharmacists. Pre- and post-implementation data will be collected to assess the effect on clinical outcomes. The objectives to be assessed include appropriate antimicrobial coverage for all positive microbiologic cultures, discontinuation of antimicrobials in patients with negative infection markers, the number of patient blood draws related to antimicrobial drug monitoring, and the cost of antimicrobials.

Results: Data collection is currently ongoing. Results and conclusions will be presented at the conference.

Learning Objectives:

Describe an integrated pharmacist model.

Discuss the advantages and limitations of current EMR technology.

Self Assessment Questions:

True or false: The EMR can aide the pharmacist in assessing medication therapy for hospitalized patients.

True or false: Implementing changes to pharmacist workflow requires careful strategic planning.

EVALUATING CHANGES IN INSULIN REQUIREMENTS IN NEWLY DIAGNOSED DIABETICS FROM HOSPITALIZATION TO AN OUTPATIENT SETTING.

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Purpose:
Intensive blood glucose control in the acute care setting has led to an increased number of type 2 diabetic patients discharged on insulin therapy. As a result of this trend, the St. Vincent Joshua Max Simon Primary Care Center (PCC) Diabetes Education Clinic has observed patients experiencing hypoglycemic episodes and thus requiring dosage reductions of insulin regimens during ambulatory care follow-up. Further review demonstrated that some patients have been successfully switched to oral therapy, while others have required no anti-diabetic medications three months following hospital discharge. The purpose of this study is to determine how many patients over a two year period have been diagnosed with type 2 diabetes requiring insulin therapy during hospitalization that later required step-down medication therapy at subsequent follow-up visits with their primary care provider.

Methods:
This is an observational, retrospective study of PCC Family Medicine and Internal Medicine patients > 18 years old who were discharged from St. Vincent Hospital with a diagnosis of type 2 diabetes mellutis and placed on insulin therapy during hospitalization between August 1, 2006 and August 31, 2008. Exclusion criteria are patients <18 years of age and patients who have a current diagnosis of either type 1 diabetes or gestational diabetes. The primary objective of this study is to determine how many patients developed hypoglycemia while utilizing an insulin regimen following hospital discharge. A secondary objective includes the reduction of insulin (short and long acting) required three months post discharge. Patients identified by the secondary objective will be prospectively surveyed to evaluate their views on the importance of factors that led to an improvement in their overall blood glucose control.

Results and Conclusions: Data collection currently in progress. Results and conclusions will be forthcoming.

Learning Objectives:

Identify those factors patients deem important in the control of their blood glucose.

Describe the need for close healthcare provider follow-up in controlling patients blood glucoses in newly diagnosed type 2 diabetics.

Self Assessment Questions:

Patients identify diet modification and adherence to his/her medication regimen as the most important lifestyle factors that control blood sugars. T or F

Patient follow-up with a diabetes education program post hospitalization allowed for identification of hypoglycemic episodes. T or F

CLINICAL OUTCOMES OF A PHARMACIST-MANAGED ANTICOAGULATION DISCHARGE PROCESS FOR THE PROPHYLAXIS AND TREATMENT OF VENOUS THROMBOEMBOLISM.

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Purpose: Venous thromboembolism (VTE) continues to be a significant clinical and economic burden on the health care system in the United States. There is reliable evidence that outpatient treatment of VTE with low molecular weight heparin (LMWH) is cost-saving and at least as safe and effective as inpatient treatment with unfractionated heparin (UFH). Current national guidelines for the treatment of VTE all recommend outpatient treatment if possible. The University Hospital has had a pharmacist-driven anticoagulation discharge process in place since June 1996 in order to facilitate the treatment of VTE on an outpatient basis. The current study is an observational, single-center study evaluating the efficacy and safety of this pharmacist-managed anticoagulation discharge process.

Methods: Patients will be identified using interdisciplinary care rounds and a currently utilized targeted drug list. Any patient discharged from University Hospital on LMWH or fondaparinux for any indication between December 2008 and February 2009 will be eligible for inclusion. Subjects who are prisoners, less than 18 years of age, pregnant at the time of discharge, or whose discharge status is placement to another facility will be excluded. The primary endpoint is the percent of patients discharged on a low molecular weight heparin or fondaparinux who are counseled by a pharmacist. Secondary endpoints include length of time it takes to counsel a patient on LMWH or fondaparinux and procure the drug for that patient upon discharge, length of stay for patients admitted with a primary diagnosis of VTE, the rate of VTE recurrence at 3 months, and the number of major/minor bleeding events in patients followed by University Hospital-affiliated clinics or readmitted to University Hospital following discharge from University Hospital on LMWH or fondaparinux. These outcomes will be compared to national averages for similar patient groups.

Results: Data collection and analysis are ongoing.

Learning Objectives:

Review ACCP guidelines for the use of LMWH in the inpatient and outpatient treatment of venous thromboembolism

Describe the pharmacist-managed anticoagulation discharge process at an academic teaching hospital

Self Assessment Questions:

According to the 2008 ACCP guidelines, the following agents are options for the initial treatment of acute VTE:
a. Subcutaneous LMWH
b. IV UFH
c. Subcutaneous fondaparinux
d. Monitored, fixed-dose subcutaneous UFH
e. All of the above

True or False: According to the 2008 ACCP guidelines, in patients with acute DVT, subcutaneous LMWH are recommend as the initial treatment of choice, as an outpatient if possible or inpatient if necessary, rather than treatment with IV UFH

THROMBOEMBOLIC COMPLICATIONS ASSOCIATED WITH RECOMBINANT FACTOR VIIA ADMINISTRATION IN TRAUMA PATIENTS

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Purpose: In 1999, the U.S. Food and Drug Administration approved the use of recombinant Factor VIIa (rFVIIa) for use in patients with hemophilia and congenital Factor VIIa deficiency. Increasingly rFVIIa has been used to help control acute hemorrhage and for emergent reversal of anticoagulation in non-hemophilic patients. Although concerns about arterial thromboembolic complications have been recently published, limited studies are available on the incidence of thromboembolic complications in trauma patients. One retrospective review in the trauma patient population reported thromboembolic complications in 9.4% of patients after the administration of rFVIIa. Only one prospective trial in trauma patients to date has been published and there was a similar incidence of thromboembolic events between placebo and those that received rFVIIa. The purpose of this study is to determine the incidence of thromboembolic complications associated with the use of rVIIa in trauma patients.

Methods: A retrospective chart review will be conducted in trauma patients who received rFVIIa from July 1, 2003 to June 30, 2008. Exclusion criteria include age less than 18 or greater than 89, pregnancy, history of hemophilia or congential Factor VIIa deficiency, and incarceration. The data to be collected include demographics (age, weight, height, and gender), indication for use, history of thrombosis, hematologic labs, baseline medications, transfusions, use of other hemostatic medications, and evidence of ischemia or thromboembolism from cardiac enzymes, radiologic tests, electrocardiograms, and vascular studies. Data will be collected from patient charts and electronic medical records. The primary outcome will be the incidence of thrombotic complications within 30 days of the administration of rFVIIa. Secondary outcomes include 30 day survival and hospital mortality.

Results: Results and conclusions for 40 patients are pending and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the indications for use of rFVIIa and dosing recommendations

Evaluate the complications associated with rFVIIa in trauma patients

Self Assessment Questions:

Potential complications of rFVIIa include all of the following except
a. Deep vein thrombosis
b. Thrombocytopenia
c. Acute Myocardial Infarction
d. Ischemic bowel

True or False: rFVIIa is FDA-approved for acute hemorrhagic shock

EVALUATION OF PHENOBARBITAL ADMINISTERED SUBCUTANEOUSLY IN HOSPICE PATIENTS

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Purpose:
Terminally ill patients may experience symptoms including agitation, delirium, or seizures, which may not respond to commonly prescribed medications. For refractory symptoms, initiating palliative sedation to reduce suffering is a reasonable option. Benzodiazepines and antipsychotics are first line agents. Phenobarbital is an alternate agent when first line agents do not provide adequate symptom management.

In hospice clinical practice, phenobarbital is administered subcutaneously. According to American Hospital Formulary Service, subcutaneous administration of commercially available phenobarbital is cautioned. Phenobarbital is an alkaline substance that was reported to cause local skin reactions. Since subcutaneous phenobarbital is used in practice, there is a need for evidence to support or refute cautions regarding its safety and efficacy. The primary objective is to retrospectively review hospice patients charts to evaluate the incidence of local reactions caused by subcutaneous phenobarbital. The secondary objective is to evaluate the efficacy of phenobarbital administered subcutaneously in hospice patients.

Methods:
This study was approved by the Institutional Review Board. It is a retrospective chart review of patients treated in an inpatient hospice in Columbus, Ohio between January 1, 2006 and December 31, 2008. All patients treated with subcutaneous phenobarbital will be considered for inclusion. Investigators will review charts for data relating to indication, concentration, dose and frequency, site of administration, and injection site reactions. Every injection will be recorded as a single data point. Injection site reactions will be graded according to National Institute of Allergy and Infectious Disease Adult Toxicity Table. Because benzodiazepines and antipsychotics are also used to manage refractory symptoms at the end of life, additional data will be collected for these two classes of medications for evaluation of subcutaneous phenobarbital efficacy. Data will be analyzed to determine safety and efficacy of subcutaneous phenobarbital injections.

Results/Conclusion: Preliminary results to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define the role of subcutaneous phenobarbital for the management of refractory symptoms in terminally ill patients.

List guidelines that allow for the safe and appropriate use of phenobarbital by the subcutaneous route.

Self Assessment Questions:

True/False: Administration of subcutaneous phenobarbital is often used with the aid of a single subcutaneous butterfly port and not given at a rate higher than 50mg/minute.

Which of the following is/are considered first line for the treatment of anxiety and agitation in terminally ill patients?
A.Ativan
B.Haloperidol
C.Phenobarbital
D.A and B
E.A, B, and C

DETERMINING PREDICTORS OF POOR OUTCOMES FOR CLOSTRIDIUM DIFFICILE INFECTION

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Purpose:
Over the past several years the frequency and severity of Clostridium difficile infection (CDI) has increased along with higher rates of relapse and more severe outcomes. The main objective of this study is to determine predictors of poor outcomes for patients with CDI with an emphasis on time to receipt of CDI therapy. A secondary objective is to identify opportunities for improvement and adherence to institutional guidelines.

Methods:
This study is a retrospective cohort of 200 consecutive patients with the diagnosis of CDI between January-September 2008 at Henry Ford Hospital. Inclusion criteria includes patients who are at least 18 years of age, without prior history of CDI, and have a positive stool enzyme immunoassay for Clostridium difficile toxin A or B during the specified time period. Patients were excluded if they were listed as palliative care at the time of diagnosis of CDI. For subjects who meet the inclusion criteria we will evaluate the initial time that a stool toxin assay was ordered, stool toxin assay result received, medication therapy is ordered, and medication therapy is administered. Other characteristics assessed will include age, community versus nosocomial infection, peripheral leukocyte count, severity of comorbidities as determined using the Charlson Comorbidity Index, renal function, immune status, use of proton pump inhibitors, use of antimotility agents, and use of antibiotics. Patients will be grouped as either poor outcome or successful outcome. Poor outcomes will be defined as failure to clinically improve by day six, occurrence of severe complications, relapse, or death during CDI treatment with no alternative explanation. Clinical characteristics will be compared using standard univariate and multivariable techniques to determine the association of each characteristic with poor outcome.

Results:
Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe characteristics of the C. difficile BI/NAP1 strain that lead to increased virulency

Identify risk factors for severe outcomes in patients with CDI

Self Assessment Questions:

True or False:
The occurrence of the C. Difficile BI/NAP1 strain has led to increased incidence of community acquired CDI

True or False:
Overuse and misuse of antibiotics contributes to the development of CDI

IMPROVING COMPLIANCE WITH HEART FAILURE CORE MEASURES

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PURPOSE: In order to improve the quality of patient care, the Joint Commission and the Centers for Medicare and Medicaid Services (CMS) published hospital quality measures on surgical care, pneumonia, acute myocardial infarction and heart failure. If hospitals do not meet these standards, CMS may choose not to reimburse and/or fine the hospital in areas that they are deficient. The purpose of this study was to implement a protocol to improve compliance with the heart failure discharge counseling guidelines.

METHODS: A year-long retrospective review of compliance with CMS heart failure guidelines was performed at Cabell Huntington Hospital. In order to increase compliance with CMS heart failure guidelines, a clinical pharmacist completed a home-medication reconciliation, assisted physicians with discharge paperwork and provided discharge medication counseling. All patients were counseled on heart failure, discharge medications, medication compliance, worsening symptoms, diet, activity level, daily weighing, smoking cessation, and use of over-the-counter pain medications. Also, patients were provided a wallet-sized medication card and 7-day pill holders. Compliance was assessed after the patient was discharged using a check list which evaluated if CMS requirements were met.

RESULTS: Compliance with CMS guidelines before and after pharmacist intervention will be provided.

CONCLUSION: It is anticipated that this project will increase compliance with CMS heart failure guidelines and core measures. This project is also projected to indicate that pharmacist provided assistance with discharge paperwork and patient discharge counseling is necessary to increase compliance with CMS guidelines and to reduce heart failure exacerbation readmission rates.

Learning Objectives:

Review CMS guidelines and requirements for heart failure discharge instructions.

Explain the benefit of pharmacist provided discharge education in the hospital setting.

Self Assessment Questions:

True/False: Compliance with CMS guidelines and core measures are available to the public by going to www.qualitycheck.org.

2.Written heart failure discharge instructions must include:
a)Activity level
b)Diet
c)Discharge medications
d)Follow-up appointment
e)Weight monitoring
f)What to do if symptoms worsen
g)All of the above

TIME TO APPROPRIATE ANTIBIOTIC THERAPY AND OUTCOMES IN CRITICALLY ILL PATIENTS WITH ACINETOBACTER BAUMANNII PNEUMONIA

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Background:
The prevalence of nosocomial pneumonia caused by multi-drug resistant (MDR) pathogens is increasing at an alarming rate particularly in intensive care units (ICU). The most common source of infection associated with Acinetobacter baumannii (AB) is pneumonia with incidence rates almost doubling from 1986 to 2003. AB has developed intrinsic and/or acquired resistance to all currently available classes of antibiotics. These MDR AB strains are increasing in prevalence and are associated with high rates of morbidity and mortality.

Purpose:
To evaluate the time to appropriate antibiotic therapy and clinical outcomes in critically ill patients with AB pneumonia (ABP). These patients will be compared to those with non-AB pneumonia (NABP).

Methods:
This is a retrospective study examining all patients 18 years and older admitted to the ICU with ABP and NABP. The clinical diagnosis of pneumonia will be based on criteria from the 2005 American Thoracic Society and Infectious Disease Society of America guidelines. Patients will be excluded if respiratory cultures contained mixed flora, if colonization was considered or if the patient was transferred from another hospital. Baseline data to be collected will include age, gender, past medical and surgical history, acute physiology and chronic health evaluation (APACHE) II score, Charlson comorbidity index score, and sequential organ failure assessment (SOFA). Clinical and microbiological data will include radiographic results, signs and symptoms of infection, clinical pulmonary infection score (CPIS), antimicrobial agents administered along with time to first dose, timing and results of microbiologic respiratory cultures, in vitro susceptibility to antimicrobial therapy, hospital and ICU length of stay, all-cause mortality.

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

Learning Objectives:

Examine antibiotic resistance patterns at our institution and review the mechanisms responsible for resistance.

Evaluate the outcomes associated with time to empiric antibiotic therapy in Acinetobacter baumannii pneumonia.

Self Assessment Questions:

Which mechanism(s) of resistance occur in -lactam antibiotics against Acinetobacter baumannii?

What can be done to help prevent Acinetobacter baumannii nosocomial infections?

PHARMACOEPIDEMIOLOGY OF INPATIENT ACUTE RENAL FAILURE

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Purpose: Hospital acquired acute renal failure has been documented to occur with up to 20% of all inpatient admissions with drug induced causes accounting for up to 30% of those cases. Patients that develop acute renal failure are at increased risk for recurrent hospitalizations, renal replacement therapy and mortality. The purpose of this study is to identify the most prevalent drug-induced causes of acute renal failure which may allow development of targeted interventions for future improvements.

Methods: This study is observational, retrospective case-controlled. Patients were included if they were an inpatient over the age of 18, discharged between November 2007 and September 30, 2008. Case patients were identified as those with an ICD-9 code of acute renal failure which was not present on admission. Control patients were randomly selected from those patients without a code for acute renal failure. Patients with end-stage renal disease were excluded. The cases and controls were stratified into four groups according to primary ICD-9 code; congestive heart failure, infection, liver disease or other. Demographic, length of stay and disposition data were collected on all patients. Comorbid conditions and other risk factors shown to contribute to the development of acute renal failure were collected. The medications of interest were chosen based on the frequency of association with acute renal failure in current literature and include; antimicrobials, angiotensin converting enzyme Inhibitors, angiotensin II receptor blockers, non-steroidal anti-inflammatory agents, calcineurin inhibitors, antineoplastic agents, vasopressors, radio-contrast media, indinavir and furosemide. Univariate and multivariate regression analyses will be completed to identify any associations between a medication and the presence of acute renal failure. Based upon the results of the study a pharmacy based improvement plan will be considered in order to reduce the incidence of acute renal failure.

Results: Results and conclusions will be presented at the residency conference.

Learning Objectives:

Identify common medications associated with the development of acute renal failure in hospitalized patients.

Describe confounding disease states that can contribute to the development of acute renal failure.

Self Assessment Questions:

True or false: In the current literature, aminoglycoside antibiotics contribute to at least 20% of all drug induced acute renal failure.

True or false: Available literature documents that major surgery and sepsis are two of the most common conditions associated with the development of inpatient acute renal failure.

OUTCOMES OF DAPTOMYCIN THERAPY IN PATIENTS WITH END STAGE RENAL DISEASE

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Purpose: Daptomycin is an important antimicrobial agent for the treatment of Gram-positive infections. In patients with end stage renal disease (ESRD) receiving hemodialysis, the recommended dose of daptomycin is once every 48 hours. However, three times weekly dosing is often employed in clinical practice as a result of hemodialysis schedules and patient convenience. The pharmacokinetics of three times weekly dosing are currently under investigation. Limited data exist on the clinical outcomes of daptomycin in treating serious infections in hemodialysis patients, let alone the possible positive and negative effects of different dosing strategies. Therefore, the purpose of this study is to evaluate the safety and efficacy of daptomycin in patients with ESRD at various dosing schedules.

Methods: This retrospective cohort study will identify all consecutive patients treated with daptomycin between January 2006 and December 2008 using pharmacy dispensing records. Adult patients diagnosed with ESRD, defined as Stage 5 chronic kidney disease (creatinine clearance less than 15 ml/min by Cockroft-Gault or on dialysis), and treated with daptomycin for at least 3 days will be included. Patients receiving continuous renal replacement therapy or peritoneal dialysis will be excluded. Data will be collected from electronic medical records including patient demographics, clinical and microbiological data, and adverse events. Clinical outcomes (success or failure) will be assessed by investigators blinded to treatment strategy. Descriptive statistics will be used to analyze data. Continuous data will be presented using mean and standard deviation. Categorical information will be expressed as a percentage. A comparison will be made between the success rates of different dosing regimens, however this will be exploratory only and is not expected to include a sufficient number of patients to show statistical significance.

Results: The results and conclusions are pending and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe daptomycin elimination and the need for dosage adjustments in patients with ESRD.

Discuss the advantages and disadvantages of different daptomycin dosing regimens commonly used in patients with ESRD.

Self Assessment Questions:

True or False: Daptomycin is mainly eliminated by the kidneys and the amount cleared by hemodialysis is generally less than would be expected with normal renal function.

True or False: Administration of daptomycin on a schedule which coincides with hemodialysis sessions instead of every 48 hours may help to preserve potential dialysis access sites for future use.

A PHARMACIST-INITIATED PERIPHERAL ARTERIAL DISEASE SCREENING BASED IN A COMMUNITY PHARMACY SETTING

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Purpose: Peripheral arterial disease (PAD), also known as peripheral vascular disease, affects approximately 8-12 million Americans aged 65 and over and results in increased cardiovascular mortality. Although effective measures are available to prevent and treat PAD, the majority of individuals who could benefit from such proven services do not receive them due to under diagnosis. Peripheral arterial disease can be accurately detected using a handheld Doppler and calculating an ankle brachial index (ABI). While primary care physician-based screening programs are effective in detecting PAD, to date, no studies have been performed utilizing pharmacists in a community setting to screen for PAD without the aid of a physician-nurse partnership. Therefore, the purpose of this project is to develop, implement, and evaluate a PAD screening program in which community pharmacists screen at-risk patients. The objectives of this study are to evaluate the feasibility of implementing a pharmacist-initiated PAD screening program in the community setting and determine the ability of this screening to increase the number of at-risk patients diagnosed with PAD through early detection.

Methods: Community pharmacists at several Cincinnati Kroger Pharmacy Patient Care Centers will screen patients who are currently enrolled in existing disease management programs to determine patients at-risk for PAD. At-risk patients will then undergo a PAD screening which includes an assessment of PAD symptoms and an ABI calculation using a handheld Doppler. Any patient with newly detected PAD will be referred to their physician for further evaluation and will be given appropriate counseling on possible treatments, medications and lifestyle modifications. If successful, this project will demonstrate that a service provided by community pharmacists will improve a healthcare need of disease detection and treatment in patients at-risk for PAD.

Preliminary Results: PAD screenings are currently being implemented. Preliminary results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the risk factors and symptoms associated with peripheral arterial disease.

Explain community pharmacists role in improving disease detection and early treatment in those at high risk for PAD.

Self Assessment Questions:

Which of the following are not associated risk factors for peripheral arterial disease:
a.Smoking
b.Diabetes
c.COPD
d.Hypertension

According to the 2005 PAD guidelines, which ankle-brachial index (ABI) is indicative of having peripheral arterial disease:
a.1.40
b.1.00
c.0.90
d.0.80

ADHERENCE TO HEPATITIS B PHARMACOTHERAPY GUIDELINES AND ASSOCIATED HEPATOTOXICTY IN HUMAN IMMUNODEFICIENCY VIRUS (HIV) CO-INFECTED PATIENTS

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PURPOSE: Approximately 10% of the 36 million individuals infected with HIV worldwide are also co-infected with chronic hepatitis B virus (HBV). The risks of HBV disease progression in patients coinfected with HIV are substantially greater than those of monoinfected patients. According to recent literature, patients receiving care in accordance with current treatment guidelines demonstrate decreased liver-related morbidity and a regression in liver fibrosis. The primary objectives of this study are to evaluate adherence to the treatment recommendations of the DHHS Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents, and the HIV-Hepatitis B Virus International Panel Guidelines for HIV/HBV coinfected patients and to assess the incidence and severity of any attendant hepatotoxicity. Secondary objectives include identifying factors that influence the likelihood of adherence to guidelines (e.g., age, race/ethnicity, years of co-infection), comparing the incidence of hepatotoxicity and serological conversion between patient groups, and assessing adherence to recommended monitoring guidelines.

METHODS: This is a single-center, retrospective chart review evaluating the medication therapy of HIV/HBV coinfected patients at Saint Marys Special Immunology Services. Eligible subjects (n = 679) were screened using the following inclusion criteria: 18 years of age or greater; HIV-positive by Western Blot; and chronic HBV based upon serology. Thirty patients meeting these criteria were identified having periods of care in the clinic ranging from less than 1 year to greater than 10 years. An evaluation of each patients HIV/HBV treatment will be used to assess adherence to the guidelines, surrogate markers of response, and laboratory or clinical signs of toxicity. Statistical comparisons of adherence will be conducted using Fishers exact test. Secondary objectives will be evaluated using Fishers exact test, Wilcoxon rank sum, and t-tests as appropriate for the level of comparison.

RESULTS: Data collection ongoing.

CONCLUSIONS: Pending data review and analysis.

Learning Objectives:

Recall the appropriate therapy for HIV/HBV coinfected patients

List monitoring parameters to identify treatment response and disease progression

Self Assessment Questions:

Which HBV agent(s) should be used cautiously in the absence of full antiretroviral therapy due to the proclivity to select for HIV drug resistance?
A.Entecavir
B.Interferon
C.Both A and B
D.Neither A nor B

True/False: According to the DHHS Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents, if HBV or HIV requires treatment, then therapy should be directed at both viruses.

USE OF SIROLIMUS AND TACROLIMUS IN THE PREVENTION OF GRAFT VERSUS HOST DISEASE IN STEM CELL TRANSPLANT

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PURPOSE: One of the most important complications of allogeneic stem cell transplantation is graft-versus-host disease (GVHD). Methotrexate/cyclosporine are commonly utilized for the prevention of GVHD in stem cell transplant patients. However, methotrexate may exacerbate injury to the gastrointestinal tract, contribute to the risk of infection, delay engraftment, and exacerbate mucositis. The aim of the current investigation is to retrospectively compare the efficacy and safety of methotrexate/cyclosporine to the combination of sirolimus/tacrolimus for the prevention of acute GVHD in patients treated with conventional allogeneic stem cell transplant.

METHODS: A retrospective, chart review was conducted at Indiana University Simon Cancer Center, Indianapolis, Indiana. Indiana University stem cell transplant databases were used to identify patients who had undergone transplantation between January 2005 and September 2008. Inclusion criteria included those patients HLA-A, -B, -C, -DR matched, age > 18, and who have received either the methotrexate/cyclosporine regimen or sirolimus/tacrolimus, +/- antithymocyte globulin regimen prior to their allogeneic stem cell transplant.

Primary endpoints of the study were incidence and severity of acute GVHD between the methotrexate/cyclosporine and sirolimus/tacrolimus groups. Secondary endpoints included the following incidences of: veno-occlusive disease, thrombotic microangiopathy, interstitial pneumonitis, mortality at 30 and 100 days, and median overall survival.

RESULTS AND CONCLUSIONS: A total of 75 patient charts were reviewed; 34 received methotrexate/cyclosporine and 41 patients received sirolimus/tacrolimus. The mean ages of patients at time of transplant were 37.2 years (range 21-56) and 40.6 years (21-59), respectively. Fifty-nine percent of the patients were male in the methotrexate/cyclosporine arm and 37% were male in the sirolimus/tacrolimus arm. The most common disease was acute myeloid leukemia in both groups comprising 49% of total patients. Results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the clinical presentation of acute graft-versus-host disease.

Discuss immunosuppressant agents used in the prevention of graft-versus-host disease.

Self Assessment Questions:

Possible sign(s) or symptom(s) of acute graft-versus-host disease include(s):
a.Diarrhea
b.Rash
c.Elevated bilirubin
d.All of the above

Complication(s) associated with the use of methotrexate include(s):
a.Delayed engraftment
b.Mucositis
c.Renal toxicity
d.All of the above

EVALUATION OF A STANDARDIZED WARFARIN EDUCATION PROGRAM

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PURPOSE:
Pharmacist-managed anticoagulation clinics have demonstrated a decrease in warfarin-related complications and an increase in time within target INR range. However, there are limited data on how established pharmacist-managed anticoagulation clinics can further improve outcomes. At our institution, the Pharmacy Anticoagulation Service (PAS) manages warfarin therapy for approximately 100 patients. When initiated on warfarin, patients are provided with telephonic education that is currently not standardized from one pharmacist to another. The primary objective of this study is to assess patients understanding of anticoagulation therapy. The secondary objectives are to assess the effects of standardized education on INR levels and patient adherence to warfarin therapy.

METHODS:
A standardized educational program will be developed and implemented. The Anticoagulation Knowledge Assessment (AKA) will be utilized to assess patients knowledge regarding warfarin therapy. Patients meeting inclusion criteria will be randomized to the educational or control group. At baseline, patients in both groups will receive the AKA via mail with instructions on survey completion.

For patients in the education group, standardized education will be provided once the completed AKA is received, with additional education every 3 weeks for 9 consecutive weeks. Patients in the control group will receive no additional education other than that provided at warfarin initiation. At week 12, patients in both groups will be re-surveyed utilizing the AKA for understanding of anticoagulation therapy. No education will be provided during weeks 12 to 18 to either group and an additional survey will be sent to both groups at week 18.

Effect on INR will be evaluated by assessing the number of values outside the patients therapeutic range. Adherence will be evaluated by assessing patient-reported missed/extra doses, patient-reported medication regimen accuracy and missed or late lab appointments.

RESULTS and CONCLUSIONS:
Final results will be presented at the conference.

Learning Objectives:

Describe the warfarin education requirements of the 2008 National Patient Safety Goal 3E.

Identify mechanisms of improving a patients anticoagulation knowledge within a pharmacist-managed anticoagulation clinic.

Self Assessment Questions:

True or False. The 2008 National Patient Safety Goal 3E only requires anticoagulation education be provided to health care providers.

True or False. The development of pharmacist-managed anticoagulation clinics has been shown to decrease warfarin related complications.

EVALUATION OF ERLOTINIB-RELATED TOXICITIES IN LUNG CANCER PATIENTS WITH EGFR MUTATIONS

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Purpose: Erlotinib, an oral tyrosine kinase inhibitor directed against the Epidermal Growth Factor Receptor (EGFR), is approved for refractory advanced or metastatic non-small cell lung cancer (NSCLC). Retrospective studies showed that somatic activating mutations (exons 19 and 21) in the tyrosine kinase domain of EGFR were strong predictors of antitumor responses in lung cancer patients receiving treatment with EGFR tyrosine kinase inhibitors. Toxicities commonly observed with these agents include skin rash and diarrhea. The intensity of these side effects varies among patients and it has been suggested that there is an association/correlation between the rash and antitumor efficacy. In vivo/vitro studies suggest that the concentration required for EGFR inhibition in tumors with these mutations is considerably less. Thus, the possibility exists that recommended doses of erlotinib are larger than those required for EGFR inhibition in this patient population. The objective of the study is to determine whether patients with known EGFR mutations receiving erlotinib are more prone to require dose reductions due to toxicities.

Methods: This is an IRB approved, retrospective, observational study to describe the toxicities and dose reductions seen in patients with tumors possessing activating EGFR mutations treated with the conventional dose (maximum tolerated dose) of erlotinib (150mg daily). All eligible patients from January 2008 to April 2009 with a diagnosis of NSCLC and amplification and/or mutations in either exon 19 or 21 of the EGFR in their tumors will be evaluated for erlotinib tolerability. The primary endpoint is dose reductions secondary to moderate or severe toxicity. Secondary endpoints include rate and degree of dermatologic and gastrointestinal (GI) adverse events using the National Cancer Institute (NCI) toxicity grading scale. Baseline characteristics including smoking history and mutation type will be collected for analysis.

Results/Conclusion: Data collection in progress. Results and conclusion will be presented at the conference.

Learning Objectives:

Define the role of EGFR testing in NSCLC prior to tyrosine kinase inhibitor therapy.

Review dose-limiting toxicities of erlotinib in non-small cell lung cancer based on National Cancer Institute (NCI) toxicity grading scale.

Self Assessment Questions:

Ninety percent of EGFR mutations consist of exon 19 and 21 mutations. T/F
Answer: True

NSCLC patients with EGFR mutations predominantly have a history of smoking. T/F
Answer: False

DETERMINATION OF RISK FACTORS ASSOCIATED WITH COLONIZATION OR INFECTION DUE TO EXTENDED SPECTRUM BETA-LACTAMASE-PRODUCING (ESBL) KLEBSIELLA PNEUMONIAE.

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Background: The prevalence of infections due to extended spectrum beta-lactamase (ESBL)-producing Klebsiella pneumoniae are increasing world wide. Specifically, at our institution 30% of Klebsiella pneumoniae harbor ESBLs. These organisms present a therapeutic dilemma due to a limited susceptibility pattern as they often retain susceptibility only to carbapenems and tigecycline. As a result, empiric antimicrobial regimens for patients infected with this organism are often inadequate and inappropriate empiric antimicrobial therapy is a known independent risk factor for mortality in patients with bacteremia or pneumonia. However, not all patients warrant broad-spectrum coverage, and misuse of these last line antibiotics can lead to an increase in their resistance, and a subsequent decrease in their utility. Presently, there are few data available with regards to the risk factors for isolation of ESBL-producing Klebsiella pneumoniae. We therefore designed this retrospective case-control study to identify the risk factors associated with isolation of ESBL-producing strains of Klebsiella pneumoniae.

Methods: The study population was identified by querying the microbiology laboratory database for all positive cultures of Klebsiella pneumoniae from January 1, 2007 through December 31, 2007. Patients who are at least 18 years or older with all initial positive Klebsiella pneumoniae cultures were included in the study. Exclusion criteria are any duplicate isolates. All unique subjects whose Klebsiella pneumoniae strains are ESBL-positive will comprise the case group. The control group will be randomly selected from the ESBL-negative Klebsiella pneumoniae strains in order to have an equal number as the control group. Electronic and written patient charts, as well as pharmacy records will then be analyzed in order to determine risk factors for harboring an ESBL-positive strain. Risk factors that will be analyzed are demographic data, prior hospitalizations, previous antibiotic exposures, and any co-morbid conditions.

Results and conclusions: Pending

Learning Objectives:

Describe the risk factors associated with isolation of ESBL-producing strains of Klebsiella pneumoniae.

List the current treatment options for ESBL-producing infections.

Self Assessment Questions:

True or False: Ceftriaxone is an appropriate empiric antibiotic therapy for suspected ESBL-producing strains of Klebsiella pneumoniae infections

True or False: Meropenem is an appropriate treatment agent for ESBL-producing strains of Klebsiella pneumoniae infection

DIABETES MELLITUS TYPE 2 CONTROL, SAFETY, AND COST: INTERMEDIATE ACTING INSULIN NPH VS LONG ACTING GLARGINE INSULIN IN A VETERAN POPULATION

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Background:
Diabetes mellitus is a metabolic disease that can lead to serious complications. Due to the continued decline of beta cell function, most type 2 patients will eventually need insulin therapy. Both rapid acting and slow basal insulin mimic the bodys natural insulin release. Glargine is a modification of human insulin. Its pharmacodynamic profile more closely resembles normal physiologic function of basal insulin. Delayed absorption and a longer duration of action are the resulting advantages of glargine insulin.

Purpose:
The purpose of this study is to evaluate the efficacy of insulin glargine vs NPH in the treatment of type 2 diabetes mellitus at the Jesse Brown VA Medical Center after the addition of glargine to the national formulary.

Method:
This study will be a retrospective, electronic chart review of patients at the Jesse Brown VA Medical Center who are 18 years or older with type 2 diabetes mellitus who received a new prescription for glargine insulin between 4/1/08 and 9/18/08. Patients who were on glargine from an outside hospital and patients with type 1 diabetes will be excluded. Patients need to have tried NPH for at least 3 months, or be nave to insulin prior to starting glargine. Patients must have an A1c within 8 months after initiation of glargine. Patients must have an HbA1c within 8 months prior to initiation of glargine. HbA1cs, weights, insulin regimens, hypoglycemic events, and oral medication usage by class, and noncompliance will be analyzed and compared between the NPH to glargine switches. Data will be analyzed to evaluate HbA1c in patients newly started on glargine to determine improved, worsening, or stable control of the disease.

Results:
This research is in the data collection phase. Final results with conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

To review advantages of tight glycemic control.

Discuss diabetes control with NPH and glargine.

Self Assessment Questions:

True or False. Beta cell function continues to decline over time in patients with type 2 diabetes mellitus.

When should insulin therapy be initiated?
a.HbA1c levels above 8%,
b.After optimizing oral therapy
c.Blood glucose levels >250mg/dl
d.All of the above

RISK FACTORS FOR TREATMENT FAILURE IN PROSTHETIC JOINT INFECTIONS (PJIS)

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Background: Methicillin-resistant S. aureus (MRSA) prosthetic joint infections (PJIs) have been associated with higher rates of treatment failure and increased mortality compared to methicillin-sensitive S. aureus. According to CLSI, MRSA is susceptible to vancomycin when the minimum inhibitory concentration (MIC) is ≤ 2 mcg/mL and intermediate when the MIC is 4 to 8 mcg/mL. Recent data have demonstrated elevated vancomycin MICs among MRSA isolates. Several studies have suggested that MRSA bacteremias with MICs ≥ 2 treated with vancomycin have been associated with poorer treatment outcomes than isolates with MICs < 2. Limited data exists evaluating the outcomes of patients treated with vancomycin as well as other therapies, such as daptomycin and linezolid, for MRSA PJIs with MICs ≥ 2.

Objective: The primary objective is to evaluate the clinical and microbiological outcomes of patients treated with vancomycin for MRSA PJIs with MICs < 2 and MICs ≥ 2. For isolates with MICs ≥ 2, the secondary objective is to compare the outcomes of patients with PJIs treated with vancomycin to those treated with daptomycin or linezolid.

Methodology: A retrospective chart review of first PJI episodes at Rush University Medical Center treated between January 2000 and September 2007 was conducted. Patients who received reintervention within 2 years of initial treatment modality were defined as "cases"; patients who did not receive reintervention of their PJI within 2 years of initial epsiode were defined as "controls". The primary endpoint was to determine the percentage of patients with clinical and microbiological cures at the end of follow-up. Clinical cure was defined as the resolution of symptoms with prosthesis retention; microbiological cure was defined as the eradication of infection based on negative cultures and histopathology.

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

Learning Objectives:

Define potential risk factors associated with treatment failure in prosthetic joint infections

Describe clinical and microbiological outcomes of patients with MRSA prosthetic infections with MICs ≥ 2 treated with vancomycin

Self Assessment Questions:

What MIC is vancomycin considered resistant to MRSA?
a.≤ 2 mcg/mL
b.2 to 4 mcg/mL
c.4 to 8 mcg/mL
d.≥ 16 mcg/mL

True or False: Daptomycin and linezolid can be utilized as therapeutic alternatives in the treatment of MRSA prosthetic joint infections with MICs ≥ 2.

RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF INFECTION OR COLONIZATION WITH LINEZOLID-RESISTANT, VANCOMYCIN-RESISTANT ENTEROCOCCUS (LRVRE)

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Purpose: From 2000 to 2005, LRVRE was rare at UIMCC; however, the incidence of linezolid resistance among Enterococcus faecium increased from 9% in 2005 to 16% in 2007. Additionally, ~5% of E. faecalis were reported to be resistant to linezolid during this time period. The aim of this study is to determine risk factors for the development of infection or colonization by LRVRE as well as describe the outcomes associated with LRVRE infections.
Methods: We are conducting a retrospective review of adult patients with VRE isolated from blood, body fluid (intra-abdominal fluid or cerebrospinal fluid) or stool cultures from January 2000 to September 30, 2008 as identified by the clinical microbiology laboratory excluding patients without documented linezolid susceptibility results. VRE isolated from blood or body fluid will be considered infection and isolates from stool only will be considered colonization. Cases will be defined as patients with LRVRE and will be matched 1:1 to control patients with linezolid-susceptible VRE based on culture date and whether the isolate is associated with infection or colonization. The following data will be collected from patients medical records: demographics, previous linezolid exposure, presence of immunosuppressive conditions, co-morbidities, hospital length of stay, major surgical interventions, surgical complications, microbiology culture data, hospital location at time of LRVRE or VRE culture, antibiotics received within the 2 weeks prior to isolation of LRVRE or VRE, minimum inhibitory concentration (MIC) of the isolate to linezolid and other antimicrobials, time to appropriate antimicrobial therapy, highest APACHE II score in the 24 hours prior to time of first positive culture, and outcome of VRE or LRVRE infection.
Results: The study is IRB approved; subject identification and data collection is in process.

Learning Objectives:

Describe the trends in resistance patterns exhibited by Enterococcus species and explain the mechanism of linezolid resistance in this organism.

Identify patient populations and risk factors for the development of infection or colonization with linezolid-resistant, vancomycin-resistant Enterococcus (LRVRE).

Self Assessment Questions:

Identify patient populations and risk factors for the development of infection or colonization with linezolid-resistant, vancomycin-resistant Enterococcus (LRVRE).

What risk factors have been identified for the development of infection or colonization with LRVRE?

PROSPECTIVE COMPARISON OF DAYTIME VERSUS NIGHTTIME SEDATION AND OPIOID ANALGESIA USE IN THE MEDICAL AND SURGICAL INTENSIVE CARE UNITS

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Purpose

There is limited data available in the medical literature comparing daytime to nighttime use of sedative and opioid analgesic in the critically ill population. The primary objective of this study is to compare patients level of sedation using the Riker Sedation-Agitation Scale (SAS) in the daytime versus nighttime, and the secondary objective is to compare the amount of sedative and opioid analgesic used in the daytime versus nighttime. Patients admitted to the medical critical care unit (MCCU) and surgical intensive care unit (SICU) at the University of Toledo Medical Center (UTMC) are being enrolled. The preliminary data from this study will contribute to the medical literature available on sedative and opioid analgesic use in critically ill patients.

Methods

A prospective chart review of critically ill patients age 18 years or older requiring sedative and opioid analgesic, and eligible for sedation interruption in the MCCU and SICU is being conducted. Patients on paralytic agents, in moribund states, and whom life support is withdrawn are excluded. Sedatives evaluated in the study include midazolam, lorazepam, dexmedetomidine and propofol, and the opioid analgesics are morphine, hydromorphone, and fentanyl. One hundred patients from December 2008 to April 2009 will be enrolled in the study. SAS scores and sedative and opioid analgesic usage will be recorded as primary and secondary outcome measures respectively. Demographics, ICU admitting diagnosis, Acute Physiology & Chronic Health Evaluation II scores on study enrollment, need for mechanical ventilation, and in-patient mortality are also being collected. A twenty-five percent difference between daytime versus nighttime sedative and opioid analgesic use, and SAS scores will be considered clinically significant. The study was approved by the UTMC Investigational Review Board.

Results/Conclusion

Data compilation and statistical analyses will be completed by April 2009. Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

recognize the variability in daytime versus nighttime sedative use and level of sedation at UTMC

Discuss the impact of oversedation in the ICU

Self Assessment Questions:

Which of the following is a sedative?

(a)Dexmedetomidine
(b)Hydromorphone
(c)Morphine
(d)Oxycodone
(e)Fentanyl

Unless contraindicated, ICU patients should receive sedation holidays. (True or False)

DEVELOPMENT OF A PHARMCIST-CONDUCTED ANTIMICROBIAL STEWARDSHIP SERVICE

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PURPOSE: The development of antimicrobial resistance continues to result in increased morbidity, mortality, and cost of health care. This increased rate of resistant bacteria has driven the need for surveillance of antibiotics along with appropriate intervention. The Infectious Diseases Society of America has developed guidelines on appropriate antimicrobial stewardship to optimize patient outcomes and decrease healthcare costs while minimizing the consequences of antibiotic usage such as toxicity, secondary infections and future resistance. This study was designed to evaluate the impact of an interventional pharmacist antibiotic management program on average patient length of stay, clinical outcomes, and expenditures for antibiotics against a pre-intervention period.

METHODOLOGY: A retrospective chart review will be conducted to evaluate current broad spectrum antibiotic usage. The prospective clinical study will include patients receiving prespecified antibiotics during an interventional period from January to February 2009. A pharmacist will provide antimicrobial consultation for eligible patients throughout their length of stay. Interventions could include suggesting more appropriate empiric coverage, de-escalation to narrow spectrum antibiotics, converting to oral administration, dosing adjustments, discontinuation of drugs, or toxicity monitoring.

RESULTS/CONCLUSIONS: Data collection is ongoing and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the essential roles of the antimicrobial stewardship pharmacist.

Explain the barriers for successful implementation of an antimicrobial stewardship program.

Self Assessment Questions:

The primary goal of antimicrobial stewardship is to reduce healthcare costs without adversely impacting quality of care. T or F

The core strategies of antimicrobial stewardship are formulary restriction and prospective audit with intervention. T or F

DEVELOPING AN ASHP ACCREDITED PHARMACY TECHNICIAN TRAINING PROGRAM IN AN ACADEMIC MEDICAL CENTER

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As the demand for pharmacy services expands in the hospital setting it is imperative that University of Wisconsin Hospital and Clinics (UWHC) pharmacy department develops a highly skilled and knowledgeable technical workforce. The current methods with which we train technicians are not uniform. There is a need for standardized training, advanced competence and heightened engagement of the pharmacy technicians. The development of an ASHP accredited pharmacy technician training program aims to increase job satisfaction and fortify the pharmacy technical workforce at UWHC.

The objectives of this project are fivefold: 1) to perform a gap analysis to identify opportunities for improvement in the current UWHC pharmacy technician training program, 2) to lead a program design team in guiding the development of an accredited pharmacy technician training program; 3) to lead a pharmacy and human resources workforce engagement team to propose strategies to expand the career path of UWHC pharmacy technicians who complete the accredited technician training program; 4) to propose a plan with adequate resources to implement the teams strategies; and 5) to identify measurements to gauge the programs success.

A gap analysis was performed comparing current UWHC technician training content to the ASHP accreditation standards and to assess staff perception of the quality of the current training program. The gaps identified will be presented to both the program and workforce engagement design teams. The program design team will develop program content, structure, methods and resources to bridge the identified gaps while the workforce engagement team will develop strategies to enhance opportunities available to the technical workforce. Based on recommendations, a detailed action plan will be developed to create an improved pharmacy technician training program. The successful implementation of an ASHP accredited training program will augment the ability of our technical workforce to support our pharmacists in providing safe and cost-effective services.

Learning Objectives:

Describe key benefits of an ASHP accredited pharmacy technician training program within a Pharmacy Department.

Describe the design process of the ASHP accredited pharmacy technician training program within the Pharmacy Department at UWHC.

Self Assessment Questions:

What assessment tool was utilized to compare the evaluation of current UWHC pharmacy technician training program to ASHP accreditation standards, and UWHC staff perceptions?

Identify two intended outcomes following the design and implementation of an ASHP accredited pharmacy technician training program within the Pharmacy Department at UWHC.

FREQUENCY OF ACETAMINOPHEN USE IN HOSPITALIZED PATIENTS

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PURPOSE: To determine the number of orders written which would potentially allow for more than 4 grams daily of acetaminophen (APAP) to be administered and to calculate the actual amount of APAP administered daily for the patients described above.

METHODS: This retrospective chart review will include all adult patients admitted to specific nursing units between May 1, 2008 and August 1, 2008 with an order written for APAP or an APAP-containing product. The following data will be collected: age, gender, location, admission date, discharge date, length of stay, admission diagnosis, admission service, orders containing APAP, indication for APAP or APAP-containing product, number of doses received by patient, total daily milligrams of APAP possible and received, date medication ordered, date medication discontinued, baseline liver enzyme tests and throughout hospital stay, serum creatinine, and risk factors for toxicity (e.g., malnutrition, concommitant enzyme inducers, history of ethanol abuse, and history of liver disease). Descriptive analysis of the data will include the maximum total daily dose of APAP, percentage of days the patient received greater than 4 grams of APAP, if any elevation was noted in the liver enzyme tests, and if the patient had any risk factors for APAP-related hepatotoxicity. Logistic regression analysis will analyze if confounding variables are present in the patients with higher doses of APAP.

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

Learning Objectives:

Identify patients with an increased risk for liver toxicity associated with acetaminophen.

Describe the mechanism of acetaminophen-related liver toxicity.

Self Assessment Questions:

Which of the following are associated with an increased risk of acetaminophen-related hepatotoxocity?
a. History of chronic ethanol use
b. Concommitant use of enzyme-inducing medications
c. Malnutrition
d. Concommitant use of APAP-containing narcotics
e. All of the above

What is the metabolic pathway that forms the toxic metabolite, NAPQI, and results in hepatotoxicity following acetaminophen overdose?
a. Glucuronidation
b. Sulfation
c. CYP450 2E1
d. a and b
e. All of the above

BASAL-BOLUS INSULIN REGIMEN FOR POSTOPERATIVE GLYCEMIC CONTROL IN CARDIAC SURGERY

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Purpose: Hyperglycemia after cardiothoracic surgery is associated with greater mortality, higher incidence of deep sternal wound infections, and increased length of stay. Basal-bolus regimens are thought to be effective for glycemic control when transitioning off insulin infusions. The primary objective for this study was to compare postoperative glycemic control in cardiac surgery patients, before and after implementation of a basal-bolus insulin protocol.

Methods: Adult patients that underwent coronary artery bypass grafting or valve replacement were identified retrospectively via an institutional database. Patients admitted to the intensive care unit or on a basal-bolus regimen postoperatively prior to protocol institution on October 1, 2008 were excluded. Subjects were stratified to pre and post basal-bolus groups, utilizing data from August 2008 and November 2008, respectively. Demographics, postoperative blood glucose values up to seven days, presence of deep sternal wound infection, and length of stay were collected. Outcome variables included rates of: blood glucose values within the desired range defined by hospital protocol (70 to 150), hypoglycemia (less than 70), hyperglycemia (151 to 400), and extreme hyperglycemia (greater than 400).

Results: Preliminary data from 39 patients was collected and analyzed. For 19 pre-protocol subjects, 46.2% of 445 postoperative blood glucose levels were hyperglycemic and 53.5% were within the desired range. In contrast, 20 basal-bolus patients yielded 422 blood glucose values, of which 57.8% were deemed hyperglycemic and 42.2% fell within range. Extreme hyperglycemia was not seen in either population, but one hypoglycemic event was observed in the pre-protocol group.

Conclusions: Further data collection and evaluation is currently in progress. Conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe complications associated with postoperative hyperglycemia in cardiac surgery patients.

Describe basal-bolus versus sliding scale insulin therapy for cardiac surgery patients.

Self Assessment Questions:

Which of the following is an outcome associated with hyperglycemia in patients status post cardiothoracic surgery?
A.Mortality
B.Sternal wound infection
C.Increased length of stay
D.All of the above

True or False: Basal-bolus insulin should begin immediately following coronary artery bypass grafting and/or valve replacement.

PROCESS DEVELOPMENT FOR THE IDENTIFICATION OF PHARMACY COST-SAVINGS OPPORTUNITIES THROUGH ANALYSIS OF DIAGNOSIS-RELATED GROUP CODES

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Today it is increasingly important for hospital pharmacies to contain drug costs, since they comprise the majority of department budgets and contribute significantly to health-system spending overall. In the last decade, drug expenditures have increased at faster rates than other health-system expenses, while reimbursement rates have declined. While there is considerable published literature outlining processes for cost containment through initiatives such as formulary management, therapeutic interchange and clinical pharmacy services, lacking from these recommendations is a method for identifying cost savings opportunities through the analysis of billing and reimbursement, including strategies for using diagnosis-related groups (DRGs). The primary objective of this study is to develop a process to identify potential cost savings opportunities for the pharmacy department of a 500-bed rural community teaching hospital through analysis of DRG codes. The secondary objective of this study is to identify targeted DRGs for the institution to further evaluate as part of our cost-containment inititatives.

Through colaboration with key stakeholders, billing and coding data from fiscal year 2008 (October 1, 2007 to September 30, 2008) was complied electronically from a relational database containing inpatient transaction information. Data collected included primary DRG code, total number of discharges per DRG, discharge days, average length of stay, total charges and cost per DRG, pharmacy charges and cost per DRG, total reimbursement, and reimbursement gap. Data is being systematically analyzed to identify DRGs for potential cost-containment initiatives. The key steps taken to extract this information will be documented and the process will be flowcharted.

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

Learning Objectives:

List key stakeholders in the identification of pharmacy charges within the DRG system of coding and billing.

Identify a process for determining DRGs with potential cost-savings opportunities for pharmacy departments.

Self Assessment Questions:

List four key stakeholders in the identification of pharmacy charges within the DRG system of coding and billing.

True or False: Pharmacy charges are billed separately from medical charges in the DRG system of coding and billing T or F

ASSESSING THE PROPER INDICATION OF GI PROPHYLAXIS AT DISCHARGE IN PATIENTS TREATED AT THE CINCINNATI VA MEDICAL CENTER: A RETROSPECTIVE REVIEW

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Purpose: GI prophylaxis has become the accepted standard of care for acutely ill inpatients. The purpose of this study is to determine if patients receiving GI prophylaxis during an inpatient stay who are discharged on these medications have a proper indication for continued use at the time of discharge.

Methods: A retrospective chart review will be performed at the Cincinnati VA Medical Center looking at all of the patients discharged from January 2008 through March 2008 on a proton pump inhibitor or a histamine H2 antagonist. The following data will be collected: admission diagnosis, length of hospital stay, days of use, indication of PPI/H2 antagonist at discharge, which PPI/H2 antagonist patient is taking at discharge, dosage of PPI/H2 antagonist, if patient was on medication in the year prior to admission. The primary outcome measured will be an assessment of appropriate continuation of GI prophylaxis at discharge based on following criteria: documented GI disorder (e.g. GERD, duodenal ulcer, gastric ulcer, erosive esophagitis, peptic ulcer disease, and Zollinger-Ellison Syndrome), previous documented GI bleed within 1 year, use of high risk medications (e.g. NSAIDs, ASA, glucocorticoids, anticoagulants), and coagulopathy (defined as platelet count <50,000mm3, INR >1.5, PTT>2times control value). Primary outcomes will be assessed using descriptive statistics, looking at the percentage of patients appropriately discharged on GI prophylaxis. A cost analysis will also be completed.

Results and Conclusion: This research is currently in the data collection phase. The final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

List risk factors for developing a stress ulcer.

Review the evaluation criteria used to evaluate patients for the appropriate continuation of PPI/H2 antagonists at discharge.

Self Assessment Questions:

True or False: Patients on mechanical ventilation for more than 48 hours should receive stress ulcer prophylaxis.

All of the following are risk factors for developing stress ulcers except:
A.History of GI bleed within the past year
B.Receiving high dose steroids
C.Admitted into the hospital
D.Coagulopathy (defined as platelet count <50,000mm3, INR >1.5, PTT>2 times control value)

EVALUATION OF ADHERENCE TO RECOMMENDED MENTAL HEALTH CARE PROVIDED TO OPERATION ENDURING FREEDOM/OPERATION IRAQI FREEDOM VETERANS WITH A POSITIVE SCREEN FOR POST TRAUMATIC STRESS DISORDER

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Purpose: To evaluate adherence to recommended mental health care provided to OEF/OIF veterans with a positive screen for PTSD at the Lexington Veterans Affairs Medical Center (LVAMC). Results will hopefully shed light on areas to improve delivery of PTSD services to new combat veterans.

Methods: This retrospective chart review will be conducted by gathering patient information from the Computerized Patient Record System at the LVAMC. The study period is March 1, 2007 through September 1, 2008. The Institutional Review Board has granted approval for this study. The study population will consist of males and females aged ≥ 18 who presented to the LVAMC, were OEF/OIF eligible, and had a positive PTSD screening during the study period. Patients who did not screen positive will be excluded. Mental health care will be evaluated on two measures 1) adherence to prescribed medication and 2) adherence to follow-up visits. Adherence to the primary psychotropic medication will be defined as a medication possession ratio (MPR) of ≥ 0.8 during the first six months post- PTSD screen. Using electronic prescription claims, the MPR will be calculated by the number of days of treatment dispensed divided by the number of days between prescription refills (excluding the last refill). Follow-up visits will include non-emergent face-to-face visits as recommended by the respective treatment setting provider. The following patient variables will be collected as potential confounders to adherence: age, gender, race, co-morbid conditions, type of psychotropic medications prescribed, and distance between residence and the LVAMC. The primary outcome, effect of treatment setting on adherence, will be determined using chi square analysis with $\alpha = 0.05$. Descriptive statistics reporting means and frequencies of most measures will be used in data analysis, while logistic regression will be performed to identify predictors of adherence.

Results: Pending

Conclusions: Pending

Learning Objectives:

Identify factors that are associated with poor adherence to medication therapy among new combat veterans.

Describe the risk of PTSD in military veterans.

Self Assessment Questions:

List 3 factors that are associated with poor adherance to medication and health care treatment among new combat veterans.

What is the reported prevalence of PTSD among military veterans?

DETERMINATION OF RISK FACTORS AND OUTCOMES OF ENGRAFTMENT SYNDROME (ES) IN ALLOGENEIC BLOOD AND MARROW TRANSPLANT (BMT) RECIPIENTS

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PURPOSE: Engraftment syndrome (ES) is a known syndrome occurring around the time of neutrophil recovery after a BMT and consists of fever >38.0C, skin rash, weight gain and/or dyspnea, hypoxia, and pulmonary infiltrates. ES has been associated with increased transplant-related mortality. A few studies have investigated specific factors in autologous transplants theorized to increase the incidence of ES, such as mononuclear cell dose, use of colony stimulating factors (CSF), and steep neutrophil recovery. However, studies in allogeneic BMT are lacking. The purpose of this project is to determine the incidence and risk factors for ES during allogeneic BMT and its relationship with the incidence and severity of GVHD. The results of this study will aide in determining factors associated with increased risk of ES in allogeneic BMT so that current practices may be optimized.

METHODS: Data was collected over a four year time period from January 1st 2004 to December 31st 2007. Recipients of allogeneic BMT were identified using the University of Michigan Health System BMT database. ES confirmation and additional data were collected through the electronic medical records. Data collected included patient age, gender, disease that resulted in transplant, source of stem cells, HLA match, conditioning regimen, GVHD prophylaxis, ES symptoms, neutrophil recovery, ES therapy, and subsequent incidence of GVHD. SAS software (Cary, NC) and propensity scores will be utilized to determine the matched cohort. Demographic data will be compared between groups using a chi squared test and t-test for nominal and continuous data, respectively. A multivariate logistic regression model will be created to determine the probability ES based on each risk factor.

RESULTS: Preliminary data will be reviewed to identify trends that affect the incidence of engraftment syndrome.

CONCLUSIONS: Pending further analysis.

Learning Objectives:

Describe the signs and symptoms associated with engraftment syndrome.

Explain the potential relationship between conditioning regimens, GVHD prophylaxis and engraftment syndrome.

Self Assessment Questions:

Which of the following is NOT a sign or symptom associated with ES?
a. weight gain
b. rash
c. tachycardia
d. fever

True/False It is theorized that myeloablative conditioning regimens and potent immunosuppression for GVHD prophylaxis may increase the incidence of engraftment syndrome.

DEVELOPMENT OF A STABILITY-INDICATING ASSAY OF SODIUM NITROPRUSSIDE AND SODIUM THIOSULFATE MIXED INFUSION

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Purpose: Cyanide toxicity is a limitation of nitroprusside therapy, and absence of toxicity promotes the use of more expensive alternative agents such as nicardipine or clevidipine. Combining thiosulfate with nitroprusside has demonstrated a reduction of cyanide toxicity risk. Literature reports demonstrate no loss of nitroprusside efficacy when combined with thiosulfate, but limited evidence exists evaluating the stability of the two products when combined. This study aims to conclusively demonstrate that the admixture is stable, using high performance liquid chromatography (HPLC) to measure active and degradation compound concentrations.

Methods: Absorptive spectrophotometry produced unfavorable results between 230nm and 800nm since the absorption peaks for all compounds overlapped around 240nm. Next, thin layer chromatography was employed to develop optimal solvent conditions for HPLC. Variable ionic strengths and hydrogen ion concentrations will be tested. The conditions resulting in adequate separation and elution of all compounds will be used to perform HPLC with UV spectrophotometry. Internal standards will be used to quantify compound concentrations. Samples will be taken from a mixed solution of 0.1% sodium nitroprusside and 1% sodium thiosulfate (50mg sodium nitroprusside and 500mg sodium thiosulfate in 250mL of 5% dextrose in water USP and separately combined in 250mL of 0.9% sodium chloride USP) will be stored at 25C and 4C and sampled at 0, 4, 24, 72 hours, 7 days, and 14 days.

Results: Mixed infusion nitroprusside and thiosulfate can provide effective blood pressure control at low cost. A three day treatment of nitroprusside at typical therapeutic doses (3 mcg/kg/min) have projected savings of $14,778.84 and $15,428.28 compared to nicardipine at 10 mg/hr and clevidipine at 5 mg/hr at typical therapeutic doses, respectively. Results of this study will be presented to the department chair of critical care, neurosurgery, cardiovascular medicine and surgery, and peripheral vascular services.

Learning Objectives:

Identify benefits and concerns about nitroprusside use in critically ill patients and how combination with sodium thiosulfate alleviates those concerns.

Describe the necessary components of a stability indicating study.

Self Assessment Questions:

True or False: The combination of sodium nitroprusside and sodium thiosulfate produces a stable admixture and reduces the potential for cyanide toxicity in critically ill patients?

Name three elements necessary to perform an acceptable USP stability study

DURATION OF ALLOPURINOL TREATMENT IN PATIENTS UNDERGOING INDUCTION CHEMOTHERAPY FOR ACUTE MYELOID LEUKEMIA

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Purpose: Allopurinol is administered during induction chemotherapy for acute myeloid leukemia (AML) to reduce the severity of hyperuricemia occurring with tumor lysis syndrome (TLS). The optimal duration of allopurinol therapy that provides sufficient efficacy without producing unnecessary side effects is unknown. At our institution, allopurinol generally continues throughout the hospital admission or until the occurrence of an adverse event, such as rash or renal impairment. We sought to examine the duration of allopurinol therapy in patients undergoing induction chemotherapy with the 7+3 regimen for AML in order to develop institutional guidelines for allopurinol administration in this population.
Methods: Patients were retrospectively identified based on their diagnosis of AML and treatment with the 7+3 regimen. Patients less than 18 years of age were excluded. Charts were reviewed for patient demographics, allopurinol and chemotherapy regimens, serum chemistries, blood counts, dermatological reactions and other adverse events, duration of hospital admission, and patient outcome at time of hospital discharge. Laboratory signs of TLS were assessed.
Preliminary Results: To date, 20 patients have been evaluated. Mean (SD) patient age was 58.111.4 years and 45% were male. Mean duration of allopurinol therapy for all patients was 19.49.1 days. Forty percent of patients experienced a dermatological reaction. The mean duration of allopurinol therapy was 15.87.5 days for patients who experienced a dermatological reaction, compared to 21.89.7 days for patients with no dermatological reaction. Median baseline uric acid concentration was 7.2 mg/dL (2.3-11.7 mg/dL). Mean duration of hospital admission was 30.37.9 days. Allopurinol was discontinued in 25% of patients due to adverse events. Clinical outcomes will be reported.
Conclusion: Due to the development of adverse events warranting discontinuation of allopurinol therapy, guidelines will be established to limit the duration of allopurinol to the period of time that AML patients undergoing treatment with 7+3 are most at risk for TLS.

Learning Objectives:

Describe the role of allopurinol therapy for patients undergoing induction chemotherapy for AML.

Identify three potential adverse effects of allopurinol and discuss the risks of continuing therapy with allopurinol beyond the period when tumor lysis syndrome is likely to occur.

Self Assessment Questions:

Allopurinol therapy is used to reduce which of the following adverse events associated with TLS?
A. Hyperuricemia
B. Hyperkalemia
C. Hyperphosphatemia
D. Hypocalcemia

Side effects of allopurinol include which of the following?
A. Gastrointestinal toxicity
B. Allopurinol hypersensitivity syndrome
C. Skin rash, Stevens-Johnson syndrome
D. All of the above

DEVELOPMENT OF A PHARMACIST-MANAGED DIABETES CARE CLINIC IN AN URBAN COMMUNITY HEALTH CENTER

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Purpose:
This service is designed to develop a collaborative practice agreement between clinical pharmacists and physicians with the intent to improve adherence with ADA recommendations in diabetic patients in an urban community health center. A retrospective review conducted at the health center found that only 41.4 percent of patients with diabetes met the ADA recommend HbA1c goal of less than 7 percent.
Methods:
The clinical pharmacist-managed diabetes therapy management pilot program will be available for patients greater than 18 years of age with a diagnosis of type 1 or type 2 diabetes and a primary care provider at Mercy Family Health Center. Patients will be referred to the pharmacist-managed clinic for various indications, such as newly diagnosed diabetes, poor glycemic control, poor adherence, or a combination of these.
Within the pharmacist-managed clinic, pharmacists will review the patients past medical history, determine adherence to their medication regimen and the level of the patients disease state and glucometer use knowledge. Each patient will receive a comprehensive diabetes evaluation based on their individual needs as recommended by the American Diabetes Association standards of medical care. In addition, the pharmacist will interpret laboratory values and recommend appropriate medical referrals and lifestyle modifications. Medication recommendations will be made to the physician for consideration or medications will be adjusted per protocol with physicians approval.
Results:
The pharmacist-managed diabetes clinic has been approved by the Mercy Family Health Center medical director and will be provided one day per week. A diabetes care protocol has been approved for use and clinic materials as well as data collection forms have been developed. Additional results will be presented.
Conclusions:
The development of a pharmacist-managed diabetes care clinic has potential to improve patient care and increase patients and physicians perceptions of the pharmacists role in health care.

Learning Objectives:

Describe the epidemiology of diabetes in the United States

Explain the impact of a pharmacist-managed diabetes service on clinical outcomes

Self Assessment Questions:

Which of the following statements is correct regarding the epidemiology of diabetes?
a. Only one-quarter of adults in the US with diabetes have achieved the ADA recommended HbA1c level of <7%
b. Less than one-half of diabetic patients receive the proper preventative measures recommended by the ADA
c. The prevalence of diabetes is higher in the African American population
d. End stage renal disease is the leading cause of death in patients with diabetes

Studies have shown that pharmacists can have an impact on ALL of the following ADA preventative care measures EXCEPT:
a. Improving patient adherence to yearly eye and foot exams
b. Initiating daily aspirin therapy (75-162mg daily)
c. Recommending monthly screenings for elevated blood ketone levels
d. Improving patient compliance with influenza and pneumococcal vaccinations

IMPROVING ANTICOAGULATION INPATIENT SAFETY: IDENTIFYING BEST PRACTICES AND CURRENT TRENDS IN USING WARFARIN

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PURPOSE:
The Joint Commissions 2008 National Patient Safety Goals (NPSG), section 3E, recommends the implementation of a "defined anticoagulant management program" in an effort to ensure a maximal standard of care through individualization of therapy. The main objective of this study is a retrospective medication use review of all inpatients started on warfarin at the Veterans Affairs Ann Arbor Healthcare System (VAAAHS) from January 2008 to June 2008. Data collected on inpatients on warfarin will exhibit an image of warfarin use prior to implementation of a pharmacist run anticoagulation inpatient service at the VAAAHS. Data collected will include: indication for warfarin and starting dose, baseline and subsequent INRs throughout treatment, time to therapeutic INR, hemorrhagic or thromboembolic events and bridging for undercoagulated patients,. Variations in treatment and patients needs may further support the need for a pharmacist dedicated to anticoagulation monitoring in this inpatient population. A secondary objective of this study is to identify best practices for a pharmacist-managed inpatient warfarin service for hopefully future implementation in all inpatient care areas at the VAAAHS.

METHODS: A search of the VAAAHS inpatient prescription database will supply a list of patients with inpatient warfarin orders from January 2008 to June 2008. Investigators will track all aspects of warfarin and heparin use including indications, drug doses, International Normalized Ratios (INR), serum creatinine (Scr), complete blood cell counts (CBCs) and any hemorrhagic episodes.

A protocol for the inpatient warfarin pharmacist service will be a compilation of guidelines based on CHEST recommendations and other national best practices for anticoagulation management.

RESULTS & CONCLUSIONS: Data collection and analysis are currently ongoing. Preliminary results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe current management of warfarin anticoagulation at the VAAAHS and identify opportunities for improvement.

Describe the need of an inpatient anticoagulation pharmacist service at the VAAAHS.

Self Assessment Questions:

True/False-Although warfarin has been used for many years to prevent thromboembolic events , there are still many opportunities for pharmacists to impact this type of patient care.

True/False-Pharmacists, nurses and physicians often collaborate in an interdisciplinary manner to provide safe and effective anticoagulation therapy.

OUTCOMES OF A PHARMACIST-BASED MONITORING PROGRAM ON WARFARIN THERAPY IN HOME BASED PRIMARY CARE VETERANS

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Background:
In 2007, the Joint Commission revised the National Patient Safety Goals for Home Care to include the goal of reducing the likelihood of patient harm associated with the use of anticoagulation therapy. In November 2007 a pharmacist-based anticoagulation monitoring program was implemented at Hines VA Hospital for the Home Based Primary Care (HBPC) veterans in an effort to optimize therapy, reduce resource utilization, and minimize adverse outcomes among this population.

Purpose:
The primary purpose of this study is to evaluate the outcomes of a pharmacist-based monitoring program on warfarin therapy in HPBC veterans.

Methods:
We will identify HBPC patients with warfarin therapy prescribed during two time periods: first, during the pre-intervention period (November 2006 through October 2007) and second, following the implementation of a pharmacist intervention (November 2007 through October 2008). From the eligible population, we will select 50 patients from each time period. Data collected will include patient demographics, international normalized ratio (INR) dates and values, the number of different strengths of warfarin prescribed, documentation time and method, dose changes, interacting medications, and adverse events during a six month period. The first 6 weeks of treatment will be excluded for new enrollees to account for variability during initiation of warfarin therapy.

The primary outcome of the study will be to measure the difference in the average proportion of therapeutic INR values per patient during the physician monitoring period in comparison with the pharmacist intervention monitoring period. Secondary outcomes that will be evaluated include adverse events, frequency of INR monitoring, time to follow-up after a non-therapeutic INR, time to documentation, dose changes, percentage of documented complete blood count (CBC) and urinalysis (UA) in 6 months, time in therapeutic range, and the number of different strengths of warfarin prescribed.

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

Learning Objectives:

Identify potential challenges that may interfere with warfarin therapy in the home care population.

Identify the potential benefits of a pharmacist-based anticoagulation monitoring service among the home care population.

Self Assessment Questions:

T/F: Cognitive difficulties, medication non-adherence, fall risk, and altered pharmacokinetics are potential concerns among the home care population that may complicate warfarin therapy.

What was the difference in the average proportion of therapeutic INR values per patient during the pre-intervention group versus the post-intervention group found in this study?

EVALUATION OF PHARMACOLOGIC TREATMENT STRATEGIES IN POST-TRAUMATIC STRESS DISORDER PATIENTS WITHIN THE HUNTINGTON VA MEDICAL CENTER.

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Protocol Title: Evaluation of pharmacologic treatment strategies in post-traumatic stress disorder patients within the Huntington VA Medical Center.

Statement of Purpose: The purpose of this project is to identify pharmacologic treatment strategies of post-traumatic stress disorder associated with a lower total number of medications used while achieving maximum therapeutic benefit. This research seeks to identify therapeutic agents or combinations of agents associated with better outcomes in the treatment of post-traumatic stress disorder. Polypharmacy is an established, widespread problem in healthcare, contributing to poor medication regimen compliance and a high likelihood of critical drug-drug and drug-disease interactions. These negative effects may result or contribute to hospitalization, ER visitation, morbidity, and/or mortality. Moreover, duplicate drug therapies and avoidable complications contribute significantly to high medical costs. A better understanding of current treatment of post-traumatic stress disorder may reduce the incidence of polypharmacy-related adverse effects, simplify complex regimens, and ease medical costs.

Statement of Methods: A retrospective analysis of medical records of Huntington VA Medical Center post-traumatic stress disorder patients will be conducted. Primary endpoints being evaluated include medications used to treat post-traumatic stress disorder, global assessment of functioning (GAF) scores, emergency department visits, mental health clinic visits, and hospitalizations and clinic visits due to adverse effects of medications.

Results: Research is currently in the data collection phase. Final results with conclusion will be reported at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Learning Objective #1: Recognize the need for appropriate pharmacological treatment of post-traumatic stress disorder.

Learning Objective #2: Identify pharmacological agents and drug classes that may improve outcomes for patients with post-traumatic stress disorder.

Self Assessment Questions:

True/False: SSRIs are the recommended first line agents for the treatment of post-traumatic stress disorder.

True/False: Most patients with post-traumatic stress disorder can be effectively treated with a single psychotropic agent.

THE IMPACT OF SPECIALTY PHARMACY DISTRIBUTION CHANNELS ON MEDICATION PERSISTENCE AND MEDICAL OUTCOMES.

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Background: Usage of specialty pharmaceuticals is on the rise which translates to increased costs to members and payers. Most specialty medication regimens are extremely complex and require intense therapy management. Specialty pharmacies are designed to focus their attention and resources on these patients which may ultimately lead to improvements in health outcomes.

Objective: This retrospective, observational study will examine the differences in patients persistence to specialty medications between the retail and specialty pharmacy distribution channels and will determine if the differences in persistence translate to differences in medical outcomes.

Methods: This study will employ a retrospective multi-cohort design to examine the differences in medication and medical utilization for adult patients receiving specialty medications from either retail or specialty pharmacies. Four highly utilized specialty medications distributed by specialty and retail equally have been identified using 2007 claims data (Enbrel, Copaxone, Pegasys and CellCept. For each medication, a comparison will be conducted of medication persistence across 2007 between patients using a retail pharmacy and those using a specialty pharmacy. Persistence will be measured as the proportion of days covered (PDC). The mean differences in PDC will be compared by a students t-test, and by using a multivariate analysis of variance to adjust for group differences in age, gender and number of medications. Medical expenditures in 2007 will be compared between the two distribution channels using a students t-test, and by using a multivariate analysis of variance to adjust for group differences in age, gender, and number of medications. Finally, a linear regression model will be constructed for each disease state to examine the association of medical expenditures with PDC while controlling for age, gender and number of medications.

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

Learning Objectives:

recognize the difference between specialty distribution and retail distribution of specialty products.

Evaluate persistence based on type of specialty product.

Self Assessment Questions:

Do care management programs utilized by specialty pharmacies decrease medical expenditures?

Are members more persistent on their medication through specialty distribution vs. retail distribution?

PATIENTS PERCEPTIONS OF THYROID SCREENINGS IN A COMMUNITY PHARMACY SETTING

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According to the NHANES study, 15% of the population has established thyroid disease, while an additional 4.1% have hypothyroidism and are completely unaware of it. Pharmacists are in an ideal position to perform preliminary screenings and increase awareness.
Objectives:
The primary objectives are to evaluate patients satisfaction with community pharmacy based thyroid screenings and to evaluate the pharmacists role in increasing patient awareness of hypothyroidism. The secondary objective is to determine the potential clinical impact of community pharmacy based thyroid screenings.
Methods:
This study will be piloted at two grocery chain pharmacy sites and includes a two-part survey that will be administered to patients. Pharmacists at both sites will be trained on the study design by the primary researcher. Based on current recommendations, all females over 18 years of age and males over 60 years of age will be included. Exclusion criteria include: pregnant patients, those already diagnosed with thyroid disease, and recently hospitalized patients. Patients will be given a preliminary survey designed to determine eligibility to participate, risk factors and knowledge of hypothyroidism prior to pharmacist education. All participating patients will be provided a consent form for the point-of-care test and study participation. The patient will then be screened using the CLIA-waived rapid screening device, ThyroChek. During the ten minute wait time for results, patients will be provided written and verbal education on hypothyroidism. Upon test completion, results and individualized recommendations will be provided. A post-screening survey will be utilized to assess patient satisfaction with the service and reassess knowledge of the disease-state. If results are not within goal, the patient will be called one month post-screening to determine the clinical impact of the screening evaluated through questions about follow-up with physician and symptoms.
Conclusion:
Research is in the data collection phase and will be analyzed using SPSS.

Learning Objectives:

Identify patients who have a higher risk of developing hypothyroidism

Review a method of implementing thyroid screenings in the community pharmacy setting

Self Assessment Questions:

Who would be the LEAST likely person to screen?
a. a 40 year old female whose mom had thyroid disease
b. a 40 year old male who has type 2 diabetes
c. a 65 year old male with multiple sclerosis
d. a 65 year old female on amiodarone
e. a 40 year old female who feels extremely tired, has been gaining weight, and has noticed her hair falling out

True/False - Symptoms of hypothyroidism include unexplained fatigue, weight gain, coarseness/loss of hair, and memory impairment.

ELECTROLYTES DURING THERAPEUTIC HYPOTHERMIA AND REWARMING

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PURPOSE: Therapeutic hypothermia is used post-cardiac arrest to improve neurologic outcomes. The appropriate management of electrolytes is not completely understood during hypothermia. As a patient cools, potassium serum concentrations decrease due to shifts from the extracellular to interstitial or intracellular spaces as well as losses from hypothermia-induced diuresis. During rewarming serum potassium concentrations will rebound. The duration of hypothermia and rewarming may also affect electrolyte abnormalities and replacement. Most published protocols rewarm patients over a six hour period and do not replace potassium during this phase. At Methodist Hospital patients are rewarmed over a 24 hour period and hypokalemia is not treated six hours prior to or during rewarming. It is unknown if patients are treated appropriately for serum potassium abnormalities during the extended rewarming period. The study aims to evaluate serum potassium concentrations and current replacement practices during therapeutic hypothermia and rewarming.

METHODS: A retrospective chart review will be conducted on post-cardiac arrest patients treated with therapeutic hypothermia at Methodist Hospital. Patients who were pregnant and/or less than 18 years of old will be excluded from the study. The study endpoints include serum potassium, magnesium, and phosphorous concentrations, patient temperature, and replacement given. Adverse events of QTc prolongation and physician-documented arrhythmias will be recorded.

RESULTS/CONCLUSIONS: Pending based on completion of data collection and analysis.

Learning Objectives:

Describe the pathophysiology behind therapeutic hypothermia which leads to electrolyte abnormalities.

Summarize potassium replacement recommendations for patients being treated with therapeutic hypothermia.

Self Assessment Questions:

Which of the following does not contribute to electrolyte abnormalities in patients being treated with therapeutic hypothermia:
a.diuresis
b.acid/base abnormalities
c.extracellular to intercellular/interstitial shifts
d.renal failure

True/False Potassium should not be replaced during rewarming in patients actively rewarmed over 6 hours.

LIPID ALTERING EFFICACY OF ROSUVASTATIN MONOTHERAPY UPTITRATION VERSUS CHANGING TO EZETIMIBE/SIMVASTATIN

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Background: Decreasing low-density lipoprotein cholesterol (LDL-C) has become a main target in attempting to decrease the risk of coronary heart disease (CHD). Decreasing LDL-C, not only in the general population but also in patients with diabetes mellitus (DM), has been shown to significantly decrease the risk of CHD, coronary mortality, and other cardiovascular (CV) events. When patients are nearing the end of their options for statin therapy, two of the more potent therapies are usually initiated: rosuvastatin or a combination therapy that includes both a statin and an intestinal cholesterol absorption inhibitor, ezetimibe/simvastatin. It is often times unclear which medication to choose based on one of the following factors: limited head-to-head trials, trials conducted with researcher bias, short-term trials, and lack of trials looking at patients started on one therapy and then either dose increased on that therapy or switched to combination therapy.

Purpose: The primary objectiv is to determine the percent change from baseline in LDL-C in patients taking rosuvastatin 20mg daily and subsequently being switched to either a higher dose of rosuvastatin or to ezetimibe/simvastatin to better control hyperlipidemia.

Methods: Patients will be selected from a pharmacy database-generated list who were taking rosuvastatin 20mg daily from January 2008, the time of the initial data collection, through December 2008. Eligible patients include male patients > 45 years old with LDL-C>100 and <200mg/dL, baseline lipid panel and AST/ALT levels, and at least one follow-up lipid panel at least four weeks after being switched to either rosuvastatin 40mg or ezetimibe/simvastatin daily. Patients will be excluded from the study if they had no labs beyond baseline, have not filled rosuvastatin 20mg in four months, AST/ALT > 1.5 times the upper limit of normal at baseline according to VA lab standards, TGs>300mg/dL, diabetic patients with A1c>9.0%, on other lipid-lowering medications (fibrates, niacin, bile acid sequestriants), or serum creatinine >1.5mg/dL at baseline.

Results: Pending
Conclusions: Pending

Learning Objectives:

Determine the benefit or increased risk of uptitrating rosuvastatin vs. ezetimibe/simvastatin.

Explain the percent difference in lipid lowering potency in terms of clinical implications.

Self Assessment Questions:

T/F Ezetimibe/simvastatin lowers LDL-C levels to a greater extent than rosuvastatin uptitration.

T/F Ezetimibe/simvastatin causes an increase in proteinuria.

EVALUATING OUTCOMES OF PATIENTS WITH INVASIVE METHICILLIN-RESISTANT STAPHYLOCOCCUS (MRSA) INFECTIONS: A REVIEW OF VANCOMYCIN MICS AND SERUM TROUGH CONCENTRATIONS

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Background:
Vancomycin is considered the treatment of choice for invasive nosocomial methicillin-resistant Staphylococcus aureus (MRSA) infections. However, the emergence of MRSA isolates with increased vancomycin minimum inhibitory concentrations (MICs) has prompted a national breakpoint susceptibility reduction from 4 to 2 mcg/mL to distinguish between susceptible and resistant strains. MRSA MICs ≥ 2 mcg/mL may predict inadequate treatment response and increase infection-related morbidity and mortality. Consequently, more aggressive initial vancomycin dosing and higher trough concentrations may be necessary to effectively treat these specific MRSA strains.

Purpose:
This study will evaluate the outcomes of patients being treated with vancomycin for MRSA bacteremia and the influence of trough concentrations on these outcomes.

Methods:
This is a retrospective cohort study of patients admitted to Indiana University Hospital, Methodist Hospital, Clarian West, and Clarian North hospitals from January 1, 2008 through December 31, 2008. Patients to be included are those age ≥ 18 years old, documented culture-positive monomicrobial MRSA bacteremia > 48 hours after admission to the hospital, and vancomycin therapy for a duration ≥ 72 hours. Patients will be excluded if they received any anti-MRSA antibiotics within the 6 weeks preceding the positive blood culture, hemodialysis at any time during vancomycin therapy, polymicrobial bloodstream infection, or concomitant anti-MRSA therapy in addition to vancomycin therapy (synergy therapy with gentamicin or rifampin will be permitted). Once included, patients will be stratified into those patients with a vancomycin trough of < 15 mcg/mL or those with a trough > 15 mcg/mL. The primary outcome will be to evaluate in-hospital mortality. Secondary endpoints will be length of stay (LOS): intensive care unit (ICU) and total hospital, length of vancomycin therapy, time to sterilize the blood cultures and time to become afebrile. Other data to be collected will include demographic data, MRSA MIC values, and average vancomycin dose in mg/kg/dose and mg/kg/day.

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

Learning Objectives:

Discuss whether the attainment of an initial vancomycin free steady-state trough concentration ≥ 15 mcg/mL vs. < 15 mcg/mL at 72 hours confers a treatment benefit in MRSA bacteremia.

Describe how MRSA found in the blood with an MIC ≥ 2 mcg/mL impacts treatment outcomes in patients treated with intravenous vancomycin therapy.

Self Assessment Questions:

True/False: An initial vancomycin trough level ≥ 15 mcg/mL (vs. < 15 mcg/mL) within 72 hours of starting therapy reduces hospital stay & infectious mortality.

True/False: MRSA found in the blood with an MIC ≥ 2 mcg/mL predicts a higher intravenous vancomycin treatment failure rate.

EVALUATION OF ANTIPSYCHOTIC POLYPHARMACY IN A VETERAN POPULATION

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Background:
Treatment and management of psychotic disorders may be difficult. Both typical and atypical antipsychotics have been shown to be primary treatments in many of these disorders. It is most common to initiate treatment with one antipsychotic and then proceed with various treatment options to achieve reduction in symptoms. According to current data, as well as expert opinions, if all treatment options fail then combination therapy with antipsychotics may be tried. However, optimal dose and duration of the first agent should be attained prior to adding additional agents. Antipsychotic polypharmacy is used, yet there is limited data regarding the safety and efficacy of this practice.

Objective:
The purpose of this study is to evaluate the rationale for and response to combination antipsychotic therapy.

Methods:
This study is a retrospective, electronic chart review of patients within Jesse Brown VA Medical Center 18 years and older with two or more active prescriptions for antipsychotics initiated by September 18, 2008. There are no set exclusion criteria. The data collected include: reason for antipsychotic use, name of first agent, total daily dose of first agent, length of treatment on first agent alone, name(s) of additional agent(s), current total daily dose of additional agent(s), rationale for polypharmacy, compliance, adverse events, change in symptoms after polypharmacy, duration of polypharmacy prior to change in symptoms, and number of hospitalizations prior to and after initiation of combination therapy. The primary endpoints include: rationale for polypharmacy, average daily dose and length of treatment with the first drug alone, and combinations used. The secondary endpoints include: adverse events, change in symptoms following start of additional agent(s), length of time until change in symptoms noted, and total number of hospitalizations prior to and post combination therapy.

Results/Conclusions:
Data collection is ongoing.

Learning Objectives:

Describe the rationale of prescribing multiple antipsychotics.

Describe data supporting the use of combination antipsychotic therapy.

Self Assessment Questions:

True or False: The use of multiple antipsychotics is a recommended first line approach for difficult to treat psychosis.

True or False: There is limited data to support the use of multiple antipsychotics.

IMPACT OF PHARMACIST-DRIVEN EDUCATION ON HYPERTENSION KNOWLEDGE IN AN ANTICOAGULATION CLINIC

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Background: Anticoagulation puts a patient at an increased risk of bleeding among other adverse effects. Uncontrolled blood pressure (BP) is a modifiable risk factor for anticoagulation adverse events. The most severe adverse event being intracranial hemorrhage (ICH). High BP is a common comorbid condition in this patient population. Education about high BP and the risk of ICH may benefit this patient populations knowledge.

Purpose: The purpose of this study was to determine if pharmacists practicing in an outpatient anticoagulation clinic can increase patients knowledge about the risks of having uncontrolled BP while on anticoagulation.

Methods: This study was a prospective, randomized study. Patients were screened for eligibility during regular scheduled visits to the Harper University Hospital Anticoagulation Clinic. Eligibility criteria included: age between 18-89, medical treatment for hypertension, and an indication for anticoagulation with a predisposition for stroke (e.g atrial fibrillation) or previous stroke. Baseline demographic data, past medical history, and social history were collected. Patients were randomized to one of three groups, a control group, BP measurement group, or pharmacist education group. Baseline hypertension knowledge was obtained at visit 1 utilizing a hypertension questionnaire for all groups. The questionnaire was re-administered at the conclusion of visit 2, along with BP measurement in all groups. In addition to the described measures above, group 1, the control group, received no intervention during visit one. Group 2, the BP measurement group, received a BP measurement during visit one. Group 3, the pharmacist education group, received education on hypertension and the risks of adverse events, during visit one. Questionnaire scores were analyzed in each group from visit 1 to visit 2 using a paired t-test. Detection of difference in visit 2 scores among the three groups was obtained using an ANOVA.

Results/Conclusions: To follow upon completion of data collection.

Learning Objectives:

Review modifiable risk factors for intracerebral hemorrhage.

Discuss patients for intracerebral hemorrhage risk factors.

Self Assessment Questions:

Which of the following are modifiable risk factors for intracerebral hemorrhage?
a.Illicit drug use
b.Blood pressure
c.Smoking
d.Medications
e.All of the above

True or False: Pharmacist driven hypertension education has been shown to improve knowledge in patients with hypertension.

IMPROVING NURSES ACCESS TO INVESTIGATIONAL DRUG INFORMATION THROUGH THE IMPLEMENTATION OF ELECTRONIC DRUG MONOGRAPHS.

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Purpose: The Joint Commission requires that investigational medications are safely controlled and administered. In addition, the American Society of Health-System Pharmacists guidelines on clinical drug research and the Infusion Nursing Standards of Practice state that nurses administering investigational drugs should have access to written drug information. Drug information for investigational medications with no Food and Drug Administration (FDA) approved indication is not available in nursing handbooks or drug reference books. Because this information is not readily available, gathering drug information is an inefficient use of nursing time. The purpose of this project is to improve nurses access to drug information when administering an investigational drug, resulting in increased knowledge and confidence when administering the medication.

Methods: Froedtert Hospital is an academic medical center with a 44-chair outpatient hematology/oncology day hospital. A survey was used to assess nursing educational and operational needs for administering investigational medications. The intervention included the development and implementation of electronic monographs for investigational medications with no FDA approved indication. The monographs include study name, drug name, investigational indication, mechanism of action, potential adverse effects, drug interactions, compatibilities, dosage forms, handling precautions, administration guidelines, and monitoring parameters. The nurse administering the investigational medication accesses the monograph electronically through a link on the electronic medication administration record. After reviewing the monograph, nurses are prompted to answer self-assessment questions to document their knowledge of the investigational medication to be administered. Nurses were trained in January 2009 and the electronic monographs were implemented February 2009. Outcomes data will be collected through a follow-up nurse survey conducted in April 2009.

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

Learning Objectives:

Identify how investigational drug monographs meet nursing educational and operational needs for administering investigational medications.

Identify how an integrated clinical information system can be used to assist in the organization and documentation of nursing education on investigational drugs.

Self Assessment Questions:

True/False: ASHP Guidelines on Clinical Drug Research state that nurses administering investigational drugs should have access to adequate written drug information.

True/False: A hospital-wide clinical information system is an ineffective and inefficient way to disseminate drug information on investigational drugs.

IMPACT OF CANDIDA ALBICANS PNA FISH ON ANTIFUNGAL USE AT CLEVELAND CLINIC

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Purpose: Yeast has emerged as a significant cause of nosocomial bloodstream infections (BSIs). Candida albicans is the most frequently isolated organism in patients with candidemia, however there has been an increase in non-albicans species. Empiric therapy is often started in patients in whom blood cultures reveal yeast or if there is a high suspicion of fungemia. The antifungal of choice for empiric therapy often depends on the clinical status, co-morbid conditions, and prior history. Choices of antifungal therapy range from broad spectrum agents (i.e. amphotericin B or micafungin) to agents with a narrower spectrum of activity (i.e. fluconazole). Standard laboratory identification of some Candida species could take greater than five days. Therefore, the microbiology laboratory at Cleveland Clinic implemented the use of a Peptide Nucleic Acid Fluorescence In Situ Hybridization (PNA FISH), which can rapidly (< 3 hours) differentiate albicans from non-albicans species. Rapid identification of Candida species can decrease the time to de-escalation of therapy, result in the quicker initiation of targeted therapy, and impact healthcare savings. This study will determine the impact of PNA FISH on time to de-escalation of therapy and the initiation of targeted therapy in patients with candidemia.
Methods: A retrospective chart review of all candidemic patients between January 2007 and May 2008 was performed. Patients included were 18 years of age or older and had at least one positive Candida blood culture. Data collected included: demographics, admission and discharge dates, medical conditions, culture results, initial antifungal agent, time of initiation of therapy, start and stop dates of antifungals, and rationale for therapy changes. This data was entered into a Microsoft Access database. The study has been IRB approved.
Results and Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Discuss treatment options for BSIs due to Candida species

Describe the use of Peptide Nucleic Acid Fluorescence In Situ Hybridization (PNA FISH) for the identification of Candida

Self Assessment Questions:

PNA FISH can be used to rapidly differentiate C. albicans from non-albicans species directly from blood, tissue, and urine cultures
1. True
2. False

Which of the following agents should not be used in the treatment of BSIs due to C. krusei?
a. micafungin
b. fluconazole
c. conventional amphotericin B
d. Abelcet

STABILITY OF AN EXTEMPORANEOUSLY PREPARED CLOPIDOGREL ORAL SUSPENSION

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OBJECTIVE: Clopidogrel is an antiplatelet agent approved for the reduction of atherothrombotic events in adults and is a treatment option that holds promise for the prevention of thrombotic events in pediatric patients. Currently, no liquid formulation is commercially available. The objectives of this study were to prepare an extemporaneous clopidogrel suspension and to determine the short-term chemical stability of the formulation over a 60-day period at room temperature and under refrigeration.

METHODS: Clopidogrel oral suspension (5 mg/mL) was prepared using clopidogrel bisulfate tablets, Ora-Plus, and Ora-Sweet. Six 2-ounce samples were prepared; three were stored at room temperature and three under refrigeration. A 1-milliliter volume was withdrawn from each sample, diluted to 10 milliliters with methanol, and sonicated in a water bath to ensure complete dissolution of clopidogrel. A 300-microliter sample was then withdrawn, diluted with mobile phase to an expected concentration of 15 mcg/mL, and assayed in duplicate using high-performance liquid chromatography immediately after preparation and at 7, 14, 28, and 60 days. The stability of the clopidogrel suspension was determined by calculating the percent of the initial concentration remaining on each test day. Stability was defined as retention of at least ninety percent of the initial concentration.

RESULTS: At least 96% of the initial clopidogrel concentration remained throughout the 60-day study period, regardless of storage conditions. There were no appreciable changes in color, taste, or pH and no visible microbial growth in any sample.

CONCLUSION: Extemporaneously compounded suspensions of clopidogrel, 5 mg/mL, in a 1:1 mixture of Ora-Plus and Ora-Sweet were stable for at least 60 days when stored in 2-ounce amber plastic bottles at both room temperature and under refrigeration.

Learning Objectives:

Describe the preparation and stability of extemporaneously compounded clopidogrel suspension.

Discuss the potential benefits of a clopidogrel suspension for pediatric patients.

Self Assessment Questions:

Extemporaneously prepared clopidogrel suspension (5 mg/mL) retains greater than 90% of its initial concentration over a 60-day period.
a) True
b) False

Pediatric patients may benefit from a clopidogrel oral suspension for which of the following reasons:
a) More accurate measurement of weight-based pediatric doses
b) Pediatric patients are often unable to swallow solid dosage forms
c) Potential taste aversion with administration of a crushed tablet
d) All of the above are correct

EVALUATION OF ANTIPSYCHOTIC USE IN THE INTENSIVE CARE UNIT (ICU) FOR THE TREATMENT OF DELIRIUM IN ELDERLY PATIENTS

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Purpose: Numerous studies have shown that up to 80% of intensive care unit (ICU) patients develop delirium, which is defined as an acutely changing or fluctuating mental status, inattention, disorganized thinking, and an altered level of consciousness. ICU delirium has been associated with numerous negative adverse events. Currently, there are no definitive guidelines available for the treatment of ICU delirium. Historically, conventional and atypical antipsychotic medications have been utilized for the treatment of agitation, psychosis, and delirium in intensive care patients. However, within the last few years, the Food and Drug Administration has issued a black box warning (BBW) associated with the use of both conventional and atypical antipsychotic medications. The warning states that elderly patients with dementia-related psychosis have been found to have and increased risk of death when treated with these medications. Currently there is no consistent approach to the management of ICU delirium at Froedtert Hospital. The objectives of this project are the assess physician, nurse, and pharmacist understanding of the BBW, and to evaluate antipsychotic medication prescribing practices within the hospital to establish the incidence of antipsychotic medication prescribing in conflict with the BBW. Ultimately this project will focus on improving prescribing of antipsychotic medications through staff education, and developing a consistent approach to antipsychotic therapy in the management of ICU delirium.

Methods: In order to assess baseline understanding of the BBW and current treatment practices at Froedtert Hospital, a survey was distributed to ICU physicians, ICU nurses, and pharmacists. Patient-specific data collection is currently being collected for a total of four months. This includes patients 65 years of age or older started on an antipsychotic medication in the ICU for delirium. Other patient-specific information will be collected via chart review.

Results/Conclusions: Data analysis is ongoing. Results and conclusions will be presented at the Conference.

Learning Objectives:

Discuss the possible risks of starting antipsychotic medications in an elderly population.

Discuss identification and treatment possibilities for ICU delirium.

Self Assessment Questions:

True/False: Conventional antipsychotic medications have a black box warning regarding use in elderly patients with dementia-related psychosis, and the newer atypical antipsychotics do not.

According to the Society of Critical Care Medicine clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill patient, the most common treatment, and most current treatment recommendation for delirium is:
a. risperidone.
b. lorazepam.
c. quetiapine.
d. haloperidol.

VITAMIN K SUPPLEMENTATION IN WARFARIN PATIENTS WITH UNSTABLE INRS: ASSESSMENT OF APPROPRIATE DOSE AND GENETIC PREDICTORS OF RESPONSE

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Purpose: CHEST guidelines currently recommend vitamin K supplementation in patients with variable INRs; however, the guidelines do not specify which dose or what form is most appropriate. The objective of this study is to determine if treatment with 200 mcg of oral vitamin K1 daily will affect the percent time in therapeutic range (TTR) in patients with unstable INRs. A secondary objective is to determine if genetic differences in CYP2C9 or vitamin K epoxide reductase complex subunit 1 (VKORC1) correlate to differences in response to supplemental vitamin K therapy.

Methods: Patients will be selected from an anticoagulation clinic in an internal medicine office. Included patients will have been taking warfarin for at least 6 months, have a TTR ≤60%, and provide informed consent. Patients will be excluded from the study in cases of poor adherence, pregnancy or plans to become pregnant, recent stroke or transient ischemic attack, recent venous thromboembolism, diagnosis of antiphospholipid antibody syndrome, protein S or C deficiency, plans for a procedure requiring warfarin interruption, or anticipated warfarin discontinuation during the study period.

This study has been approved by the Institutional Review Board at Ohio Northern University.

Patients will take 200 mcg of oral vitamin K daily. A buccal swab assessing for polymorphisms in CYP 2C9 and VKORC1 will be performed and processed by gene microarray technology. Patients will be advised to make no significant dietary changes and adherence will be verified at each study visit. INR testing will be conducted weekly until two consecutive INRs are within the therapeutic range (0.2), then monitored at the discretion of the pharmacist. After six months of vitamin K therapy, percent TTR will be calculated from study initiation to termination and compared to the TTR at the time of study inclusion. Patients will be given the option of continuing vitamin K at the end of the study.

Results: to be determined

Conclusion: to be determined

Learning Objectives:

Describe the current evidence and recommendations for use of vitamin K supplementation in warfarin patients with unstable INRs.

Explain the effects of genetic variability related to the metabolism of warfarin and the activation of vitamin K.

Self Assessment Questions:

Which of the following patient situations would NOT be eligible for use of vitamin K1 according to the 2008 CHEST Guidelines?
a.Chronically low INR (< 2)
b.INR of 9 without associated bleeding
c.INR of 5 with signs of a GI bleed
d.Variable INR response with TTR 45%

Which CYP 450 isoenzyme is primarily responsible for the metabolism of the more potent isomer S-warfarin?
a.1A1
b.1A2
c.2C9
d.3A4

ASSESSMENT OF FACTORS INFLUENCING RECENT GRADUATES SELECTION OF COMMUNITY PHARMACY PRACTICE SITES

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Purpose:
(1) Identify factors influencing recent college of pharmacy graduates selection of first practice position in a community pharmacy site, (2) determine if exposure to or engagement in pharmaceutical care services during Advanced Pharmacy Practice Experiences (APPEs) correlate with any factors influencing selection of first practice position in a community pharmacy site, and (3) evaluate whether internship experiences, including exposure to or engagement in pharmaceutical care services, correlate with any factors influencing selection of first practice position in a community pharmacy practice site.

Methods:
A web-based survey corresponding to the stated objectives will be developed, pilot tested by a small group of community/ambulatory pharmacists, and then modified to ensure clarity and relevance of questions. The survey will be distributed in January 2009 to pharmacists who have graduated within the last five years (2004-2008) from participating colleges of pharmacy in the state of Ohio and from seven of The Ohio State University College of Pharmacys peer institutions. Survey data will evaluate first practice site selection, correlation with APPEs and internship, and participant demographics. Subjects will have one month to respond to the survey before data analysis. Factors influencing selection of community pharmacy practice positions will be reported as proportions and ranked in order of frequency, and correlations will be assessed using Fishers exact chi-square test.

Preliminary Results:
It is anticipated that data will be collected from at least twenty percent of the pharmacists who
receive the survey. Results of this study will show community pharmacy management the factors most important to recent graduates when selecting a practice site, to potentially assist with recruitment and retention. In addition, linking student exposure to pharmaceutical care services through APPEs and internship may be valuable to colleges of pharmacy evaluating curricular improvements.

Conclusions:
Study results and conclusions will be presented at the Great Lakes Conference.

Learning Objectives:

Identify the factors influencing recent college graduates selection of their first practice position in a community pharmacy.

Discuss the correlation between student exposure to pharmaceutical care services and the factors that impact the selection of a first practice position in a community pharmacy.

Self Assessment Questions:

What are some of the most common factors that influence recent college graduates selection of their first practice position in a community pharmacy?

What correlations exist between student exposure to pharmaceutical care services, either through APPE or internship experiences, and the factors that impact the selection of their first practice position in a community pharmacy?

IMPLEMENTING FENTANYL TRANSDERMAL PATCH ORDER SET: BEFORE AND AFTER COMPARISON FOR APPROPRIATE USE

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Purpose: In recent years, the Institute of Safe Medication Practice (ISMP) issued several newsletters regarding fentanyl transdermal patch (FTP) and the alarming rate of preventable fatal events associated with their use. Even with warnings from the FDA, manufacturers, and various patient safety agencies, FTP continues to be prescribed inappropriately for treating acute pain in opiate-nave patients. According to the FDA, FTP should only be used in patients who are opioid tolerant and who require a total daily dose equivalent to 25mcg/hour or more of FTP. A review of FTP usage at St. Vincent Mercy Medical Center (SVMMC) from October 2007 to November 2007 identified that 50% of patients evaluated did not meet the definition of opioid-tolerant and about 20% of the patients were started at doses higher than the manufacturer recommendation. To facilitate the appropriate usage of FTP based on FDA boxed warning, a standard order set was approved and implemented on November 2008 for computerized physician order entry system (CPOE) at SVMMC. The goal of this study is to evaluate the appropriate use of FTP at SVMMC after order set implementation in (CPOE) system.

Methods: This is a retrospective chart review of patients prescribed a FTP at SVMMC before and after implementation of FTP order set in CPOE system.
The pre order set charts will be reviewed from June 2008 through October 2008 and the post order set charts will be reviewed from November 2008 through March 2009. Appropriate selection of FTP for opioid tolerant patient and appropriate initial dose based on prior opioid therapy according to package insert will be evaluated. Patient admitted on a home dose of FTP were excluded.

Result and Conclusion: Data collection is currently in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the benefits of order set implementation in selection of appropriate initial dose of FTP.

List the benefits of order set implementation in selection of opioid tolerant patients.

Self Assessment Questions:

Fentanyl transdermal patch is indicated for opioid tolerant patients with moderate to severe chronic pain.
True or False

Which one of these patients is considered opiate tolerant?
1-Takes 60 mg oral morphine daily for at least 3 days
2-Takes 30 mg oxycondone daily for 7 days
3-Takes 8 mg hydromophone daily for 3 days

EVALUATION OF THE USE OF FONDAPARINUX IN CRITICALLY ILL PATIENTS WITH RENAL DYSFUNCTION

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Purpose: Fondaparinux, a synthetic pentasaccharide that reversibly binds with high affinity to antithrombin III (AT III) thus inactivating factor Xa is used in the treatment and prevention of venous thromboembolism. Compared to patients with normal renal function, total clearance of fondaparinux is lower in patients with renal dysfunction and is considered contraindicated in patients with a creatinine clearance less than 30 ml/min per the manufacturer. Despite the lack of clinical evidence, fondaparinux continues to be used in patients with severe renal dysfunction with adjustments to the dosage. The aim of this study is to review critically ill patients with an estimated creatinine clearance less than 30 ml/min who received treatment or prophylactic doses of fondaparinux. The primary objective is to determine if fondaparinux is a safe alternative for these patients based upon the incidence of major or minor bleeding events as well as any documented thrombotic events. Fondaparinux levels will also be analyzed as a secondary objective, when available.

Methods: A list of all patients who received fondaparinux from January 2007 through January 2009 will be generated from our health systems electronic medical record system. Those meeting the inclusion criteria, namely, patients between the ages of 18 and 89 with a creatinine clearance less than 30 ml/min who received at least 3 doses of fondaparinux will be evaluated. Analysis of the data will be performed by two pharmacists for the incidence of adverse effects associated with fondaparinux, and any correlations between adverse outcomes and dosing strategy, fondaparinux levels, and influence of hemodialysis. Major bleeding will be defined as a drop in hemoglobin by at least 2 gm/dL without an obvious cause and requiring an intervention. The incidence of any new, documented thrombotic events will also be recorded.

Results and Conclusion: Results and conclusion to be discussed at the conference.

Learning Objectives:

Discuss the pharmacokinetic and pharmacodynamic properties of fondaparinux in patients with renal dysfunction.

Identify if fondaparinux is safe for critically ill patients with a creatinine clearance less than 30 ml/min.

Self Assessment Questions:

If using fondaparinux in patients with a creatinine clearance less than 30 ml/min, what dose should be given?

What are the potential advantages and disadvantages to using fondaparinux over other anticoagulants in critically ill patients with renal dysfunction?

DEVELOPMENT AND EVALUATION OF INPATIENT INSULIN ORDERS BASED ON PATIENT-MONITORED CARBOHYDRATE COUNTS

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Background: Maintaining appropriate glucose control during inpatient hospitalizations has been shown to improve patient outcomes. Insulin is the preferred medication for inpatient management of hyperglycemia, however there are numerous dosing regimens for insulin therapy. There is evidence that traditional sliding scale insulin is ineffective when used as monotherapy. Use of sliding scale insulin alone is not recommended due to the corrective nature of this regimen. Many clinicians now advocate use of basal insulin doses, which may be supplemented with shorter acting insulin at meal times.

There is interest at our institution in prescribing prandial insulin doses based upon patient-monitored carbohydrate counts. There has been little research evaluating the efficacy or feasibility of patient managed insulin during inpatient hospital stays. However, patient management of insulin is addressed in clinical guidelines. Both the American Association of Clinical Endocrinologists (AACE) and the American Diabetes Association guidelines suggest that self-management of diabetes continue throughout inpatient hospital stays when feasible.

Purpose: To evaluate glucose control achieved with the use of a newly created insulin order set providing for patient-monitored insulin dosing based on carbohydrate counts.

Methods: A standardized order for patient-monitored insulin dosing based on carbohydrate counts will be developed. Specific criteria for determining appropriate patients and procedures for documenting and monitoring insulin will be included. A sample of self-monitored patients who received carbohydrate based insulin will be identified and their treatment will be retrospectively compared to a sample of patients dosed with scheduled mealtime insulin plus a traditional sliding scale. Endpoints for comparison will include blood glucose levels within recommended range, episodes of hypoglycemia and units of sliding scale insulin used.

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

Learning Objectives:

Identify patients who are appropriate candidates for self-management of insulin during inpatient hospital admission.

Discuss the advantages and disadvantages of patient-monitored insulin therapy in an inpatient setting.

Self Assessment Questions:

T/F On average, patients who received prandial insulin doses based on self-determined carbohydrate counts required fewer units of sliding scale insulin than patients treated with standard scheduled insulin doses.

T/F Episodes of hypoglycemia occurred more often in patients receiving standard scheduled doses of insulin than in patients treated with self-determined insulin doses based upon carbohydrate count.

EVALUATION OF THE MANAGEMENT OF CHOLESTEROL IN HIGH-RISK PATIENTS FOLLOWING AN ADVERSE DRUG REACTION TO HMG-COA REDUCTASE INHIBITOR THERAPY

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Purpose: The National Cholesterol Education Program (NCEP), the American Heart Association (AHA) and the American College of Cardiology (ACC) all concur that elevated low density lipoprotein cholesterol (LDL-C) is a major cause of coronary heart disease (CHD) and thus should be the primary target of cholesterol lowering therapies. LDL-C is most effectively controlled using HMG-CoA Reductase inhibitor therapy (statins). This retrospective chart review evaluates how cholesterol is managed following an adverse drug reaction (ADR) statin therapy (medications include: lovastatin, fluvastatin, pravastatin, simvastatin, atorvastatin, and rosuvastatin). Results will reflect general practices among providers and provide a guide for future management of adverse reactions to statins.

Methods: Prior to commencement this study will be approved by the Institutional Review Board (IRB). The electronic health records of patients within the William S. Middleton VA Medical Center will be used to identify patients with a documented adverse drug reaction to statin therapy. Patients who report adverse drug events while under the care of a non-VA provider will be excluded from this review. Data collected will include: patient age, gender, sex, presence of co-morbidities (diabetes, abdominal aortic aneurysm, congestive heart failure), low-density lipoprotein cholesterol (LDL-C) goal set by their provider at the time of the adverse reaction, concurrent use of interacting medications (amiodarone, gemfibrozil, warfarin, carbamazepine, azole antifungals, phenobarbital, cyclosporine), how ADR was handled (statin discontinued?, temporarily stopped?, restarted?), CK and LFT's at baseline and on the date of ADR documentation (if available), other statins tried, and current antihyperlipidemic therapies

Learning Objectives:

List the current practices of cholesterol management following an adverse drug reaction to HMG-CoA Reductase inhibitor therapy.

List guidelines for practicioners to use following an adverse reaction to HMG-CoA Reductase inhibitor therapy.

Self Assessment Questions:

What is the most common action that VA providers currently take following an adverse drug reaction to statin therapy?

Which statin is linked the most to adverse drug reactions among the population study?

CHRONIC OBSTRUCTIVE PULMONARY DISEASE EXACERBATIONS WITH SCHEDULED VERSUS AS-NEEDED ALBUTEROL USED CONCOMITANTLY WITH FORMOTEROL AND IPRATROPIUM

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Purpose: In patients with chronic obstructive pulmonary disease (COPD), scheduled short-acting beta-agonists are often prescribed as maintenance therapy even though the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines and clinical studies do not support the continuous use of these agents. The objective is to determine whether scheduled short-acting beta2-agonist therapy used concomitantly with formoterol and ipratropium causes deleterious effects on disease management by influencing the prevalence of hospitalizations, antibiotic therapy, and oral corticosteroid therapy for the treatment of COPD exacerbations

Methods: All patients over age 40 who had received healthcare at a VISN9 VAMC between January 1,2005 and December 31,2007 with a primary diagnosis of COPD and had active prescriptions for formoterol, ipratropium, and albuterol will be included. The Decision Support Service database will be used to extract the following patient information: demographics; smoker/non-smoker; dates filled, days supply, and partial fills for all active formoterol, ipratropium, albuterol, inhaled and oral corticosteroids, and antibiotic prescriptions; hospitalization dates; home oxygen usage. Prescription data for antibiotic and oral corticosteroids and hospitalization dates will only be included if coded for treatment of respiratory diseases. To determine albuterol usage and to assess patient adherence, the medication possession ratio (MPR) will be calculated for formoterol, ipratropium, albuterol, and inhaled corticosteroids. A MPR ≥ 0.75 will be designated scheduled/adherent and MPR < 0.75 will be designated as-needed/non-adherent. Patients will be allocated into two different treatment groups based on pharmacotherapy regimens. Group 1 (scheduled albuterol group) will include patients receiving scheduled formoterol, ipratropium, and albuterol and group 2 (as-needed albuterol group) will include patients receiving scheduled formoterol, ipratropium, and as-needed albuterol. The two groups will be compared for prevalence of hospitalizations, antibiotic and oral corticosteroid use for treatment of COPD exacerbations. A secondary aim is to exam the influence of inhaled corticosteroid use in these groups.

Results/Conclusions: Pending

Learning Objectives:

Discuss the effect of continuous short and long-acting beta-agonist therapy on the prevalence of hospitalizations, antibiotic therapy, and oral corticosteroid therapy for the treatment of exacerbations in COPD.

Explain the prevalence of hospitalizations, antibiotic therapy, and oral corticosteroid therapy for treatment of COPD exacerbations in patients using inhaled corticosteroids concomitantly with short and long-acting bronchodilators.

Self Assessment Questions:

COPD is currently the _____ leading cause of death in the United States with increasing mortality rates expected in the near future. By 2030, COPD is predicted to be the _____leading cause of mortality worldwide.
a.sixth, fifth
b.tenth, third
c.fourth, third
d.eighth, sixth

True or False: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) recommends the usage of scheduled short-acting beta2-agonist in patients with stage II COPD.

EVALUATION OF THE OUTCOMES OF MONITORING ANTI-XA LEVELS IN PATIENTS WITH A CREATININE CLEARANCE (CRCL) OF 30 TO 60 ML/MIN IN AN AUTOMATIC ENOXAPARIN DOSING PROGRAM

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Purpose:
Enoxaparin dose reductions are necessary for patients with CrCl < 30 ml/min. Anti-Xa level monitoring may be considered in morbidly obese patients or in patients with CrCl between 30 - 60 ml/min, where enoxaparin dose adjustments are not routinely recommended. Our institution has an enoxaparin dosing program in place for patients on treatment doses when CrCl is below 60 ml/min and/or weight >120 kg, in order to ensure that patients receive safe and effective enoxaparin dosing. The purpose of this study is to evaluate the appropriateness of monitoring anti-Xa levels in patients with a CrCl of 30 - 60 ml/min.

Methods:
A retrospective review was done for adult patients admitted to our community non-teaching 550 bed hospital between January and June 2008 who received treatment doses of enoxaparin. The following parameters will be assessed: age, height, actual/ adjusted/ ideal weight, serum creatinine, calculated CrCl, indication, dose and frequency, total and average number of anti-Xa levels drawn, number of days of therapy, whether or not the patient experienced an adverse reaction or apparent lack of efficacy, cost savings associated with dose reductions, whether or not the level was drawn correctly, level results (low/normal/high), and percentage of dose adjustments resulting in an anti-Xa level in desired therapeutic range. Patients will be evaluated overall and broken down into the following subgroups based upon CrCl: CrCl 30 - 39 ml/min, 40 - 49 ml/min, and 50 - 59 ml/min.

Results and conclusion:
Data collection is currently in progress. Results and conclusions will be presented at the ASHP Midyear meeting in December 2008.

Learning Objectives:

Identify how implementation of an enoxaparin dosing program can benefit patient outcomes in the hospital setting

Discuss the role of anti-Xa monitoring in enoxaparin dosing

Self Assessment Questions:

What parameter can be used to monitor the efficacy of enoxaparin?

Should obese patients be dosed according to actual or adjusted weight?

IMPROVING MEDICATION SAFETY THROUGH UTILIZATION OF SMART PUMP DATA

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Purpose: Smart pumps help to improve IV medication safety by reducing the incidence of administration errors. These pumps save various data elements that can be studied to further improve patient safety. The objective of this project is to establish a process to collect, analyze, and exhibit the data obtained from pumps used at one hospital. In turn, this information will be used for continuous review at medication safety meetings.

Methods: To understand what data elements are preserved and for how long, data will be extracted from a small number of pumps, analyzed and organized in Microsoft Excel. The process will then be replicated to a larger number of pumps. The local site medication safety committees will have the data presented for discussion and action. A schedule will be created for regular collection of the data, analysis, and presentation to site and system medication safety committees.

Results/Conclusions: Data collection is in progress; results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

Explain how smart pump data can be utilized to improve patient safety.

Identify barriers to the process of utilizing smart pump data.

Self Assessment Questions:

The smart pump data available from the Baxter Colleague pump allows for the creation of reports showing when drug library ranges were exceeded. T or F

Smart pump data can show if the nurse accessed the drug library. T or F

DETERMINATION OF RISK FACTORS FOR NEUROLOGICAL ADVERSE EVENTS IN ASSOCIATION WITH VORICONAZOLE USE IN PATIENTS WITH HEMATOLOGIC MALIGNANCY OR FOLLOWING STEM CELL OR SOLID ORGAN TRANSPLANTATION

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PURPOSE: Voriconazole is a broad-spectrum, triazole antifungal indicated for the treatment of invasive fungal infections. Although typically safe and well-tolerated, voriconazole has been associated with numerous neurological adverse events (AEs), such as hallucinations, encephalopathy, peripheral neuropathies, and seizures. Studies investigating the relationship between voriconazole drug levels and neurological AEs have shown an increased incidence of neurological AEs with voriconazole levels greater than 5.5 mg/L. The purpose of this project is to investigate the relationship between voriconazole drug levels and the incidence of neurological AEs and to evaluate the presence of additional risk factors for developing neurological AEs.

METHODS: This is a single-center, retrospective, observational, cohort, chart review. All inpatients, both adult and pediatric, that have received voriconazole and have had at least one voriconazole serum level will be included in the review. Data will be collected over a two year time period from January 1st, 2007 to December 31st, 2008. Data collected will include demographics, concurrent disease states, predisposing neurological conditions, indications for voriconazole, liver function tests, dates and duration of neurological AEs, voriconazole doses and administration times, serum voriconazole levels and times drawn, and concomitant medications and any corresponding drug levels. The primary outcome measure is the presence or absence of neurological AEs. All neurological AEs will be classified according to National Cancer Institute grading of adverse events, and the likelihood of voriconazole association will be determined by the Naranjo scale. Primary outcome measures will be analyzed by Chi-Square or two-tailed Fishers exact test. Potential risk factors for neurological AEs will be identified by using univariate analysis. Risk factors found to be significant in the univariate analysis ($p<0.20$) will be included in the multivariate logistic regression.

RESULTS: 147 patients have been identified for review. Results are pending.

Learning Objectives:

Identify the most common side effects of voriconazole

Describe the evidence in the literature as it relates to voriconazole drug levels and neurological side effects

Self Assessment Questions:

Studies have shown that neurological adverse events occur with an increased incidence when voriconazole levels are greater than _____

Neurological adverse events have been reported as the _____ most commonly reported adverse event

THE USE OF FOCUS GROUPS IN THE DEVELOPMENT OF CLINICAL SERVICES IN COMMUNITY PHARMACY

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Objectives:

To understand the interests and perceptions of target populations regarding a new clinical service and apply the findings towards the development of the service.

To identify the general usefulness of focus groups in the development of new services in the community pharmacy setting.

Methods:

The principal investigator is developing a new service for a grocery/pharmacy chain in which pharmacists conduct brief, health-related presentations on conditions that are managed through nutrition, self-care products and prescription therapies. In order to tailor the service to market preferences, six focus group sessions will be conducted at two Chicagoland store locations and one corporate location.

Each focus group will represent pharmacy management, grocery management, or customers. Pharmacy and grocery management will be invited to participate via email. Customers will be approached and recruited from store traffic. Sessions will be limited to 15 participants and will be 60 minutes in length. The focus groups will be facilitated, recorded and transcribed for accuracy by the principal investigator, who has researched focus group dynamics and consulted experts in the field of market research. Participants will be led through a discussion covering topics ranging from costs to logistics of the service, including desired locations and times of day to offer the program.

Qualitative data from the sessions will be analyzed using descriptive statistics and the thoughts and suggestions of each group will be compiled in a summary report. The overall utility of the focus groups and their impact on the development of a new clinical service will be assessed by looking at factors such as participation and resources used.

Preliminary Results:

The results will unveil roadblocks in program design and generate ideas to make the new service more appealing and profitable. Focus groups may help to guide the development of future services offered by this grocery/pharmacy chain and others.

Learning Objectives:

Discuss the general usefulness of focus groups in the development of new services in the community pharmacy setting

Describe the interests and perceptions of target populations regarding the new clinical service under development

Self Assessment Questions:

Potential benefits to using focus groups to gather information on a given topic include:

Based on information gathered from the focus group sessions, potential barriers that would hinder participation in a new clinical service include:

JUSTIFICATION OF A PHARMACIST IN AN OUTPATIENT ONCOLOGY CLINIC

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Purpose: Saint Margaret Mercy (SMM) is a two-campus hospital in northwest Indiana, which has outpatient oncology clinics that service patients with cancer, renal dysfunction, and infectious disease. A previous medication use evaluation (MUE) examined the use of darbepoetin alfa within the clinics and results showed only 30% of patients had a hemoglobin level checked before administration and a 40% loss of revenue was discovered due to inappropriate billing. The objective of this study is to expand the MUE to the top eleven drugs administered in the outpatient oncology clinics to determine current therapy management and billing practices.

Methods: The health systems electronic medical and accounting record systems were accessed to find overall reimbursement rates. These medications included darbepoetin alfa, filgrastim, pegfilgrastim, rituximab, trastuzumab, leuprolide acetate, zoledronic acid, cetuximab, and daptomycin. Patient specific data was collected to follow the patients clinical course. Local coverage determinators were compared with extracted information to assess appropriateness of doses and indications for the drug. Finally, reimbursement rates were compared against acquisition cost to reveal overall gaps in coverage.

Results: Seventy-nine patients comprising two hundred and eighty encounters were examined. There were 49 males and 30 females; average patient age was 72.8 years old. Out of the eleven agents, filgrastim was given most frequently, with 23.6% of administrations, followed by darbepoetin alfa 21.7%, daptomycin 28.9%, and leuprolide acetate (Lupron) 11.8%. Doses were inappropriate in 4.6% of administrations, labs were missing in 34.6% of encounters, and charges were missing in 3.9%. The largest loss with regards to reimbursement was from Lupron , at $51,392.66. The combined profit of the other agents was $36,194.45.

Conclusion: Analysis of the top 11 medications utilized suggests implementation of pharmacy presence in the outpatient oncology clinic could improve patient care and increase revenue by standardizing therapy management.

Learning Objectives:

To describe the gaps in therapy management in an outpatient oncology clinic.

List the opportunities available for a pharmacist in an outpatient oncology clinic.

Self Assessment Questions:

What types of labs were found missing in this oncology clinic?
a. hemoglobin
b. calcium
c. white blood cell count
d. all of the above

What are possible interventions a pharmacist can make in an outpatient oncology clinic?
a. protocol development
b. medication counseling and reconciliation
c. laboratory monitoring
d. all of the above

IDENTIFYING INCIDENCE AND PREDICTORS OF HYPOGLYCEMIA IN A MIXED CRITICAL CARE UNIT WHILE UTILIZING SLIDING SCALE INSULIN

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PURPOSE

Critically ill patients, even those previously having no past medical history of diabetes, are more likely to develop hyperglycemia, during the acute phase of their illness. The North Chicago Veterans Administration Medical Center (NCVAMC) utilizes either sliding scale per order set or continuous infusion per protocol for individuals admitted to the Critical Care Unit (CCU); all targeted at maintaining strict glycemic control. Most patients in the CCU are started on one of the two sliding scales, along with maintenance basal insulin. The mixed CCU is closed-format in which medical, non-trauma, and select surgical patients are followed under the direct care of the CCU team. Patients at the NCVAMC are primarily elderly, which may predispose them to hypoglycemic episodes and make them a more challenging population to balance tight glucose control. Additionally, patients have a wide variety of disease states which may influence their responsiveness to insulin. Six of theses more common disease states will be defined and recorded, if present, in an effort to identify those individuals at a higher risk for developing hypoglycemia. This study will help determine the efficacy of sliding scale glucose management strategies used in the NCVAMC CCU as well as establish an incidence and possible risk factors for developing hypoglycemia with these methods.

METHODS

Data will be collected retrospectively by accessing patients electronic medical record. Past medical history and age at admission will be recorded to help identify factors which may influence a patients responsiveness to insulin or predispose them to developing hypoglycemia. To define the severity of the hypoglycemic event, blood glucose readings from finger stick bedside glucose tests, will be recorded and rated according to severity.

RESULTS/ CONCLUSIONS

Data collection for this project is still being collected. Finalized data with conclusions will be presented at the Great Lakes conference.

Learning Objectives:

recognize the importance of maintaining strict glycemic control in critically ill patients.

Identify some predictive factors for developing hypoglycemia in a mixed CCU setting while utilizing sliding scale plus bolus insulin

Self Assessment Questions:

T/F Critically ill patients are less likely to develop hyperglycemia during the acute phase of their illness.

T/F Maintaining strict glycemic control in critically ill patient may lead to decreased length of stay in the CCU.

IMPLEMENTATION AND ASSESSMENT OF A DISCHARGE TECHNICIAN POSITION

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Purpose: The University HealthSystem Consortium (UHC) Ambulatory Care Committee has chosen to target problems related to discharge prescription processing as one of its key initiatives for 2008. Currently, the outpatient pharmacies at Froedtert Hospital are focusing on streamlining the collection of patient demographic and insurance information in order to process discharge prescriptions more quickly. The purpose of this project is to design, implement and assess a discharge technician position to improve the prioritization and efficiency of discharge prescription processing. It is expected that the implementation of this position will increase the volume of discharge prescriptions captured and increase patient and nursing satisfaction with the service provided at Froedterts outpatient pharmacies.

Methods: Pharmacists at Froedtert Hospital perform admission medication histories on all inpatients. To identify patients for this pilot, pharmacists will ask patients if they are interested in filling their discharge prescriptions at Froedterts outpatient pharmacies during history gathering. Patient answers, either yes or no, will be documented in the inpatient clinical information system (Epic). A report of patients answering yes will be generated daily Monday through Friday. A discharge technician, chosen from the outpatient pharmacies, will be trained to navigate the inpatient units and to use Epic. This technician will visit the patients listed on the computer generated report to confirm their interest in using the outpatient pharmacies and to gather demographic and insurance information. The information will be entered into the outpatient computer system (PDX) and a nursing communication form will be completed. The average number of discharge prescriptions filled daily will be assessed at baseline and during the pilot. Data will be collected to assess technician workload as well as patient, nursing and pharmacy satisfaction with the piloted process.

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

Learning Objectives:

Identify the steps necessary to design and implement a new pharmacy technician position at large academic medical center.

Discuss the financial impact of the implementation of a discharge technician.

Self Assessment Questions:

What percentage of discharge prescriptions are captured by your institutions outpatient pharmacies?

What additional data could be collected to measure the impact of a pharmacy discharge technician?

IMPROVING VENOUS THROMBOEMBOLISM PROPHYLAXIS IN GENERAL SURGERY PATIENTS AT AN ACADEMIC MEDICAL CENTER

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Background: Venous thromboembolism (VTE) is associated with increased mortality, morbidity, length of hospital stay, and health care expenditures. It is estimated that the frequency of deep vein thrombosis (DVT) is approximately 10-40% among medical and general surgical patients not receiving prophylaxis. Despite the complications of DVT, the use of appropriate prophylaxis in inpatients is suboptimal. It is estimated that only 40-60% of medical and surgical patients receive appropriate prophylaxis. To improve patient safety, the National Quality Forum (NQF) safe practices calls for the evaluation of each patient upon admission, and regularly thereafter, for the risk of developing VTE and to utilize clinically appropriate evidence-based methods of thromboprophylaxis.

Objectives: 1) Retrospective review to evaluate surgical patients risk factors for VTE 2) Assess the current practices at UWHC for VTE prophylaxis in general surgery patients 3) Improve compliance with VTE prophylaxis in general surgery patients according to evidence-based guidelines

Methods: An evidence-based guideline will be drafted for evaluating the risk of developing VTE with recommendations for selection of appropriate thromboprophylaxis for general surgery patients. The guideline will then be presented to key stakeholders and submitted to hospital oversight committees, including the Pharmacy and Therapeutics Committee and Joint Practice Committee, for review and approval. Following the approval of the guideline, a retrospective chart review will be conducted of general surgery patients from December 1, 2008-February 28, 2009 to determine current practices for providing thromboprophylaxis compared to the newly approved guidelines for VTE prevention in general surgery patients. Data within the following categories will be collected: patient demographics, admit date & length of stay, surgery service, admit diagnosis & surgical procedure, anticoagulation use prior to admission, risk factors for VTE, contraindications to pharmacologic prophylaxis, description of postoperative non-pharmacologic prophylaxis, and details of postoperative pharmacologic prophylaxis.

Data collection and evaluation are ongoing.

Learning Objectives:

Recognize the factors that place surgical patients at greater risk for developing venous thromboembolism.

Describe the current evidence-based practices for providing thromboprophylaxis to surgical patients and identify areas of improvement for UWHC to comply with evidence-based guidelines.

Self Assessment Questions:

List five risk factors for developing venous thromboembolism.

What would be appropriate thromboprophylaxis for a 65 year old patient status post total colectomy due to colon cancer?

IMPLEMENTATION OF REVISED CUSTOMIZABLE TOTAL PARENTERAL NUTRITION (TPN) ORDER TEMPLATES TO REDUCE PRESCRIBING AND TRANSCRIPTION ERRORS

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Statement of purpose: Standardization of TPN prescribing to reduce errors must be balanced with the need to provide customizable TPN formulas in the pediatric setting. In our institution, TPN orders are entered by prescribers in a computerized prescriber order entry (CPOE) system. The pharmacist then re-enters the order into the TPN compounding system. The fact that we provide TPN therapy for neonates through adult-size patients provides an added layer of complexity. One potential source of error is inadvertent selection of the wrong units of measure for individual TPN components in the CPOE or pharmacy TPN compounding systems. TPN order templates were standardized to prevent errors due to prescribing or transcribing the wrong units of measure in both systems.

Statement of methods: An interdisciplinary group revised TPN order templates based on weight and age in the CPOE system and created matching templates in the pharmacy TPN compounding system. In order to lock down the units of measure for individual TPN components, additional templates were created. Dose buttons representing the high, the low, and the standard dose for additives were added to the CPOE system. Implementation of the new templates was completed in two phases. Errors involving TPN prescribing or transcribing will be compared for the time periods prior to implementation, following phase one and following phase two of the implementation.

Conclusions: Currently many hospitals choose to order standardized TPNs to reduce the risk of error. Pediatric patients require individualized TPNs in order to optimize growth and development. Customizable TPN templates with standardized units of measure were implemented in the CPOE and TPN compounding systems to reduce the risk of error.

Learning Objectives:

recognize the potential errors that can occur when ordering adult TPNs vs pediatric TPNs.

List the benefits to creating customizable TPN templates.

Self Assessment Questions:

T/F TPN templates will eliminate all prescribing errors.

T/F Standardizing the units of measure for TPN ingredients is one way to decrease prescribing errors.

RATES OF NIACIN DISCONTINUATION COMPARING THERAPY INITIATED BY PRIMARY CARE, PHARMACIST-OPERATED MEDICATION MANAGEMENT SERVICES, OR OTHER PROVIDERS.

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Purpose: Prior studies have demonstrated a high rate of discontinuation of niacin therapy. However, further research is needed to determine whether this rate is influenced by the type of provider initiating niacinwhether primary care, pharmacist-operated medication management services, or other providers. This study seeks to determine and quantify the various reasons for niacin discontinuation and whether interventions were made to increase patients tolerability of the medication.

Methods: This is a retrospective, observational study that will utilize the health systems electronic medical record system to identify patients using niacin between January 1, 2001, and January 1, 2007. It will be submitted to the Institutional Review Board for approval. The following data will be collected: patient age, gender, race, indication for niacin, complete niacin fill history, type of provider prescribing niacin, daily dose at initiation and discontinuation, time to discontinuation, reason for discontinuation, incidence of adverse effects, interventions to ameliorate those adverse effects, and use of concurrent antihyperlipidemic, NSAID, or acid-suppressing agents. The focus of this study is to determine the rate of niacin discontinuation, to identify variables that influence this rate, and to differentiate the success of various providers in the context of patient adherence. This study is not focused on therapeutic outcomes. The rate of discontinuation will be assessed at 3 months, 6 months, 1 year, 2 years, and 4 years. The results will identify areas for improvement in antihyperlipidemic prescribing practices.

Exclusion Criteria: It will be prudent to exclude patients who started niacin for indications other than hyperlipidemia, patients who started on less than 500mg daily, and patients who either started niacin at another institution or left this institution during the course of therapy.

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

Learning Objectives:

Describe the rates of discontinuation of niacin for therapy initiated by primary care, pharmacist-operated medication management services, or other providers.

List the variables that influence the high rate of niacin discontinuation.

Self Assessment Questions:

What is the cumulative rate of niacin discontinuation at six months?

What was the main reason for niacin discontinuation and what interventions can be made to improve adherence?

EFFECTS OF ETOMIDATE VERSUS OTHER INDUCTION AGENTS ON VASOPRESSOR THERAPY DURATION IN CRITICALLY-ILL SEPTIC PATIENTS UNDERGOING RAPID SEQUENCE INTUBATION: A RETROSPECTIVE REVIEW

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Background: Because of rapid onset and short duration of action, preferential homodynamic profile and ease of administration, etomidate has become a drug of choice when performing rapid sequence intubation (RSI). However, recent concern for etomidate-associated relative adrenal insufficiency has brought routine use into question, specifically in critically-ill septic shock patients. Small studies have suggested that supplementing etomidate patients with corticosteroids may overcome the adverse hemodynamic effects of adrenal insufficiency (e.g., decreased duration of vasopressors) compared to patients not given corticosteroids. Despite this, there are limited comparative analyses of vasopressor duration between etomidate and non-etomidate RSI. Therefore a retrospective study to evaluate the difference in vasopressor duration in adult critically-ill septic shock patients requiring RSI with etomidate compared to propofol, ketamine, midazolam or fentanyl is being conducted.

Methods: Patients will be identified for inclusion into the study using a pharmacy database generated report to identify those patients with a discharge diagnosis of sepsis who received etomidate, propofol, ketamine, midazolam or fentanyl for RSI and received vasopressor therapy within 24 hours following intubation. Patients with primary adrenal or pituitary disorder, who received ketoconazole, received greater than one dose of etomidate and/or were pregnant, a prisoner, or a hospice patient will be excluded.

The primary endpoint will be vasopressor therapy duration in hours. Secondary endpoints include days mechanically ventilated, length of hospital stay, induction agent dose and mortality. Cortisol levels, SOFA and APACHE II scores will be collected and compared between groups as available. A sample size of 150 patients will be needed to achieve a statistical power of 84% to detect a decrease in vasopressor duration of 24 hours ($p = 0.05$, SD = 48 hours).

Results and conclusions: To be presented (as available) at the Great Lakes Pharmacy Resident conference.

Learning Objectives:

Describe the detrimental effects to critically-ill patients with adrenal insufficiency.

Discuss the benefits and risks of using etomidate when performing rapid sequence intubation.

Self Assessment Questions:

T or F: Patients with adrenal insufficiency are more likely to be in septic shock for a longer duration of time versus patients without adrenal insufficiency.

T or F: Single dose etomidate can result in a state of chronic adrenal insufficiency resulting in increased mortality.

A PROSPECTIVE OPEN-LABEL CONTROLLED TRIAL ON ANTIBIOTIC DOSING IN OBESE PATIENTS

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Purpose

The purpose of this study is to optimize therapeutic regimens of antibiotic dosing in obese patients (BMI ≥ 30kg/m2). This study will focus on some commonly used antibiotics, piperacillin-tazobactam (Zosyn), levofloxacin (Levaquin), ceftriaxone (Rocephin).

Methods

This study is a prospective, open-label, controlled trial. The study arm consists of patients being given piperacillin-tazobactam 3.375mg, levofloxacin 500mg or ceftriaxone 1gram from September 2008 to March 2009. Inclusion criteria include age greater than 18, obesity defined as BMI ≥ 30kg/m2, and active receipt of one of the following antibiotics: piperacillin-tazobactam, levofloxacin or ceftriaxone. Exclusion criteria includes age less than 18, pregnant females, patients receiving any of the three antibiotics for surgical prophylaxis, critically ill patients, and patients refusing to participate in the study. Patients who meet the inclusion criteria will have serum antibiotic levels taken via a blood draw by the principal investigator or hospital phlebotomy teams which will be compared to a control level provided by the testing laboratory. The primary objective of this study is to determine if therapeutic antibiotic serum concentrations are reached in obese patients, defined as having a Body Mass Index (BMI) ≥ 30kg/m2.

Results

This research is in data collection phase. Final results with conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

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Learning Objectives:

Identify a patient that may need alterations in their antibiotic dosing due to weight.

Provide recommendations for antibiotic dosing in obese patients.

Self Assessment Questions:

True or False: Piperacillin-tazobactam and ceftriaxone are considered time dependent antibiotics where as levofloxacin is considered a concentration dependent antibiotic?

True or False: Obese patients do not need altered levels of antibiotics to reach optimal levels?

EVALUATING STANDARDIZED DEPRESSION SCREENING IN AN OUTPATIENT HIV CLINIC

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BACKGROUND:

The prevalence of depression amongst HIV-positive patients is estimated to be about 36% in comparison to 17% in patients who are not HIV-positive. Depression in HIV-positive patients has been associated with decreased adherence to antiretroviral therapy. Non-adherence to antiretroviral therapy (ART) and the presence of depressive symptoms has been linked with decreased survival rates. Depression continues to be underdiagnosed and undertreated despite literature supporting the association between depression, non-adherence to drug therapy, and increased mortality.

OBJECTIVE:

The objective of this study will be to examine the effects of implementing standardized depression screenings to all patients of an outpatient HIV-clinic.

METHODS:

Current management of depression in the clinic will be examined, a standardized depression screening tool will be implemented, and the number of patients diagnosed with depression will be evaluated. This study will be conducted at the Indiana University Hospital outpatient HIV-clinic. A pre-intervention retrospective chart review will be conducted to evaluate the management of depression at the clinic for the previous six months. The Patient Health Questionnaire-9 (PHQ-9) will be implemented in the clinic and administered to all patients as a routine screening in efforts to improve patient care. After three months of implementing the depression screening, a post-intervention retrospective chart review will be conducted to evaluate the number of patients diagnosed with depression. Patients diagnosed with depression will also be assessed for initiation of drug therapy, appropriate monitoring and follow-up clinic visits.

RESULTS/CONCLUSION:

To be discussed upon the completion of data collection.

Learning Objectives:

List three examples of a self-reported depression screening tool that can be used in an outpatient setting.

Describe four counseling points that could be used for HIV-positive patients initiating antidepressant drug therapy.

Self Assessment Questions:

The prevalence of depression amongst HIV-positive patients is estimated at:

a. 7 percent
b. 15 percent
c. 25 percent
d. 36 percent

According to the Agency for Health Care Policy and Research (AHCPR) guidelines on depression in primary care, if drug therapy is initiated for the treatment of depression, patients should receive follow-up by phone or in person within:

a. 1 to 2 weeks
b. 1 to 2 months
c. 3 months
d. 6 months

EVALUATING THE BENEFITS OF A UNIT BASED PHARMACIST AT A COMMUNITY HOSPITAL

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Background: In 2000, ASHP published the 2015 ASHP Initiative as a guide for hospital pharmacies and as a goal setting tool for the profession of pharmacy. The 2015 ASHP initiative encompasses goals to increase the extent of pharmacist involvement in improving medication therapy and applying technology effectively to improve the safety of medication use. With the publication of the 2015 ASHP Initiative, the role of the hospital pharmacist is evolving from being task orientated to being a key member of the multidisciplinary team. The pharmacist is recognized as the drug information expert and a resource for patients, nursing staff, and physicians. The current practice model at our institution is a centralized pharmacy. Many institutions utilize a decentralized practice model to integrate pharmacists into the multidisciplinary team and improve pharmaceutical care.

Purpose: Evaluate the benefits of a unit based pharmacist at a community hospital.

Methods: This pilot evaluation was approved by the Hospital-Human Investigation Committee. Prior to this pilot, the nursing staff was asked to fill out a questionnaire regarding their satisfaction with current pharmacy services and asked to help identify areas that a unit based pharmacist could help facilitate and improve pharmaceutical care. This questionnaire included questions regarding areas for improvement, whether the presence of a unit based pharmacist would improve these areas, prior experience with a unit based pharmacist, and what they thought the most beneficial role of the unit based pharmacist would be. During the two week pilot, all interventions were tallied and a cost analysis was performed. A two week pilot with a unit based pharmacist was then implemented. After the pilot the nursing staff was asked to fill out another questionnaire.

Result/Conclusion: Data collection is currently ongoing. Final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the role of a unit based pharmacist.□□

Discuss the benefits of a unit based pharmacist.

Self Assessment Questions:

True/False. The majority of institutions in the United States have a decentralized pharmacy model.

According to the ASHP Initiative, by 2015 at least what percentage of institutions shall have pharmacists managing medication therapy for inpatients with complex and high-risk medication regimens, in collaboration with other members of the health-care team?
a)60%
b)70%
c)80%
d)90%

EMPLOYER GROUPS PERCEPTIONS OF A COMMUNITY PHARMACY-BASED SMOKING CESSATION SERVICE

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OBJECTIVE: The 2008 clinical practice guidelines on smoking cessation strongly recommend that tobacco dependence treatments (both medications and counseling) be a covered benefit by all health insurance plans. This study aims to analyze employers perceptions to gain insight into their willingness to collaborate with community pharmacists to provide their employees with a comprehensive smoking cessation service. The primary objective of this project is to determine the perceptions of employer groups in the Chicagoland area regarding a community pharmacy-based smoking cessation service. Information regarding levels of reimbursement for cognitive services will assist pharmacists in understanding employers views regarding the perceived value of a smoking cessation service. This study also seeks to understand barriers that may exist to employers utilizing community pharmacists for smoking cessation counseling. It is important to understand these perceptions before an effective smoking cessation service can be implemented.

METHODS: A sampling of 150 employers in the Chicagoland area will be identified through Chamber of Commerce directories and other electronic resources. A survey and cover letter will be sent via e-mail or fax. The survey contains 20 questions with topics including: employers interest in utilizing a community pharmacy-based smoking cessation service, levels of reimbursement, and barriers to pursuing community pharmacy-based smoking cessation services. Responses will be collected through an Internet-based survey tool and will be assured anonymous through the use of de-identified data. A reminder e-mail communication will be sent to all employers after four weeks to elicit additional responses.

RESULTS: Responses will be collected and analyzed for trends using descriptive statistics and Pearsons correlation coefficient with SPSS software.

CONCLUSIONS: Smoking cessation is a vital component to wellness services because cessation is often times the cornerstone of treating a patients other medical conditions. Community pharmacists are knowledgeable and accessible and can thus assist employers in providing this employee benefit.

Learning Objectives:

recognize employers interests in a community pharmacy-based smoking cessation service.

Identify employers perceptions of the benefits and barriers to a community pharmacy-based smoking cessation service.

Self Assessment Questions:

According to previously published literature, what is the impact on employers from having employees who smoke?
a.Increased absenteeism
b.Increased insurance premiums
c.Decreased productivity
d.Decreased employee satisfaction
e.All of the above

True/False: The 2008 clinical practice guidelines on smoking cessation support health insurance plans covering tobacco dependence treatments.

PRESCRIBING PATTERNS FOR THE OUTPATIENT TREATMENT OF CONSTIPATION IN THE U.S.

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Purpose:
The treatment of constipation depends on many factors, including patient demographics, geographic location, physician specialty, comorbid conditions, and insurance coverage. Due to limited studies in this area, we designed this study to identify patterns in the medication management of constipation among outpatients in the U.S. Our secondary purpose was to identify associations between constipation treatment and demographic variables in the outpatient setting.

Methods:
This is a retrospective cross-sectional study collecting data from the National Ambulatory Medical Care Survey (NAMCS) from 1997-2006 on the trends in pharmacological and non-pharmacological treatments for constipation in different age groups. The NAMCS database contains data on patient-specific outpatient office visits, including constipation-related visits, as reported by physicians.

Data collected from the NAMCS database are limited to office visits associated with constipation, identified by ICD-9 code. Information collected from each visit includes demographic data, physician specialty; non-pharmacologic and pharmacologic therapies for constipation; concurrent medications, comorbidities, surgeries and other procedural therapies with potential to influence constipation. Following data collection, statistical sampling weights will be applied to extrapolate the data to be representative of the U.S. population.

Preliminary Results:
Of all physician office visits in the U.S. from 1997-2006, 47% were related to constipation, consisting of 26% pediatric and adolescent visits, 19% patients aged 18-44 years, 19% adults aged 45-64 years, and 36% those aged 65 years or older. Of visits related to constipation, 64% were female and the majorities were white and non-Hispanic. Choice of treatment for the constipation-related visits included 20% hyperosmolars, 6% fiber, 5% stool softeners, 4% stimulant laxatives, 3% tegaserod, 2% saline and 1% prokinetics. Final results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Determine the prevalence of constipation in relation to age among outpatients in the U.S.

Identify prescribing patterns for the treatment of constipation in the U.S.

Self Assessment Questions:

Constipation is twice as prevalent in females as males. T/F

The most commonly prescribed medications for constipation among outpatients are stimulant laxatives. T/F

IMPACT OF LATE REFILL PROVIDER INTERVENTIONS ON MEDICATION ADHERENCE TO CARDIOVASCULAR THERAPIES

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Background: Medication nonadherence contributes to poor clinical outcomes and wasted healthcare resources. Desired health outcomes will not be achieved if appropriately prescribed medications are not consumed by patients. An estimated one in four individuals are nonadherent to prescribed cardiovascular therapy. Nonadherence is >1.5 times higher among individuals who do not perceive their disease as severe or a threat. Given the silent nature of cardiovascular disease, nonadherence to cardiovascular medication therapy is alarming because it can lead to disease progression, complications, higher healthcare costs and utilization rates and mortality. In an effort to address medication nonadherence, a large national pharmacy benefit manager (PBM) incorporates late refill (LR) identification and interventions as a component of the pharmacist-managed retrospective drug utilization review program. Based on pharmacy claims data, this component of RDUR identifies members who have a medication possession ratio (MPR) of ≤70% over several fills within a 180-day period. Member profiles are reviewed by clinical pharmacists for appropriateness prior to intervention with the members healthcare provider(s). Providers are alerted regarding nonadherence via telephone, fax or mail.
Purpose: This study evaluates the effectiveness of LR provider interventions on member adherence to cardiovascular therapies including angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, beta blockers and HMG-CoA reductase inhibitors in a PBM setting.

Methods: This retrospective case control study examined members with cardiovascular medication-related late refills identified between January 1, 2008 and June 30, 2008. Members who received LR interventions will be compared to members with similar baseline characteristics who did not receive interventions. Medication adherence was assessed using MPR at time of LR identification (baseline) and 120 days after baseline. Success rate of LR interventions, as defined by increasing MPR to >70% and absolute change in MPR, was compared between the intervention and control groups using the appropriate statistical tests.

Results and Conclusion: Pending

Learning Objectives:

Describe the consequences associated with nonadherence to cardiovascular medications and its impact on the patient and healthcare system.

Discuss advantages and limitations of late refill provider interventions within pharmacy benefits manager-administered drug utilization review-type management programs.

Self Assessment Questions:

What percentage of patients is nonadherent to prescribed drug therapy?
A. 25%
B. 50%
C. 75%
D. 100%

Which of the following are negative outcomes associated with nonadherence to cardiovascular medications?
A. Morbidity and morality
B. Complications
C. Disease progression
D. Higher healthcare utilization
E. All the above

ASSESSMENT OF THE RISK OF INFECTION IN NEONATES WITH CONGENITAL DIAPHRAGMATIC HERNIA TREATED WITH INHALED EPOPROSTENOL

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Purpose:
Epoprostenol is a potent vasodilator used in the treatment of pulmonary hypertension. It is approved for intravenous administration, but more recently has been used by inhalation. Epoprostenol is unstable at physiological pH, so for inhalation is administered in a glycine buffer with a pH of approximately 10.5. It is hypothesized the medication and buffer may cause pulmonary toxicity that could lead to inflammation and an increased risk of infection.

Neonates with congenital diaphragmatic hernia (CDH) typically have pulmonary hypertension as a result of CDH-associated pulmonary hypoplasia. Improvements in pulmonary function and oxygenation have been reported in several neonatal case reports, but few have addressed the adverse pulmonary effects potentially associated with inhaling epoprostenol. The purpose is to examine the relationship between inhaled epoprostenol and infection risk.

Methods:
A retrospective chart review was conducted to compare occurrence of infection in neonates with CDH receiving inhaled epoprostenol and those not receiving inhaled epoprostenol. Centers for Disease Control/National Healthcare Safety Network criteria were used to establish infection. Study patients were observed from the first dose of epoprostenol until one week after cessation of therapy. Control patients were observed for 30 days from admission. Laboratory, clinical and radiographic data were obtained in accordance to the defined criteria for infection and a determination of infection was made based on the evidence.

Preliminary Results:
There were 24 study patients and 16 controls. Eight additional patients will be included in the control group prior to analysis. Currently, infection rates are 41.66% (10/24) in the study group and 43.75% (7/16) in the control group. A relative risk analysis will be performed to determine the inhaled epoprostenol-associated infection risk

Conclusions:
Conclusions will be developed after data analysis is complete. Preliminary recommendations are to continue using inhaled epoprostenol, considering therapy on a case-by-case basis.

Learning Objectives:

Describe the role and use of inhaled epoprostenol

Describe if an association exists between inhaled epoprostenol and risk of infection

Self Assessment Questions:

Is inhaled epoprostenol an appropriate treatment for management of pulmonary hypertension in infants with CDH?

At this time, can it be concluded that inhaled epoprostenol is associated with an increased risk of developing infection?

ANALYSIS OF UPDATED DOSING GUIDELINES FOR VANCOMYCIN

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Background
Vancomycin is a glycopeptide antibiotic used for the treatment of documented beta-lactam resistant gram positive infections. Dosing of vancomycin is frequently managed through pharmacokinetic evaluation by pharmacists. Many institutions, including Riverside Methodist Hospital, employ dosing guidelines to aid pharmacists in attaining appropriate vancomycin trough levels. Current dosing guidelines may not be effective in reaching higher trough goals recommended for treatment of severe infectious, such as methicillin-resistant staphylococcus aureus pneumonia acquired in the healthcare setting.

Purpose
The purpose of this study is to evaluate the accuracy of achieving target serum concentrations of vancomycin based on newly piloted dosing guidelines. A secondary purpose of this study will be to evaluate the effect of body weight on vancomycin dosing and trough levels.

Methods
Based on a previous study, current vancomycin dosing guidelines will be updated and implemented for pharmacist use. Educational sessions for pharmacists will be provided to ensure familiarity with the updated dosing guidelines. After implementation, a retrospective analysis of vancomycin therapy based on updated dosing guidelines will be completed. Patients excluded from study include: patients receiving dialysis, neonatal patients, those receiving less than 4 doses, dosing regimens outside of guidelines, those with no vancomycin serum level obtained, or patients with inappropriately collected vancomycin levels. Data collection will include: gender, age, height, weight, serum creatinine at the time of dosing, creatinine clearance, ideal body weight, vancomycin trough concentration, vancomycin dose, and treatment indication. Data collected utilizing updated dosing guidelines will be used to assess attainment of therapeutic trough levels, off-target trough levels, and adherence with guidelines. Comparison data from a previous study will be used to evaluate the impact of the updated dosing guidelines.

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

Learning Objectives:

Review dosing strategies for vancomycin based on current literature.

Describe the effectiveness of updated vancomycin dosing guidelines.

Self Assessment Questions:

What patient-specific parameters are used in dosing vancomycin?

T or F: The goal trough level for patients with methicillin-resistant staphylococcus aureus pneumonia according to American Thoracic Society guidelines is 15 mcg/ml.

FACTORS INFLUENCING PHARMACISTS ENROLLMENT IN A STATE PRESCRIPTION MONITORING PROGRAM (PMP)

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Purpose: Prescription monitoring programs (PMPs) have been established in several states to decrease drug diversion. Enrollment by pharmacists into most PMP programs is voluntary and the percent of pharmacists enrolled is often lower than desired (18% in Ohio as of 11/7/08). The primary objective of this research is to determine factors influencing enrollment for pharmacists registered and not registered in Ohios PMP, the Ohio Automated Rx Reporting System (OARRS). Secondary objectives will (1) evaluate pharmacists perception of the impact of OARRS on dispensing behaviors and (2) identify differences in enrollment between demographics, length of practice, previous PMP education, practice site, knowledge of Ohios PMP, experience with pain management and availability of internet access at work.

Methods: After obtaining IRB approval, an original Web survey was developed, pilot tested and administered (via Zoomerang) to 10,799 of the 11,787 pharmacists licensed and living in Ohio. A total of 988 pharmacists had no e-mail address or an invalid e-mail address on file with the State Board of Pharmacy. Factors influencing enrollment will be compared using all pairwise Wilcoxon signed rank tests within each set of responses (enrollment/non-enrollment). Secondary objective analyses will include descriptive statistics and inferential statistics where appropriate.

Results: A total of 2,511 (23.3%) pharmacists completed the OARRS survey. Data analysis is underway and primary outcomes will be analyzed to determine factors that influence pharmacist enrollment into Ohios PMP. Secondary outcomes will assess pharmacists perception of the impact of OARRS on dispensing behaviors and associations of demographic/professional characteristics and knowledge of OARRS with enrollment in OARRS.

Conclusions: The findings of this study can be useful to all states with a PMP to focus attention on ways to increase pharmacist enrollment. More effective use of todays technology, through increased enrollment in PMPs, may enhance appropriate delivery of commonly abused and misused medications.

Learning Objectives:

Describe the most common factors influencing pharmacists decision to enroll in the Ohio Automated Rx Reporting System (OARRS).

Identify the preferred method of receiving OARRS education as indicated by pharmacists that completed the survey.

Self Assessment Questions:

Multiple Choice: For pharmacists already enrolled in the OARRS, the most important factor influencing enrollment according to this survey was:
A.Education received about the OARRS
B.Recommendation to enroll by a colleague/employer
C.Understanding of the law surrounding the OARRS database
D.Experience or situation at work using the OARRS
E.Being able to assist with decreasing "doctor shopping."

True or False: According to this survey, the most preferred method for obtaining education regarding the OARRS for both enrollees and non-enrollees is printed continuing education (CE).

THE RELATIVE DOSE INTESNITY OF SYSTEMIC CHEMOTHERAPY AT SPARROW REGIONAL CANCER CENTER

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Background: Dose intensity (DI) is defined at the total amount of drug delivered to a patient over the total time course of treatment. Relative dose intensity (RDI) is the percent of the dose intensity delivered relative to the reference standard dose intensity for a chemotherapy regimen. Dose reductions and delays reduce DI, allowing more tumor re-growth between cycles, thereby potentially compromising long-term survival rates. Retrospective analyses correlate DI with outcome in cancer of the breast, lung, ovary, colon and lymphoma. Data shows increased survival for patients receiving a RDI of ≥ 85% and conversely, mortality curves similar to untreated populations when this threshold RDI is not achieved.
Purpose: To retrospectively determine the average RDI of chemotherapy administered to patients at Sparrow Regional Cancer Center (SRCC) and compare the RDI of those patients who received ≥ 85% to those who received < 85%.
Methods: A retrospective chart review was conducted of adult patients diagnosed and treated with systemic chemotherapy in 2007 for cancers of the breast, lung, ovary, colon and lymphoma. Data collected included: name, height, weight, date of birth, medical record number, diagnosis, staging, lab values, disease progression, mortality status, and chemotherapy regimen - including doses and dates administered. The DI of each chemotherapy agent administered was calculated by assessing the milligrams of each drug administered, the patients body surface area (BSA), and time course of treatment. The RDI was then calculated for each treatment course. The average RDI for all the drugs in the regimen was calculated. Patient histories were also examined for concomitant use of granulocyte colony stimulating factors.
Results: Pending
Conclusions: The delivery of optimal chemotherapy dose intensity in patients with potentially curable malignancies should be a major quality indicator in cancer patient care at Sparrow Health System..

Learning Objectives:

Define relative dose intensity and explain its relationship to cancer outcomes.

Identify at least 2 common reasons for chemotherapy dose-delays and dose-reductions.

Self Assessment Questions:

Bonadonna et al. showed that breast cancer patients who received ____% of planned dose intensity experienced better disease-free and overall survival than patients who received lower dose intensity.
A) >75% B) >85% C) >90% D) <80% E) <100%

Retrospective analyses of randomized controlled clinical trials have suggested strong association between the dose intensity of chemotherapy actually given and disease-free and overall survival in which of the following cancer types?
A) Breast B) Lung C) Ovarian D) Colon E) Lymphoma F) All of the Above

PHOSPHOROUS KINETICS DURING CONTINUOUS VENO-VENOUS HEMODIAFILTRATION

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Background: Low serum phosphorous concentrations can have many deleterious effects on critically ill patients, often as a result of low intracellular ATP stores or tissue hypoxia. Two of the most notable effects of hypophosphatemia are respiratory muscle dysfunction and myocardial dysfunction. Many factors contribute to hypophosphatemia in critically ill patients, including increased loss of phosphorous with the use of renal replacement therapy.

Approximately 70% of critically ill patients with acute renal failure receive some form of renal replacement therapy with continuous renal replacement therapy being the most common. Phosphate clearance and kinetics during dialysis have been studied in intermittent hemodialysis, slow low-efficiency dialysis, and continuous veno-venous hemodialysis, but not during continuous veno-venous hemodiafiltration (CVVHDF).

Purpose: The purpose of this study is to characterize the clearance and kinetics of phosphorous during CVVHDF to allow better estimates of the amount of phosphorous replacement required during CVVHDF to prevent the potentially detrimental effects of hypophosphatemia.

Methods: This is a prospective, observational study that will include 10 critically ill adult patients receiving CVVHDF for greater than 24 hours.
Data collection will begin the morning after CVVHDF initiation and will continue for the duration of CVVHDF or five days, whichever occurs first. Data will include daily serum phosphorous and urea concentrations, the total daily phosphorous intake and output, and total daily fluid input and output. Additional data will include blood flow rates, dialysate flow rates, replacement fluid flow rates, the contents of the dialysate and replacement fluids, and the duration of interruptions in CVVHDF each day. The primary objective is to quantify the extent and variability of phosphorous clearance in critically ill patients receiving CVVHDF. The secondary objective is to evaluate the effectiveness of a phosphorous replacement protocol in these critically ill patients.

Results/Conclusions: IRB approval was obtained in January 2009. Data collection is ongoing.

Learning Objectives:

Describe the harmful effects of hypophosphatemia in critically ill patients.

Discuss the effects of continuous renal replacement therapy on serum phosphorous concentrations.

Self Assessment Questions:

Hypophosphatemia can lead to impaired oxygen release from hemoglobin.
(a) True
(b) False

Phosphorous removal is equal in all renal replacement modalities.
(a) True
(b) False

USE OF VASOPRESSIN IN SEPTIC PATIENTS WITH HEART FAILURE

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Background: Vasopressin deficiency has been reported in patients with septic shock. Low doses of vasopressin may be effective in raising blood pressure in those who are refractory to other vasopressors. Numerous studies have evaluated vasopressin in septic shock and have shown an improvement in hemodynamic parameters. In contrast to septic shock, vasopressin concentrations have been shown to be elevated in cardiogenic shock. Studies evaluating vasopressin for septic shock often exclude patients with heart failure due to the possible deleterious affects associated with the up regulation of vasopressin which causes decreased cardiac output, retention of free water, and cardiac remodeling in patients with heart failure patients. The role of vasopressin in patients with heart failure has not been elucidated due to the potential adverse effects.

Methods: This retrospective study will include adult patients with history of heart failure who were admitted to the intensive care unit (ICU) with a diagnosis of septic shock and received vasopressin as a continuous infusion. Exclusion criteria are as following: pregnancy, hyponatremia, traumatic brain injury and cardiogenic shock, acute decompensated heart failure, ischemic or hemorrhage stroke as admitting diagnosis. Patient demographics, acute physiology and chronic health evaluation (APACHE II) score, Charlson comorbidity index score, sequential organ failure assessment (SOFA), dose of vasopressors used, as well as hemodynamic parameters from ICU admission during the first 24 hours of vasopressin infusion will be recorded. Laboratory parameters, urine output and weight were assessed one day prior to initiation of vasopressors until day three of administration. All patients medical records were reviewed for the occurrence of adverse events during the time of vasopressin infusion.
Data is currently being collected, and results will be presented at the conference.

Learning Objectives:

Discuss the pathophysiology of septic shock

Describe the role of vasopressin in sepsis and heart failure

Self Assessment Questions:

Hypotension secondary to sepsis is caused by
a.Increased nitric oxide production by endothelial tissue
b.Increased vascular permeability and a decrease in intravascular volume
c.Depressed myocardial contractility
d.B and C
e.All of the above

Circle all correct statements
a.Patients with sepsis have a relative vasopressin deficiency
b.Vasopressin can increase cardiac output
c.Vasopressin can increase myocardial oxygen demand
d.Vasopressin can cause free water retention and hyponatremia

CONVERTING AMLODIPINE 10 MG TO EITHER NIFEDIPINE COATED-CORE 90 MG OR 120 MG IN UNCONTROLLED HYPERTENSION: A RETROSPECTIVE STUDY IN A VETERAN POPULATION.

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Background:
Limited comparative studies suggest that higher doses of nifedipine coated-core (90 mg and 120 mg) may provide additional blood pressure (BP) lowering for patients with uncontrolled hypertension on amlodipine 10 mg.

Purpose:
The purpose of this study is to retrospectively evaluate the efficacy and safety of changing amlodipine 10 mg to nifedipine coated-core (CC) 90 mg or 120 mg in veterans with uncontrolled hypertension.

Methods:
This study is a retrospective, electronic chart review of patients at the Jesse Brown VA Medical Center who were switched from amlodipine 10 mg to either nifedipine CC 90 mg or nifedipine CC 120 mg to achieve better BP control. Patients 18 years and older with uncontrolled hypertension who were switched from amlodipine 10 mg to either nifedipine CC 90 mg or 120 mg during a primary care visit with a physician, nurse, or pharmacist will be evaluated. The following data will be collected: demographics (age, ethnicity, gender), select concomitant disease states, medication information, BP and heart rate (HR) measurements, and adverse effects. Mean differences in BP and HR and the percentage of patients at goal after conversion will be calculated. The primary endpoints of the study will be change in BP after converting amlodipine 10 mg to nifedipine CC 90 mg or 120 mg. Secondary endpoints will include change in heart rate, the percentage of patients at goal BP, adverse events, and discontinuation rates.

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

Learning Objectives:

Review the role of dihydropyridine calcium channel blockers in essential hypertension.

List the effects of amlodipine 10 mg and nifedipine CC 90 mg and 120 mg in the management of hypertension.

Self Assessment Questions:

T/F: Dihydropyridine calcium channel blockers produce their blood pressure lowering effects by reducing heart rate (HR), slowing atrioventricular conduction, and depressing contractility.

What is/are common adverse effect(s) of dihydropyridine calcium channel blockers?
a)dizziness
b)leg swelling
c)hyperkalemia
d)a and b
e)all of the above

PILOTING PHARMACY SERVICES IN A VETERANS AFFAIRS EMERGENCY DEPARTMENT: PART I

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PURPOSE
The Roudebush VAMC includes an 18-bed emergency department (ED) that does not have a dedicated pharmacist. Activities by pharmacists in EDs have been associated with reduced costs, decreased mortality with code team participation and prevention of medication errors. Joint Commission Medication Management Standard 05.01.01 requires that all medication orders be reviewed prospectively for appropriateness. The 2009 Joint Commission National Patient Safety Goal 08.04.01 mandates that medication reconciliation be performed in the ED under certain circumstances.

A dedicated pharmacist to a clinical service area has the potential to impact the rate of medication errors, ensure compliance with the Joint Commissions standards, and potentially realize significant cost avoidance to the facility. The primary purpose of this study is to identify if the Roudebush VAMC ED will benefit from having a clinical pharmacy specialist.

METHODS
The project involves two PGY2 pharmacy residents working in the ED and documenting interventions. The types of services provided by the pharmacists will include, but will not be limited to: drug information, pharmacokinetic consultations, disease state management, code attendance, order entry, medication reconciliation, and patient and staff education.

Descriptive statistics will be reported for the interventions documented. Wait times will be compared between the study period and corresponding dates in 2007 to determine whether having a pharmacist in the emergency department modifies patient access to care and effects ED wait times. The number of medication reconciliations completed will be evaluated to determine if having a pharmacist in the ED improves hospital compliance with National Patient Safety Goal 08.04.01.

RESULTS
Results will be presented at the Great Lakes Conference pending completion of data collection.

CONCLUSION
Conclusions will be presented at the Great Lakes Conference pending completion of data evaluation.

Learning Objectives:

recognize Joint Commission's Medication Management Standard 05.01.01 and National Patient Safety Goal 08.04.01 as they relate to the emergency department.

Describe the clinical impact of a clinical pharmacy specialist in the emergency department.

Self Assessment Questions:

Which of the following situations does NOT require medication reconciliation to be completed?
a.Patient being discharged from ED with no medication changes
b.Patient being discharged from ED with change in daily lisinopril dose
c.Patient being discharged from ED with addition of daily lisinopril to regimen
d.Patient being admitted to the inpatient ward

True or False. Patients seeking care in an emergency department are not at increased risk for medication errors.
a.True
b.False

ASSESSMENT, DEVELOPMENT AND IMPLEMENTATION OF STRATEGIES TO IMPROVE PHARMACY ORDER ENTRY AT AURORA ST. LUKES MEDICAL CENTER (ASLMC)

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Purpose: There are potentially 108 medication orders per cardiovascular surgery patient at ASLMC. All but twenty-five of these orders are "as needed" medication orders. It is estimated that a single cardiovascular surgery admission can take the pharmacist twenty to thirty minutes to process. Pharmacists perform medication order entry, and this duty limits the amount of time spent in clinical activities. In addition, having numerous orders per patient adds workload to the pharmacy information system, resulting in slower response time during profile review and order entry. Multiple contingency orders can lead to polypharmacy and potential medication errors. The purpose of this project is to assess our current practices, evaluate potential interventions, and develop and implement strategies to streamline the order entry process.

Methods: The initial steps of this project involved baseline data collection, including order entry trends at other institutions, order entry volume of all intensive care units, evaluation of existing order sets for CV surgery, and time for pharmacist completion of CV surgery admissions. An intervention list with potential strategies to improve the order entry was created, prioritized and evaluated. Since this project will impact all disciplines, the evaluation process incorporates a Quality Improvement Committee utilizing a multidisciplinary approach.

Results/Conclusions: A Standing Medication Physician Order Set is being pursued. Data collection will continue. Results and conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

recognize operational and safety issues resulting from multiple contingency medication orders.

Identify potential impact on various disciplines in regards to streamlining mediation order entry.

Self Assessment Questions:

List one operational and one safety issue resulting from multiple contingency medication orders.

Streamlining medication order entry has a potential impact on all disciplines (physicians, nurses, pharmacy). T or F

RETROSPECTIVE ANALYSIS OF PHENYTOIN AND LEVETIRACETAM FOR SEIZURE PROPHYLAXIS AFTER TRAUMATIC BRAIN INJURY

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Purpose

According to the National Institute of Neurological Disorders and Stroke (NINDS), approximately 25% of patients with brain contusions or hematomas, and 50% of patients with penetrating head injuries will develop seizures. The NINDS recommends that traumatic brain injury (TBI) patients receive 7-days of therapy with phenytoin to minimize the early seizure risk. Phenytoin requires close monitoring secondary to its adverse event profile and narrow therapeutic window. Levetiracetam is being used more in practice for TBI seizure prophylaxis because it has a favorable pharmacokinetic profile and minimal adverse events. There is little evidence to support use of levetiracetams for seizure prophylaxis. This study will assess the use of levetiracetam for seizure prophylaxis after TBI in the surgical intensive care unit (SICU).

Study Objectives:

Identify and compare the adverse events associated with using levetiracetam versus phenytoin.

Compare the occurrence of breakthrough seizure with levetiracetam and phenytoin.

Methods

This is a retrospective observational study of 60 critically ill patients greater than 18 years of age who received levetiracetam or phenytoin for seizure prophylaxis after TBI while in the SICU. Patients receiving antiepileptic drugs (AEDs) for maintenance therapy for any indication prior to admission or have a history of seizures were excluded. Patients were identified based on ICD-9 codes that were cross-referenced with the pharmacy database to provide a list of patients treated between January 1, 2005 and June 30, 2008. Data was collected on patients demographics and type of brain injury. Any co-morbidities or medications that may affect treatment were documented. The initial dose of levetiracetam or phenytoin and the duration of therapy were also documented. The charts were examined for documented breakthrough seizure and adverse events during their hospital admission.

Results will be presented and discussed at the conference.

Learning Objectives:

Discuss the role of levetiracetam for seizure prophylaxis in TBI patients.

Describe the reasoning of only using prophylaxis in TBI patients for the first 7 days after injury.

Self Assessment Questions:

What is the purpose of treating patients for only 7 days with an AED agent after the TBI occurred?
a.To prevent all seizure activity
b.To prevent immediate/ early seizures
c.To prevent late seizures
d.Treatment should be longer than 7 days
e.There is no need to treat patients at all

Why is levetiracetam being used for seizure prophylaxis in TBI patients despite lack of solid evidence to support its use?
a.Greater efficacy than standard therapy
b.Proven to be safer
c.Long term benefits compared to standard therapy
d.More favorable adverse event profile
e.All of the above

EVALUATION OF WEIGHT-BASED ENOXAPARIN PROPHYLAXIS DOSING IN CARDIAC SURGERY PATIENTS

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Purpose
The effectiveness of enoxaparin 40 mg for the prevention of venous thromboembolism (VTE) in obese patients has been raised. St. Vincent Mercy Medical Center cardiovascular surgeons have instituted a weight based dosing protocol for enoxaparin beginning post-operation day 1 after increased deep vein thrombosis (DVT) rates were observed in overweight patients. The purpose of the study is to compare the safety and efficacy of the weight based enoxaparin protocol in cardiac surgery patients greater than or equal to 100 kg versus 40 mg daily in patients below 100 kg.

Methods
A retrospective chart review is being conducted in cardiovascular surgery patients from January 1, 2007 through January 1, 2009. Patients are categorized into two groups, the standard of care patients receiving 40 mg daily weighing below 100 kg and the weight based patients weighing greater than or equal to 100 kg. The standard of care patients weigh between 45 to 99 kg and are prescribed 40 mg daily. The weight based patients weigh between 100 to 149 kg and greater than or equal to 150 kg and received 30 mg every 12 hours or 40 mg every 12 hours, respectively. Patients are excluded if they had an estimated creatinine clearance below 30 ml/min or previously documented heparin induced thrombocytopenia (HIT). Patients meeting inclusion criteria are evaluated for the following: diagnosis, history of VTE, risk of DVT on admission, medications or events contributing to bleeding events during admission, hemoglobin and platelet values, and results of regularly scheduled venous Doppler scans. The primary endpoint is to compare the rate of VTE post-operatively in the weight based group versus standard therapy group until discharge. Secondary endpoints include incidence of major bleeding events and HIT incidence.

Results
Data collection is in progress. Results and conclusion will be presented at the Great Lakes Conference.

Learning Objectives:

Describe the effectiveness of weight based dosing enoxaparin protocol in cardiovascular surgery patients.

List factors associated with thromboembolism and adverse events in post surgical patients.

Self Assessment Questions:

Post-operative patients are at an increased risk of venous thromboembolism. True or False

Factors to consider when determining safety and effectiveness of enoxaparin prophylaxis include:
A. Bleeding
B. WBC elevation
C. DVT risk
D. A and C
E. All of the above

EXPLORING COMMUNITY PHARMACY WORKFLOW CHANGE THROUGH A TIME SERIES ANALYSIS FOLLOWING IMPLEMENTATION OF AN AUTOMATED PRESCRIPTION FILLING DEVICE

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Objectives: To compare the workflow sequences and time required for pharmacy technicians dispensing duties prior to and after the implementation of an automated prescription filling device in one independent community pharmacy.
Methods: Using a standardized observation form and stopwatch, the community pharmacy resident timed and recorded the sequence of dispensing tasks performed by pharmacy technicians at one independent community pharmacy in rural Wisconsin. Following a pilot test period to ensure the viability of the data collection tool, data was collected in October 2008 for one week prior to installation and included the length of time required to perform each task, the sequence of tasks, diversions from workflow, and workflow interruptions. The prescription (or set of prescriptions) that was presented at one time from a patient or provider was considered the unit of analysis. Data was collected again in January 2009, three months following installation of the automated prescription filling device, using a similar data collection tool and in the same format to identify differences in prescription filling time and workflow sequences.
Results/Conclusions: Results and conclusions will be reported at the Great Lakes Pharmacy Resident Conference, and will include positive and negative adjustments to the technician dispensing workflow, and empiric evidence that the device facilitated more efficient filling of prescriptions. Recognition of possible diversions from workflow and the role of interruptions will be explored. Anticipated outcomes include the identification of best practices or sequences for an efficient workflow, possible opportunities to decrease interruptions, and the results of the feasibility of the pilot study to expand this methodology to a larger number of pharmacies implementing a similar prescription filling device.

Learning Objectives:

To identify how automated prescription filling devices can affect workflow in a community pharmacy.

To identify best workflow practices and eliminate interruptions when filling prescriptions with an automated prescription filling device in a community pharmacy.

Self Assessment Questions:

What type of impact could an automated prescription filling device have on community pharmacy workflow sequences and time to fill prescriptions?

How might the results of this study be used to identify best workflow practices and eliminate interruptions when implementing an automated prescription filling device in a community pharmacy?

ASSESSMENT OF MEDICAL RESIDENTS KNOWLEDGE OF DRUG INTERACTIONS AFTER AN EDUCATIONAL INTERVENTION

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Purpose:
Medical residents do not routinely receive drug interaction training as part of their medical education curriculum. We hypothesize medical residents attending a series of educational sessions related to drug interactions, will have increased knowledge of drug interactions as reflected by improved post test scores compared to pre test scores.

Methods:
In collaboration with residency program directors, an outline of the drug interaction curriculum and program implementation was developed based on core concepts related to drug interactions. Information on the study was submitted to the Institutional Review Board and was granted exemption for IRB review. A case based drug interaction test was developed to assess baseline knowledge in addition to questions assessing residents past experiences and attitudes towards drug interactions. Eight internal medicine pediatrics residents were administered the pre-test. The educational intervention consisted of monthly lectures, approximately forty five minutes in length, over six months. The pharmacy resident developed the curriculum and facilitated the lectures, which consisted of a didactic lesson, discussion of patient cases and management of drug interactions. Midpoint and final feedback questionnaires were administered for future curriculum enhancement. The post test will be administered at the conclusion of the lecture series in March 2009.

Results:
All residents reported no formal training on drug interactions prior to this educational intervention. Pre test scores confirmed the need for an educational intervention with residents scoring 52% on average. Results of the post test will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusion:
Anticipated outcomes include improved post test scores and increased ability of residents to acknowledge limitations of drug interaction resources. Curriculum enhancement and incorporation into medical residency training programs will be future goals.

Learning Objectives:

Discuss the limitations of drug interaction resources.

List educational tools which engage medical residents and other adult learners to enhance their knowledge of drug interactions.

Self Assessment Questions:

T F Drug interaction resources are equally reliant in providing information about drug interactions.

E.L. is a 45 y/o female who came to urgent care complaining of sinus pressure and congestion. She was diagnosed with a sinus infection and the physician wishes to prescribe an antibiotic that does not interact with her medications. She is currently taking amlodipine (Norvasc) 10 mg po once daily, multivitamin po once daily, and carbamazepine (Tegretol) 400 mg po three times daily for her bipolar disorder. Considering drug-drug interactions, which Macrolide or Ketolide is the best option for this patient?

A. erythromycin
B. clarithromycin (Biaxin)
C. azithromycin (Zithromax)
D. telithromycin (Ketek)

IMPACT OF THE 4T'S SCORING SYSTEM AND AN IGG SPECIFIC ELISA ON THE POTENTIAL TO OVERDIAGNOSE HIT

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Background:
Heparin-induced thrombocytopenia (HIT) is an antibody-mediated adverse effect of heparin which can result in life-threatening thrombosis. Serological assays available to confirm the diagnosis of HIT include platelet activation assays (e.g., serotonin release assay [SRA]) and antigen assays (e.g., polyspecific enzyme-linked immunosorbant assays [poly-ELISA]). Platelet activation assays have a high specificity but are not routinely available due to their complexity. Antigen assays are widely available and less complicated to perform but they lack specificity for pathogenic HIT antibodies. A new IgG-specific ELISA has been developed to target only pathogenic HIT antibodies. In addition to the laboratory assays, a pretest bedside scoring system, the "4Ts", has been evaluated to estimate the probability of HIT. Currently in our institution, HIT is diagnosed when there is clinical suspicion and the poly-ELISA is positive. Recent literature suggests that combining the results of the IgG-specific ELISA and the 4Ts score may be a new approach to diagnosing HIT.

Purpose:
To compare the rate of overdiagnosis of HIT using two different diagnostic strategies.

Methods:
In this prospective study, patients who have a SRA ordered will be screened for inclusion. Exclusion criteria include patients with missing laboratory data, uncertain date of heparin initiation, lack of documented heparin exposure or confirmed HIT within 100 days. Researchers will be contacted upon laboratory receipt of an SRA sample. The SRA, poly-ELISA and IgG-specific ELISA assays will be performed and a 4Ts score will be calculated. Overdiagnosis of HIT is typically defined as a positive ELISA with a corresponding negative SRA result. The overdiagnosis of HIT resulting from our current diagnostic approach will be compared to that calculated using the suggested new diagnostic approach. Sensitivity, specificity, positive and negative predictive values of the 4Ts test and each laboratory assay will be calculated.

Results/Conclusions:
Will be presented at the conference.

Learning Objectives:

Compare the advantages and disadvantages of the laboratory tests for HIT

Explain the concept of the 4Ts score

Self Assessment Questions:

Which one of the following tests can detect both pathogenic and non-pathogenic HIT antibodies?
a.Polyspecific ELISA
b.IgG specific ELISA
c.SRA
d.4Ts

True or false: The "4Ts" is a post-test bedside scoring system developed to assist clinicians in evaluating the probability of HIT.

DEVELOPMENT OF AN ANTIMICROBIAL STEWARDSHIP PROGRAM IN A COMMUNITY HOSPITAL SETTING

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Purpose: The purpose of this project is to implement a pharmacist driven, collaborative antimicrobial stewardship program that fosters appropriate antimicrobial use.

Methods: Throughout the course of the year, we plan to create a manual that will contain pertinent information for pharmacists/healthcare professionals to make recommendations for antimicrobial use in our patient population. This manual will contain commonly seen microbiology laboratory terms, common pathogens and their associated category, and up-to-date treatment guidelines for common disease states. We also plan to initiate two new policies for automatic pharmacy adjustment: IV to PO and Renal Adjustment policies. We will provide education to our hospital pharmacists to help them become more familiar with the antimicrobial agents available at our hospital as well as current treatment guidelines. As part of the program, pharmacists at our institution will monitor daily cultures and sensitivities for proper antimicrobial coverage and will make recommendations for de-escalation as appropriate. As a measure of our success, we will review the pharmacoeconomic savings associated with our program by performing a retrospective medication use evaluation.

Results/Conclusion: Pharmacoeconomic analysis pending. Results and conclusion will be presented at Great Lakes Residency Conference

Learning Objectives:

Identify methods for implementing pieces of an antimicrobial stewardship program.

List ways pharmacists can improving patient care through Antimicrobial Stewardship initiatives

Self Assessment Questions:

(T/F) Pharmacists taking an active role in hospital antimicrobial usage helps decrease hospital costs.

(T/F) Increased pharmacist involvement in antimicrobial therapy selection has a positive impact on patient care.

QUANTIFY PERCENTAGE OF ORDER ENTRY THAT TRIGGERS ALERTS AND IMPLEMENT REDUCTION STRATEGIES

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Purpose:
Medication safety alerts within the computerized hospital order entry system are a useful tool for pharmacists that assist in reducing medication errors and ensuring patient safety. Overriding medication safety alerts may be clinically appropriate, but a high volume of alerts with little credibility can cause alert fatigue. As a result, pharmacists may override important alerts due to this fatigue. Alert fatigue is an issue with increasing importance in the hospital setting and within the Aurora Health Care System. Therefore, the purpose of this project is to review the appropriateness of medication safety alerts and decrease the number of order entry alerts that trigger within the Aurora Health Care System, reducing pharmacist alert fatigue.

Methods:
Prior to the initiation of this project, it was submitted to the Institutional Review Board for approval and the current literature regarding alert fatigue in the hospital setting was reviewed. Data was collected via Cerner generated reports and downloaded in Microsoft Excel for further analysis. This data was reviewed for the number of medication orders entered and the number of significant medication safety alerts that were generated. The significance of the alerts was predetermined by eight clinical coordinators within Aurora Health Care. After reviewing the data, removal of insignificant alerts that were generated during medication order entry will be implemented. After implementation of alert removal, the number of alerts of high significance that were triggered during order entry will be reevaluated.

Results/Conclusions:
Currently, data is being reviewed for the potential to reduce the number of alerts that fire during the medication order entry process. Data collection and implementation of reduction strategies will continue. Conclusions will be presented at Great Lakes Residency Conference.

Learning Objectives:

recognize the importance of alert fatigue during medication order entry

List common medication safety alerts that are triggered during order entry

Self Assessment Questions:

Alert fatigue is an important issue during medication order entry. T or F

Name 2 common medication safety alerts that can trigger during medication order entry

EVALUATION OF POLICIES AND PROCEDURES INVOLVING PATIENTS HOME MEDICATION USE DURING INPATIENT HOSPITAL STAYS

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Purpose: The objective of this study is to evaluate pharmacist documentation of drug identification of patients own supply medications along with assessing timing and safety issues involving these medications. The hypothesis for this study is that pharmacist education and an updated policy on patients own medications will increase proper pharmacist documentation and reduce medication errors.

Methods: The daily non-formulary medication report will be used to assess home medications processed during one month. The following data will be collected: patients age, insurance status, medication listed for the home medication, time the order was written, documented administration time on the medication administration record, time of patient admission into the hospital, and documentation of pharmacist identification of the medication. Pharmacists will participate in a survey on patients own supply of medications and will be educated on an updated identification process. Data will be collected after this educational session to assess policy compliance. The hospital database for adverse event reporting will also be used to evaluate documented medication errors associated with patients own supply medications.

Results: Results are pending at this time and will be presented at the Great Lakes Pharmacy Residency Conference.

Conclusions: Pharmacists play a key role in ensuring the safety of inpatients who use their own supply of medications. The results of this study will serve to increase safety and efficiency of dispensing patients own medications.

Learning Objectives:

Describe the risks and benefits associated with allowing patients to use their home medications while in the hospital.

Describe the pharmacists role in ensuring the safety of patients who use their home supply of medications.

Self Assessment Questions:

True/False: JCAHO standard MM.2.40 requires hospitals to create a process to safely manage medications that patients or their families bring to the facility.

List three risks associated with allowing patients own medication usage in the hospital setting.

PILOTING PHARMACY SERVICES IN A VETERANS AFFAIRS EMERGENCY DEPARTMENT: PART II

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Purpose: Studies have shown that pharmacists engaged in clinical practice in the emergency department (ED) have been associated with reduced costs, decreased mortality associated with code team participation, and prevention of medication errors. The purpose of this study is to determine if the Richard L. Roudebush Veterans Affairs Medical Center would benefit from having a pharmacist in the emergency department.

Methods: Two pharmacy residents staffed in the emergency department and documented clinical interventions with Clinical Measures software (Gold Standard, Tampa, FL). These interventions were placed into categories and then associated with a cost savings or cost avoidance dollar amount. These amounts will be calculated for interventions that were accepted by providers, as well as those that were not accepted, in an effort to tally potential cost savings/avoidance that was not realized. Yearly cost savings and cost avoidance will be extrapolated in order to evaluate whether or not the emergency department would benefit financially from having a pharmacist on staff. A return on investment analysis will also be conducted.

Results: Research is in the data collection phase. Results will include: total cost savings and total cost avoidance, which will be extrapolated to one year; cost of employing a clinical pharmacy specialist in the ED; and the return on investment analysis results.

Conclusion: Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define cost savings and cost avoidance.

Describe the financial implications an emergency department pharmacist may have in a Veterans Affairs Medical Center.

Self Assessment Questions:

All of the following are billable medication therapy management codes or services an ED pharmacist could utilize except:
A. Asthma/inhaler counseling
B. 99605
C. 99606
D. Medication reconciliation

Which of the following is not a cost avoidance intervention?
A. Duplicate therapy
B. IV to PO conversion
C. Drug-allergy prevention
D. Dose adjustment

EVALUATION OF OUTPATIENT ANTIBIOTIC PRESCRIBING PRACTICES AFTER EDUCATION AND IMPLEMENTATION OF ANTIBIOTIC ORDER SETS IN A VETERANS AFFAIRS MEDICAL CENTER

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PURPOSE: Providing antibiotic order sets for commonly diagnosed infections, including COPD exacerbations and urinary tract infections (UTI), could improve prescribing practices thereby improving patient safety and cost savings. Also, order sets can be useful to practitioners unfamiliar with formulary agents and save practitioners time when prescribing antibiotics. The primary objective of this analysis is to compare outpatient antibiotic prescribing practices before and after education and implementation of antibiotic order sets for UTIs and COPD exacerbations.

METHODS: This study is a retrospective, observational, descriptive analysis reviewing antibiotic prescribing practices before and after order set implementation, and after order set re-education. Medical charts of outpatients diagnosed with a UTI or COPD exacerbation, identified using ICD-9 codes, who presented to the Huntington VA Medical Center will be retrospectively evaluated for appropriate antibiotic choice, including drug, dose, and duration. The primary endpoint of this study will be to evaluate for appropriate use of antibiotics. Secondary endpoints will include the number of relapses/treatment failures in patients not adequately treated and the economic impact of the antibiotic order sets.

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

Learning Objectives:

Recognize the potential effects of computerized order sets on appropriate medication usage.

Identify at least four antibiotics that can be used for the treatment of COPD exacerbations.

Self Assessment Questions:

What organisms should be covered in the treatment of COPD exacerbations?

What organisms should be covered in the treatment of urinary tract infections?

EVALUATING THE INCIDENCE OF MEDICATION NONADHERENCE ASSOCIATED WITH EMERGENCY DEPARTMENT ADMISSIONS AND RETURN ADMISSIONS IN THE ADULT PATIENT POPULATION IN A COMMUNITY HOSPITAL SETTING

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Purpose: Previous studies have shown that a significant percentage of preventable medication-related emergency department (ED) visits can be attributed to medication nonadherence; however, studies are lacking that demonstrate the relationship between nonadherence and return ED visits. The primary objective is to determine the number of return admissions occurring due to nonadherence. Secondary objectives include determining the contributing factors, and the role demographic and financial constraints of the patient population have in contributing to nonadherence. The results of this study will serve as a benchmark in developing innovative pharmacy services in the ED as a means to decrease the need for return patient visits secondary to nonadherence and to improve patient, nursing, and physician satisfaction.

Methods: Patients admitted to the St. Vincent Indianapolis adult ED with a previous ED visit at one of three local St. Vincent hospitals within the previous 21 days were evaluated. A prospective study design was used to evaluate the study objectives. Researchers collected medication histories via verbal interview and assessed adherence through standardized questioning for patients meeting inclusion criteria. Data collection took place on the traditionally highest volume days throughout the months of November and December 2008. Patients presenting to the ED with a suspicion of drug or alcohol abuse, categorized as an acuity level one (i.e. patient actively dying), arriving from a long term care facility, and those under the age of 18 were excluded.

Results and Conclusions: Data collection is completed and analysis is currently in progress. A total of 82 patients were screened and 57 patients met inclusion criteria. Preliminary results show that 25 patients (43.9%) were determined to be nonadherent. Further results and conclusions will be presented at the conference.

Learning Objectives:

Recognize barriers to patient medication adherence.

Identify opportunities for pharmacy involvement in improving patient adherence, thereby decreasing the number of return admissions to the ED.

Self Assessment Questions:

Financial impact and pharmacy inconvenience are two contributors to medication nonadherence. T or F

Pharmacy interventions to improve medication adherence include emphasizing the value of the regimen and the effect of adherence, providing simple and clear instructions for the medication regimen, and encouraging the use of a medication-taking systems. T or F

RETROSPECTIVE EVALUATION OF THE USE OF AN ALBUMIN-FUROSEMIDE INFUSION IN PATIENTS WITH ACUTE KIDNEY INJURY

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Acute kidney injury (AKI) is reported to occur in up to 25% of critically ill patients. The risk of mortality in critically ill patients with AKI is 20-90%. Since the kidneys during this time of stress may not be able to regulate fluids and electrolytes, acid-base balance, or excrete toxins and waste products, supportive therapy to assist with these functions may be beneficial to the patient. The addition of albumin to a furosemide infusion may facilitate the excretion of fluids, potassium, and other waste products, preventing further accumulation of these products. In this Study we will determine the outcomes of patients with AKI who receive an albumin-furosemide intravenous infusion during hospitalization at the University of Toledo Medical Center. The data that will be collected and analyzed from the patient charts includes demographic information (patient weight, age, sex, race), past medical history, cause of kidney failure, electrolytes (blood urea nitrogen, serum creatinine, potassium), urine output, initiation of the albumin-furosemide infusion, length of time until the patient received the albumin-furosemide infusion once AKI was diagnosed, initiation of dialysis, recovery of kidney function and number of days to kidney function recovery. The data is conflicting on whether or not albumin potentiates the diuretic effects of furosemide in patients with AKI. Studies of these effects in humans are sparse, and present conflicting results. This study is imperative for two reasons; very little is known about the outcomes of patients with AKI who receive this infusion and the results of this study could be used as pilot data for a prospective study further evaluating an albumin-furosemide infusion in patients with AKI.

Learning Objectives:

Describe whether albumin and furosemide together in an IV infusion improve kidney function in a patient with Acute kidney Injury.

Describe the length of time until kidney function improves on the albumin-furosemide IV infusion if it does improve.

Self Assessment Questions:

Did the albumin-furosemide infusion decrease the length of time until a patient required dialysis?

Did the albumin-furosemide infusion significantly improve kidney function in patients with acute kidney injury?

EVALUATION OF THE IMPACT OF POTENTIAL QUALITY EDITS ON ANTIPSYCHOTIC USE IN PEDIATRICS

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Background: During the past decade, there has been a substantial increase in the prescribing of antipsychotics for children and adolescents. This increase is due largely to the expanding use of second generation antipsychotics for a variety of pediatric psychiatric disorders. Use of second generation antipsychotics in younger people has mirrored the spike in use in the adult population. In January 2007, Indiana Medicaid implemented quality edits to improve the care of adults being treated with more than one antipsychotic. The purpose of these edits is to encourage use of antipsychotic monotherapy in the adult population as well as ensure appropriate use of antipsychotic polypharmacy, if necessary. PURPOSE: To evaluate and quantify the number of pediatric patients receiving more than one antipsychotic. The information gathered will inform Wishard Health Services of the impact of implementation of pediatric antipsychotic polypharmacy edits in Medicaid. METHODS: This is an IRB approved, retrospective, observational pediatric outpatient record analysis of children and adolescents prescribed antipsychotics. Pediatric patients were included in the study if: 1) the child received treatment at WHS; 2) 6 - 17 years old; 3) utilizing a WHS outpatient pharmacy; 4) prescribed 1 or more antipsychotic(s) from July 1, 2006 -June 30, 2007; 5) not a detainee at the Marion County Jail or Juvenile Detention Center. RESULTS/CONCLUSIONS: One hundred twenty-two patient charts were reviewed. Sixty-six patients (54%) were excluded who did not meet inclusion criteria for reasons including age and prescription fill history. Fifty-six patients (45%) met the eligibility criteria, of these two patients (3.5%) were prescribed two antipsychotics concurrently. Aripiprazole and quetiapine were the polypharmacy antipsychotics taken by both patients by both patients. Risperidone was the most commonly prescribed antipsychotic; twenty-seven patients (48%) were prescribed this medication as monotherapy. The conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Restate the Indiana Medicaid goal of antipsychotic quality edits.

Explain the risk of using antipsychotic polypharmacy in the pediatric population for psychiatric disorders.

Self Assessment Questions:

Which antipsychotic is NOT prescribed in the pediatric population:
1)Olanzapine
2)Quetiapine
3)Risperidone
4)All of the above are prescribed

True or False:Risperidone is the only second generation antipsychotic FDA approved for use in children less than 10 years of age.

ADDITION OF ORAL METOLAZONE TO INTERMITTENT INTRAVENOUS FUROSEMIDE VERSUS TRANSITION TO CONTINUOUS INFUSION FUROSEMIDE IN ACUTE DECOMPENSATED HEART FAILURE PATIENTS EXPERIENCING AN INADEQUATE RESPONSE TO THERAPY

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Purpose: Most patients hospitalized for ADHF have evidence of volume overload requiring IV loop diuretics to promote diuresis and alleviate congestion. While there is a consensus about the use of IV diuretics as a first line treatment for ADHF, the most effective and safe administration method is more controversial. Two strategies for overcoming diuretic resistance are the addition of a thiazide-like diuretic (i.e., metolazone) to standard IV bolus (IVB) loop diuretics or transition to continuous infusion (CI) of loop diuretics. Each of these strategies is given equivalent recommendations in the HFSA guidelines for ADHF patients who are refractory to initial diuresis. However, the comparative safety and efficacy of these approaches has been poorly studied. We plan to compare IVB loop diuretics plus metolazone (M) to CI diuretics in refractory ADHF patients.
Methods: This is a multi-center, prospective, randomized, open-label trial coordinated through the University of North Carolina. Eligible patients must be hospitalized ≤ 24 hours at enrollment, have > 1 symptom and > 1 sign of ADHF, and have demonstrated an inadequate response to IV diuretics with an anticipated need for IV diuretic therapy of ≥ 48 hours. 160 patients who satisfy inclusion and exclusion criteria will be randomized to one of two IV diuretic groups: IVB loop diuretic M (IVB+M) or transition to CI loop diuretic. A suggested algorithm for initial dosing and titration of these treatment strategies will be provided. The primary efficacy endpoint is change in daily net fluid output at 48 hours following randomization. A variety of efficacy parameters will be compared as secondary endpoints. Safety endpoints include electrolyte deficiencies, deterioration in renal function, held doses of study medications due to hypotension, and hypotensive episodes. It is anticipated that the UIMC at Chicago will enroll 16 - 20 patients.
Results & Conclusion: The study is enrolling patients at this time.

Learning Objectives:

To identify the different approaches to treatment of ADHF patients refractory to initial IVB loop diuresis.

To define the major risks posed by excessive doses of bolus furosemide.

Self Assessment Questions:

What are acceptable strategies in treating ADHF refractory to IVB loop diuretics?
a.Repeat IVB doses of the same loop diuretic at the same dose
b.Transition to CI loop diuretic, with our without initial bolus
c.Addition of a thiazide(-like) agents
d.Both b and c

What are two potential adverse effects of excessive bolus dosing of furosemide?

AUDIT, ASSESSMENT, AND STANDARDIZATION OF PHARMACIST WORKFLOW FOR DAILY PATIENT MONITORING USING AN ELECTRONIC HEALTH RECORD AT AN ACADEMIC MEDICAL CENTER

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Background: At the University of Wisconsin Hospital and Clinics (UWHC) all inpatients have their drug therapy regimens monitored daily by pharmacists. Pharmacists have specific education and training that make them uniquely qualified to make medication related interventions to minimize adverse drug events and to ensure the appropriateness of drug therapy. UWHC policy and procedure outlines the expectations for daily pharmacist profile review. The pharmacist is expected to consider the following patient-specific information: the patients diagnosis, comorbidities and concurrently occurring conditions, the medication interview, current inpatient medications, relevant laboratory values/results, medication administration record, and other pertinent information in the patients medical record. UWHC recently implemented a system-wide electronic health record (EHR) and currently there is no standard pharmacist workflow designed to assist in accomplishing this responsibility.

Objectives: The primary objective is to maximize the efficiency of pharmacist patient monitoring and hand-offs. Secondary objectives are to audit, assess, and document the current and future pharmacist clinical monitoring workflows.

Methods: Observe and document the workflows of 25% of the UWHC inpatient pharmacists for each required element of daily profile review and handoffs. The documentation will be presented in process diagrams of the order/number of steps as well as locations queried within and outside the EHR. A team of pharmacists and pharmacy informatics staff will design, build, test and validate new workflows. Staff education will be provided on the new workflows prior to implementation via inservices and updates to the training manual. Observation with documentation will be repeated to measure the impact of the new workflows.

Results/Conclusion: Results and conclusion regarding a new standardized drug therapy monitoring workflow shall follow pending completion of data collection and analysis.

Learning Objectives:

Explain the current workflows used by UWHC for pharmacist monitoring of patients.

Describe the new pharmacist workflow design developed at UWHC for pharmacist patient monitoring.

Self Assessment Questions:

What effects does implementation of an EHR have on pharmacists ability to complete daily monitoring of patients?

What is the impact of having a standardized workflow for pharmacist patient monitoring?

TOLERABILITY OF CARBOPLATIN WHEN USING ALTERNATE SERUM CREATININE VALUES

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Purpose:
Carboplatin is dosed using the Calvert formula, which takes into account renal function. Renal function is commonly estimated by creatinine clearance (CrCl), which is calculated using the Cockcroft-Gault formula. Some clinicians round up low serum creatinine (SCr) values (< 1 mg/dL) due to the belief that the Cockcroft-Gault formula overestimates CrCl for patients with a low SCr. The proper way to calculate CrCl, and therefore dose carboplatin, in patients with a low SCr is not known. The objective of this study is to determine the tolerability, including nausea/vomiting and bone marrow suppression, of carboplatin for patients with SCr < 1 mg/dL, who had their dose calculated using rounded up SCr values compared to those who had their dose calculated using actual serum creatinine values.

Methods:
This study is a retrospective analysis of patients identified through pharmacy chemotherapy records. Inclusion criteria were first dose of carboplatin received inpatient between January 1st 2004 and November 30th, 2008, SCr < 1 mg/dL, carboplatin dose determined using the Calvert formula, and CrCl calculated using the Cockcroft-Gault formula. Patients were excluded if they received < 100% of the calculated carboplatin dose. Patients were divided into three groups based on the SCr value used to calculate CrCl: actual SCr, SCr rounded to 0.8 mg/dL, and SCr rounded to 1 mg/dL. Patient records were reviewed to determine demographic data, platelet and neutrophil nadirs, documented use of as needed antiemetics and nausea and vomiting episodes within the first 24 hours of carboplatin, and information regarding treatment delays.

Results and Conclusion:
Two hundred eighty seven patients were identified who received carboplatin. One hundred patients met the inclusion criteria (actual SCr n=38, SCr 1 mg/dL n=40, SCr 0.8 mg/dL n=22). Data collection is ongoing. Final results with conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the impact of low serum creatinine values in calculating CrCl, and therefore dosing carboplatin.

Discuss the tolerability of carboplatin for patients with low SCr values who had their dose calculated using alternate SCr values.

Self Assessment Questions:

What are the common toxicities associated with carboplatin?

How does carboplatin dosing differ from most other chemotherapeutic agents?

EVALUATION OF PHARMACIST MEDICATION ORDER REVIEW

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Background
Medication order transcription is a key step of the drug distribution process. It requires pharmacists to interpret handwritten orders and accurately enter them into a computer system. Pharmacists face numerous distractions which create extra burden and increase the likelihood of error. A study conducted in 2004 found a 14.9% error rate for pharmacist-input orders. A follow-up study in 2007 examined a pilot of a segregated pharmacy model in which distractions were removed. The error rate subsequently was decreased to 10.9%. A new electronic medication order processing system was implemented in October 2007. This next phase of the evaluation will assess the impact of this new system on error rate while continuing with the segregated satellite pharmacy model.

Purpose
The primary objectives are to categorize and evaluate the error rate within the current segregated model while using a new order entry system. The secondary objective is to stratify the error rate based on the time of order entry.

Methods
All medication orders received by pharmacy from a general medicine unit between November 2nd, 2008 to November 15th, 2008 were collected. Original orders were compared to those transcribed by pharmacists into the order entry system. We assessed the accuracy of orders based on: 1) Correct patient, medication, strength, and frequency; 2) Proper start date; 3) Special administration instructions; 4) Appropriate evaluation for duplicate therapy, allergies, drug interactions, and renal dosing. We recorded the time when the orders were input as well as the pharmacists who entered the orders. Orders were assigned scores based on amount of correct criteria. An error rate will be calculated. Descriptions of the discrepancies will be documented. Errors will be stratified based on minor, moderate, and major severity.

Results/Conclusions
Data analysis is ongoing. Results and conclusions will be presented at the GLPR Conference.

Learning Objectives:

Discuss the effect of a new pharmacist order entry system on error rate.

Discuss a baseline of pharmacist verification patterns to compare with a future computer physician order entry model.

Self Assessment Questions:

T/F Medication errors are defined as any avoidable event that may harm patients due to inappropriate use of drugs.

Which of the following are potential distractions that pharmacists face during the order entry process:
a)Answering telephone calls
b)Calculating doses of antibiotics
c)Clarifying ambiguous orders
d)Responding to drug information questions
e)All of the above

THE BENEFIT AND SAFETY OF CALCIUM AND MAGNESIUM INFUSIONS FOR THE PREVENTION OF OXALIPLATIN-INDUCED PERIPHERAL NEUROPATHY (OIPN)

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Purpose: Oxaliplatin (Eloxatin) is an antineoplastic agent used to primarily treat metastatic/advanced stage colorectal cancer. The dose-limiting side toxicity is peripheral neuropathy which contributes to treatment delays and poor outcomes. Several pharmacologic agents have been used to manage oxaliplatin-induced peripheral neuropathy (OIPN), including pre- and post-dose calcium (Ca)/magnesium (Mg) infusions. The primary purpose of this study is to determine the benefit of Ca/Mg infusions to decrease oxaliplatin-induced peripheral neuropathy. The secondary objective is to assess the safety of Ca/Mg infusions at MetroHealth Medical Center (MHMC).

Methods: A retrospective chart review will be conducted pre- and post-implementation of Ca/Mg infusions at MHMC. Approximately 30 patients on oxaliplatin alone and 30 patients on oxaliplatin with Ca/Mg infusions will be studied. Demographic data collected will include age, gender, performance status, indication, concomitant medications/disease states, and smoking/alcohol history. Components of the chemotherapy regimen, number of cycles, cumulative oxaliplatin dose, and duration of treatment will be recorded. Neuropathy toxicity grade, symptoms, and the number of treatment delays, discontinuations or dose reductions due to neuropathy will be documented. For safety, calcium/magnesium lab values and the incidence of Ca/Mg - induced toxicity will be gathered. Comparative statistics will be used to analyze the efficacy and safety results. All data will be collected on a standardized form and documented on a Microsoft Excel spreadsheet.

Complete results and conclusions will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe the incidence and mechanism of oxaliplatin-induced peripheral neuropathy (OIPN) and the current proposed methods of management, including the use of calcium and magnesium infusions.

Discuss the importance of the various clinical trials leading to the proposed and continued use of calcium/magnesium infusions for OIPN.

Self Assessment Questions:

What is oxaliplatins dose-limiting toxicity?
1.Cumulative peripheral, sensory neuropathy
2.Acute, motor peripheral neuropathy
3.GI issues (nausea, vomiting, diarrhea, stomatitis)
4.Increased liver function tests

What is the role of oxalate in the mechanism of oxaliplatin-induced peripheral neuropathy?

SAFETY OF PEDIATRIC LIPID EMULSIONS REPACKED BY AN AUTOMATED COMPOUNDING DEVICE

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Purpose: Parenteral nutrition (PN) serves an important role in the pediatric population, with special considerations given to neonates unable to absorb, digest or ingest nutritional supplements by mouth. In the 1970s, lipid emulsions emerged as a beneficial macronutrient, primarily to prevent essential fatty acid deficiency and serve as a delivery vehicle for many medications.

Doses of lipid emulsions for pediatric patients are prepared from manufacturer stock solutions in amounts of 100 mL and 250 mL, respectively. Hanging this bulk amount of lipid emulsion is particularly problematic, especially if doses are allowed to infuse over time periods greater than 12 hours. Syringe repackaging has been used as a means of reducing the costs and enhancing safety by preventing overdose infusions of lipid emulsions; however, controversy exists substantiating the sterility and safety of this delivery system.

Non-traditional methods of unit-dosing lipid emulsions have yet to be developed and validated as safe and cost-effective. One approach is to repackage lipid emulsions into smaller intravenous fluid bags via an automated compounding device (ACD).

Methods: This study will evaluate the sterility of each bag of lipid emulsion repackaged for pediatric patients by an ACD. A sample from each compounded bag will be cultured at 0, 1, and 5 days to detect the presence of microorganisms commonly found in previous studies.

Preliminary results: Data will be statistically evaluated using the Chi-squared test and the Fishers exact test. Statistical significance is defined as $p < 0.05$. To obtain an adequate number of samples, power to detect the difference will be set at 80%.

Conclusions: The results of this study may provide evidence to support using ACDs to measure and dispense unit doses of lipid products that are safe to administer.

Learning Objectives:

The learner will be able to identify the microbiological risks involved with repackaging lipid emulsions.

The learner will be able to describe the role of an automated compounding device in the repackaging of pediatric lipid emulsions.

Self Assessment Questions:

Name two bacteria attributed to the contamination of unit-dosed lipid emulsions in previous studies?

What method was used to unit-dose lipid emulsions into empty bags in this study?

IMPACT OF AN INPATIENT PHARMACY-MANAGED ANTICOAGULATION SERVICE ON INR VALUES

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Purpose: Warfarin is effective in the treatment and prevention of thrombosis but is characterized by a narrow therapeutic window, numerous drug interactions, and significant risk of adverse events with excess or inadequate anticoagulation. Because of the risks associated with anticoagulant use, national hospital accreditation organizations have advocated the need for healthcare institutions to develop and implement ways to improve the safe use of these medications. This study aims to compare inpatient pharmacy management of warfarin therapy with physician management in a community hospital.

Methods: A list of hospitalized patients who received warfarin from 01/01/08 to 03/31/08 was obtained by searching the hospitals pharmacy computer system. Fifty patients not meeting exclusion criteria were randomly selected from this list for by submitting requests through Medical Records. Patients managed by orthopedics, who were hospitalized for fewer than 3 days, or who had anticoagulation therapy held upon admission were excluded. Data collected for each patient included INR throughout hospital stay, daily warfarin dose, indication for warfarin therapy, target INR, gender, age, race, vitamin K doses, whether warfarin was first initiated during hospitalization, and whether bridging with another anticoagulant was utilized.

Physicians may opt for inpatient pharmacy management of their patients warfarin therapy beginning 01/01/09. The inpatient pharmacy service was developed by the pharmacy resident and is run by a trained team of inpatient pharmacists. Data collection for patients referred to inpatient pharmacy management as well as a sample of those managed by physicians will be from 01/01/09 to 03/31/09 and include the same data as for the retrospective part of the study. The primary endpoints are the number of daily INRs which are in target range (+ 0.1) and whether INRs are in target range (+ 0.1) at the time of discharge. The study received Institutional Review Board approval prior to commencement.

Results/Conclusion: Pending

Learning Objectives:

Identify factors that can impact INR levels in patients receiving warfarin therapy.

List reasonable warfarin management strategies for specific patient scenarios.

Self Assessment Questions:

Which clotting factors does warfarin effect?

a. VII, IX, X, II
b. II, V, X, IX
c. X and II only
d. XI, VII, VIII, II

Which of the following is/are not expected to increase the effects of warfarin (increase the INR)?

a. Amiodarone
b. Congestive heart failure
c. Diarrhea
d. Hypothyroidism
e. Reducing dietary vitamin K intake
f. None of the above

OUTCOMES, COST, AND FEASIBILITY OF EXTENDED-INFUSION PIPERACILLIN/TAZOBACTAM IN THE INTENSIVE CARE UNIT

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Purpose: Ever increasing resistance among gram negative infections and increasing mortality associated with these organisms has led to the reevaluation of the optimal method to administer current antibiotics. Chastre et al. suggested extended-infusion of the carbapenem doripenem was non-inferior to intermittent infusion of imipenem. Lodise and colleagues discovered extended-infusion piperacillin/tazobactam improves outcomes in critically ill patients with Pseudomonas aeruginosa infections. Based on this compelling new research, our institution converted all piperacillin/tazobactam dosing in the ICU to extended-infusion dosing in two phases over the past 18 months.

Methods: The primary objective of this study is to compare the efficacy, safety and cost of extended-infusion piperacillin/tazobactam against alternative effective therapies. A retrospective chart review of adult patients admitted to the intensive care unit between January 1, 2007 and December 31, 2008 treated with extended-infusion piperacillin/tazobactam or intermittent-infusions of cefepime, imipenem/cilistatin, meropenem, doripenem, or piperacillin/tazobactam for more than 48 hours will be included in this review. Patients will be identified by ICD-9 codes for treatment for any infection in which Acinetobacter spp., Klebsiella spp., Pseudomonas spp., Serratia spp., E. Coli, or Citrobacter spp. are the causative organism. Excluded will be any patient who received greater than 24 hours of effective antibiotics before the initiation of study drug or any patient whose infection is proven resistant to empiric therapy. The following data will be collected and analyzed: age, gender, race, vital signs, creatinine clearance, APACHE II score, site of infection, infectious organism, MIC data if available, 14-day mortality data, length of stay, length of stay in the ICU, number of days on a ventilator, time to resolution of fever, duration of antibiotic therapy, concomitant antibiotics, any note indicating a reason why extended-infusion was not initiated, use of vasopressors, adverse events, and institution level cost information.

Results and conclusions: Results will be presented at the residency conference.

Learning Objectives:

Describe the relationship between the pharmacokinetics of piperacillin/tazobactam and the utility of extended infusion.

Discuss the potential advantages and disadvantages associated with extended infusion antibiotics from a patient as well as a system point-of-view.

Self Assessment Questions:

Which type of pharmacokinetics best describes piperacillin/tazobactam?
A.Concentration dependent
B.Concentration independent

Which of the following is not a potential advantage of using extended infusion piperacillin/tazobactam?
A.Decrease in side effects from overall decrease in drug exposure
B.Decrease in cost from fewer therapeutic failures
C.Decrease in nursing time spent administering infusion
D.Decrease in cost from fewer associated side effects

A RETROSPECTIVE EVALUATION OF EPOETIN ALFA USE IN POSTOPERATIVE CARDIAC SURGERY PATIENTS

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PURPOSE: Anemia is frequently observed among post-surgical patients and is commonly treated with blood transfusions. Due to the risks associated with blood transfusions, such as infusion reactions and disease transmission, epoetin alfa has been studied preoperatively and postoperatively to treat anemia following surgery. There has been a noticeable increase in epoetin alfa use postoperatively in cardiac surgery patients at the Louis Stokes Cleveland VA. Our purpose is to evaluate if postoperative administration of epoetin alfa reduces the number of transfusions and improves hemoglobin levels of cardiac surgery patients.

METHODS: This is a retrospective chart review of patients greater than 18 years old who had cardiac surgery between January 2006 and June 2008 who also received at least one dose of epoetin alfa within 72 hours following surgery. Patients will be excluded if they received epoetin alfa or any blood transfusion within 7 days prior to surgery, returned to the operating room within the same hospital admission, or did not undergo scheduled cardiac surgery. Fifty patients with the most recent date of cardiac surgery who meet all criteria will be included in the evaluaton. A matched patient population of cardiac surgery patients during the same time period who did not receive epoetin alfa following surgery, will be selected based upon age, sex, baseline hemoglobin and serum creatinine. Primary outcomes include the number of transfusions and hemoglobin level within 7 days following surgery. Secondary outcomes include receipt of any transfusion, follow up hemoglobin and hematocrit levels, length of stay, and adverse events (specifically thrombotic event and/or death).

RESULTS: Approved by IRB. Currently in the data collection phase. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List risks associated with both transfusions and treatment with erythropoetic stimulating agents.

Describe appropriateness of postoperative epoetin alfa treatment following cardiac surgery.

Self Assessment Questions:

Epoetin alfa is approved to treat anemia in:
a. Chronic renal failure patients
b. Zidovudine-treated HIV-infected patients
c. Cancer patients on chemotherapy
d. Surgery patients who are at high risk for blood loss from elective, noncardiac, nonvascular surgery
e. All of the above

True or False: Hemoglobin and hematocrit levels usually improve within 10 days of administration of epoetin alfa.

EVALUATION OF ERYTHROPOIESIS STIMULATING AGENTS (ESAS) USE FOR CHEMOTHERAPY-INDUCED ANEMIA WITH RECENT REIMBURSEMENT CHANGES

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PURPOSE:
Erythropoiesis stimulating agents (ESAs) have been approved by the Food and Drug Administration (FDA) for chemotherapy-induced anemia (CIA). In recent years, two major trials indicated that the use of ESAs with a targeted Hb level above 12 g/dL decreased survival and locoregional control in solid tumors. With these concerns, the Centers for Medicare and Medicaid Services (CMS) issued the national coverage determination (NCD) which imposed restrictions on ESA reimbursement for Medicare and Medicaid beneficiaries. This issue had a major impact on our current practice, because a majority of our patients are Medicare or Medicaid recipients. Since July 2007, our practice on use of ESAs was changed to coincide with the NCD. With the more restrictive reimbursement policy that ESA can only be initiated in CIA patients with Hb ≤ 10 g/dL, we believe fewer patients are receiving ESAs and more patients require transfusion.

The purpose of this study is to evaluate the use of ESAs in patients with CIA before and after the change of practice based on reimbursement restrictions imposed by the NCD. The primary outcome of this study is the number of transfusions in relation to the ESAs practice change.

METHODS:
The medical records of all adult patients with a non-myeloid malignancy who have received ESAs between July 2006 and June 2008 at the University of Illinois Medical Center at Chicago for CIA will be evaluated. The medical records will be reviewed for demographic information, medical and medication history, treatment outcome, transfusion record and laboratory data. The number of transfusion in patients who have received ESAs prior to versus after guideline implementation and a descriptive analysis of subjects data will be discussed.

RESULTS & CONCLUSION:
A total of 158 subjects will be reviewed. Data collection is in progress. Results and conclusion will be presented at the conference..

Learning Objectives:

Identify the risks associated with the use of ESAs in patients with CIA

Recognize the impact of the reimbursement restrictions on transfusions in patients with CIA

Self Assessment Questions:

List two risks associated with the use of ESAs in patients with CIA

Describe the impacts of the reimbursement restrictions on patients receiving ESAs for CIA

EFFECTS OF SUB-INHIBITORY CONCENTRATIONS OF ANTIBIOTICS ON QUORUM SENSING-MEDIATED PROTEIN PRODUCTION IN METHICILLIN-SENSITIVE AND METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS.

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Background
Quorum sensing is used as a decision-making process for the up-regulation of genes and transcription factors in various bacteria. Quorum sensing is used to direct processes that relate to competition, biofilm formation, motility, and antibiotic production. In Staphylococcus aureus, the autoinducible quorum-sensing system agr increases the regulator RNAIII to produce virulence factors. Modulation of quorum sensing-mediated virulence factor could be a novel treatment approach. Recent studies have shown that sub-inhibitory concentrations decreased the production of virulence factors; however, the correlation of this effect with RNAIII modulation has not been studied. We aim to determine the change in quorum sensing-mediated protein synthesis in relation to various antimicrobial concentrations and inoculum size.
Methods
Methicillin susceptible (MSSA) and methicillin-resistant (MRSA) strains of S. aureus were maintained in trypsin-soy broth at 37C and diluted to a starting concentration of 1 x 105 CFU/mL. Cultures were exposed to 0, 0.125, 0.25, and 0.5 MIC of clindamycin and linezolid (as determined by eTest) and collected throughout the growth curve at times 0, 3, 6, 12, and 24 hours to capture bacteria through the log-growth and stationary phases. Dilutions were plated on tryptic soy agar at each time point to determine time-growth curve. Cells were lysed with a lysis buffer containing protease inhibitors and stored at -80C. Western blots were performed in duplicate with protein extracts for the quorum sensing mediated protein alpha-hemolysin and imaged. Relative protein concentration was determined by densitometry analysis. Repeated measures ANOVA was used to compare ratios at each time point between varying drug concentrations.

Results and Conclusions
Data collection is currently in progress. Results and conclusions will be presented at GLPRC in April.

Learning Objectives:

Describe the role of quorum sensing in bacteria.□□

Describe the agr quorum sensing system in S. aureus.

Self Assessment Questions:

What quorum-sensing signaling molecule does S. aureus use?

True or false: S. aureus constitutively expresses RNAIII.

EVALUATION OF PATIENTS IN ICU WITH COMPLICATED INTRA-ABDOMINAL INFECTIONS

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Purpose: In 2003, the Infectious Diseases Society of America (IDSA) published guidelines on the selection of anti-infective agents for adults with complicated intra-abdominal infections. Complicated intra-abdominal infections are defined as infections extending beyond the hollow viscous of origin into the peritoneum. Patients admitted to the intensive care unit (ICU) with intra-abdominal infections currently receive empiric antibiotic or antifungal therapy. Current guidelines do not recommend coverage against fungi in patients with acute perforations of gastrointestinal tract unless the patient has received immunosuppressive therapy, transplantation, or has inflammatory disease. There are few studies published regarding the empiric use of antienterococcal or antifungal therapy in patients with abdominal visceral perforations, and there is conflicting evidence and recommendations regarding the initiation of those therapies. The objective of this study is to evaluate empiric antibiotic and antifungal therapy and outcomes of ICU patients with intra-abdominal infections secondary to visceral perforation at MHMC, as well as to identify microorganisms isolated from cultures.
Methods: This study is approved by the Institutional Review Board at MHMC. Patients will be identified by ICD-9 coding (peritonitis and/or retroperitoneal infections). A retrospective chart review of 50 patients will be conducted to obtain baseline data on patients eligible for the study. Data will be collected on patient demographics and source of admission to the ICU. Information will be obtained regarding the specific antibiotic or antifungal used empirically, number of gastrointestinal sites perforated, type of microbiological cultures obtained, microorganism(s) isolated, and the number of microorganisms isolated per patient. Empiric agents will be evaluated for appropriateness based on the microorganism(s) isolated. Outcome measures, discharge disposition, and mortality rate will be assessed. To maintain confidentiality, no patient identifiers will be used in this study.
Results/Conclusion: Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe empiric antibiotic and antifungal therapy appropriateness when compared to culture/sensitivity results in patients with abdominal visceral perforation.

Describe how often microbiological cultures are obtained and identify which microorganisms isolated from cultures in ICU patients with complicated intra-abdominal infections.

Self Assessment Questions:

True/False: Microorganisms obtained from cultures include both facultative aerobic and anaerobic bacteria, as well as fungi.

True/False: Antienterococcal therapy is not necessary for patients with hospital acquired intra-abdominal infections.

EXAMINING ADRENAL INSUFFICIENCY IN SEPTIC PATIENTS AFTER ETOMIDATE ADMINISTRATION IN AN ACADEMIC MEDICAL CENTER

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Purpose: Etomidate is considered a first-line agent for patients experiencing hemodynamic instability and needing intubation. However, etomidate is known to cause decreased cortisol levels which can limit the stress response of critically ill patients, specifically, septic patients. Previous studies demonstrated single-dose etomidate causes adrenal suppression for a short time (4-12 hours), and no clinically significant reduction in blood pressure or clinical outcomes. More recent literature has shown an association of worsened outcomes in patients that received etomidate for rapid-sequence intubation (RSI) than those patients who did not. This studys aim is to examine etomidates unclear role in adrenal suppression and worsening mortality in septic patients. The primary objective is to evaluate the incidence of adrenal insufficiency in patients with sepsis that received etomidate versus those who did not. Secondary objectives are to evaluate the difference in cortisol levels, corticosteroid use, length of intensive care unit stay, and mortality between the two groups.
Methods: The study is a retrospective chart review approved by The University of Illinois Medical Center at Chicagos institutional review board. Subjects were identified through a computer generated list from ICD-9 codes for a discharge diagnosis of sepsis, severe sepsis, and SIRS-non-infected with acute organ dysfunction (995.91, 995.92, 995.94) between January 1, 2003 and December 31, 2007. Patients were screened based on inclusion and exclusion criteria and placed into groups based on the presence or absence of etomidate use during RSI. The clinical characteristics of the two groups were compared.
Descriptive statistics will compare the baseline characteristics and demographics of the two groups. A Chi-squared test with Bonferroni correction will be used for analysis of our primary and secondary endpoints. Statistical significance will occur at $p \leq 0.05$.
Results and Conclusion: Outcomes and interventions remain under investigation with data collection and evaluation currently being conducted.
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Learning Objectives:

Explain the pharmacologic profile of etomidate and its effects of adrenal function.

Explain one institutions incidence of adrenal dysfunction in septic patients receiving etomidate for intubation compared to those receiving other induction agents.

Self Assessment Questions:

True or false? Failure of the adrenal gland to produce the essential basal secretion of cortisol results in adrenal insufficiency.

True or false? The study showed that etomidate decreases the incidence of adrenal insufficiency in septic patients.

RETROSPECTIVE COMPARISON OF ADHERENCE TO STATINS BETWEEN PATIENTS WITH SCHIZOPHRENIA AND PATIENTS WITHOUT MENTAL ILLNESS

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PURPOSE:
Poor adherence to HMG-CoA reductase inhibitor (statin) therapy is associated with diminished morbidity and mortality benefits. Psychological problems are one of the predictors of poor medication adherence. Additionally, treatment, of schizophrenia with second generation antipsychotics (SGA) predisposes patients to metabolic side effects such as dyslipidemia, which can increase the likelihood of statin use. The purpose of this study is to determine if there is a difference in adherence to statins between patients with schizophrenia and patients without mental illness.

METHODS:
A retrospective chart review of patients with a prescription for a statin between October 1, 2004 and September 30, 2007 will be performed to calculate medication refill adherence (MRA). MRA will be defined as (total dayssupply/total days in period) x 100%. Patients with MRA of ≥80% will be considered adherent. MRA will be evaluated over a one year period. The group of patients with a statin prescription will be divided into two sub-groups, group one with a prescription for a statin and a SGA, and group two with a prescription for a statin and no prescriptions for psychotropic medications. Based on prescription dispensing data, the MRA to statins will be estimated in each group. The primary endpoint is the percent difference in adherence to statins between the two groups. Secondary endpoints include, the percent of patients in each group meeting their LDL goal, and in group one the difference in adherence to statins compared to SGAs over one year during the study period. We will include 200 patients per group in order to have adequate power to detect a difference of 15% in statin adherence between the two groups.

RESULTS and CONCLUSIONS:
Results and conclusions to follow after completion of data collection and analysis.
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Learning Objectives:

Evaluate adherence to statins at Edward Hines Jr. VA in patients with schizophrenia and in patients without mental illness.

Identify if there are differences in adherence to statins, between patients with schizophrenia and patients without mental illness.

Self Assessment Questions:

True / False: Adherence to statin therapy drops to below 50% within 12 months of initiating statin therapy.

True / False: Psychosocial problems have not been identified as predictors of poor medication adherence.

EVALUATION OF POSTOPERATIVE ATRIAL FIBRILLATION IN PATIENTS UNDERGOING CARDIAC SURGERY

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Background and Purpose:
Postoperative atrial fibrillation (POAF) is a common complication of cardiac surgery with an incidence ranging from 15 - 40%, particularly in patients undergoing Coronary Artery Bypass Grafting (CABG), valvular surgery, or both. The optimal treatment strategy of POAF remains controversial. Studies have examined both rate control with beta receptor blocking agents as well as rhythm control with antiarrhythmic agents, particularly amiodarone. Both treatment strategies have been shown to control POAF; however, no direct comparison of rate control versus rhythm control has been conducted in these patients.
Currently at OSUMC the frequency of POAF is unknown and there is no established protocol in place to prevent or treat POAF in patients undergoing cardiac surgery. The purpose of this study is to assess the incidence of POAF areas for improvement, further characterization of risk factors, treatment strategies, and outcomes in patients undergoing cardiac surgery.

Methods:
Patients aged 18 years or greater undergoing CABG, valvular surgery, or both during the time period of October 1, 2007 through September 30, 2008 are included in this analysis. Data was collected via the STS database, patient charts, OSUMCs electronic medical record, electronic charting system, and the electronic pharmacy system. Data to be collected include demographic data, comorbidities, procedure type, medication use, and risk factors for POAF. Primary outcomes that will be assessed include frequency of POAF, hospital length of stay, morbidity and all-cause mortality. Assessment of these outcomes will allow for characterization of POAF, appropriate identification of risk for developing POAF, and recommendations for risk reduction and treatment. Statistical analysis will be done using descriptive statistics.

Results and Conclusions:
Final results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Identify the risk factors for development of postoperative atrial fibrillation in patients undergoing cardiac surgery.

Describe the treatment of postoperative atrial fibrillation.

Self Assessment Questions:

True/False: Postoperative atrial fibrillation is a common complication associated with cardiac surgery.

True/False: Preoperative prophylaxis with amiodarone has been shown to be effective in preventing postoperative atrial fibrillation.