**Evaluation of Efficacy And Safety Of Premixed Parenteral Nutrition vs. Customized Parenteral Nutrition In A Large Teaching Hospital**

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**Purpose:** The hypothesis for the research is that premixed PN are equally safe, effective, and less costly than customized PN in managing hospitalized patients’ nutritional needs. Safety goals were measured by Adverse Drug Reaction reports. Efficacy was measured by positive trend in electrolyte, prealbumin, and glucose levels. Cost justifications of the components associated with premixed PN versus customized PN were additives, labor, supplies, wastes, and quality. Costs were determined by the difference between premixed double chamber bags versus customized PN.

**Methods:** This was a randomized observational sequential study of 100 patients requiring central PN. Fifty subjects were consecutively observed under the current customized PN format and fifty subjects were observed with a premix double chamber PN solution containing protein, carbohydrate, and electrolytes. A randomization chart was used to place each patient in a study group after obtaining consent. Each subject enrolled was followed until the PN was either discontinued, patient was transferred from the facility, or the patient expired. Due to the nature of the study, blinding was not possible since the prescriber needed to know the formulations they were ordering.

**Results:** Results revealed that premixed PN solutions were equally safe, effective, and less costly than customized PN solutions. Patients receiving premixed PN solutions experienced less ADRs, prealbumin, and metabolic abnormalities than patient receiving customized PN solutions. 20% of the patient receiving standardized PN experienced less ADRs such as bacterial infection, pneumonia, blood infection, intra-abdominal infection, skin and soft tissue infection, urinary tract infection, sepsis, or septic shock. Patients receiving standardized PN experienced less electrolyte abnormalities: sodium-5.3%, potassium-3.4%, carbon dioxide-10%, glucose 11.8%, phosphorous-9.5%, and prealbumin-4.7%. The patients receiving standardized PN did experience a 5% increase in magnesium abnormalities. Standardized PN solutions also yielded a cost savings of $41,900 annually.

**Conclusions** Standardized PN were equally safe, effective, and less costly than customized PN solutions in managing nutritional needs for hospitalized patients.

12/3/2011
Evaluation of the treatment of diabetic ketoacidosis (DKA) in a large community hospital
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Purpose: The protocol for diabetic ketoacidosis (DKA) treatment at our institution was recently revised to reflect the most current treatment guidelines. This study was undertaken to determine if the revised protocol has resulted in better treatment outcomes for patients presenting with DKA as compared to the previous version.

Methods: This study has been approved by the Institutional Review Board. Retrospective chart review will be utilized to determine treatment outcomes for patients with DKA prior to revision of the protocol. Concurrent and retrospective chart review will be used to determine treatment outcomes for patients admitted after the protocol was revised. Patients less than 18 years old, those admitted with hyperosmolar hyperglycemic state, or those with hyperglycemia who do not meet the criteria for DKA will be excluded. Data to be collected will include patient age and gender; serial blood glucose readings; venous pH; serum electrolyte measures; length of intensive care unit (ICU) stay; and timing of initiation of subcutaneous insulin and discontinuation of insulin infusion. Collected data will be used to determine the primary endpoint of average and median time to resolution of DKA, as well as the secondary endpoints of incidence of hypoglycemia at any point during therapy, incidence of hyperglycemia at any point following discontinuation of insulin infusion until discharge from the ICU, average and median time of transition from insulin infusion to subcutaneous insulin and if subcutaneous insulin was initiated 1 to 2 hours prior to discontinuation of insulin infusion, average and median time of ICU stay, and time to correction of electrolyte abnormalities.

RESEARCH-IN-PROGRESS

1/17/2012
Minocycline Prevents IL-6 Increase after Acute Ischemic Stroke
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Purpose: Post-stroke inflammation characterized by higher levels of inflammatory biomarkers, including IL-6, has been correlated to stroke severity and poor clinical outcome in acute ischemic stroke (AIS). Minocycline (MC) is a known anti-inflammatory agent with a favorable pharmacokinetic and safety profile and blood-brain barrier permeability; thus, the effect of MC on IL-6 in the first 24 hours of AIS was investigated to determine potential anti-inflammatory and neuroprotective activity.

Methods: The Minocycline to Improve Neurologic Outcome in Stroke (MINOS) study was a non-randomized trial of IV MC for AIS within 6 hours of onset. Plasma IL-6 samples were collected at 24 hours and compared to those collected in a separate observational study of blood biomarkers in AIS. IL-6 levels were measured by commercially available ELISA kits.

Results: Sixty MINOS subjects and 29 non-MINOS subjects were enrolled. The odds of a non-detectable IL-6 at 24 hours in MINOS was 8.94 (95% CI 2.62 – 30.46) compared with non-MINOS subjects.

Conclusions: It is likely that MC has a potent systemic anti-inflammatory effect in AIS and whether this proves to be neuroprotective and result in improved outcome remains to be tested in a randomized clinical trial.
Retrospective Evaluation of Quetiapine at Doses Less Than 200mg/day at a Large Tertiary Teaching Hospital with a Behavioral Medicine Service
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Purpose/Background: Quetiapine is an antipsychotic agent indicated for the treatment of schizophrenia, psychosis and mood disorders. Quetiapine has demonstrated efficacy at doses of 150-750mg/day. Quetiapine is frequently used off-label in dosing regimens for insomnia, anxiety and other indications for which safety and efficacy has not been established. The consensus of experts is that quetiapine does not have a favorable benefit:risk ratio compared to other pharmacologic treatment options outside of thought and mood disorders.

This study will evaluate the use of quetiapine at doses less than 200mg/day to describe quetiapine use for indications other than those currently approved. This study will also identify the use of quetiapine <200mg/day as monotherapy or as part of a multi-drug regimen for antipsychotic benefit.

Methods: This study is a retrospective medical record review including all adult patients admitted to Memorial University Medical Center (MUMC) between January 2010 and June 2011 receiving quetiapine <200mg/day. The assessment will include indication and dose efficacy by that indication. Statistics will be primarily descriptive. Data collected will include: if the patient was on low dose quetiapine prior to admission, prescriber’s service, concurrent diagnoses of thought or mood disorders, and AP polypharmacy versus monotherapy.

RESEARCH-IN-PROGRESS

1/25/2012
Dual Inhibitory Effect of Chaetoglobosin K on PI-3 kinase/Akt and SAPK/JNK Phosphorylation in ras-Transformed and Human Lung Carcinoma Cells
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Purpose: SAPK/JNK is critical for the expression of genes that play an important role in cell cycle transition, proliferation, and metastasis. Activation of the PI-3 kinase/Akt has been shown to activate the Rho protein Rac1, which in turn can lead to activation of SAPK/JNK. Thus, regulation of Rac1 by PI-3 kinase/Akt phosphorylation provides a route for possible crosstalk between the PI-3 kinase/Akt and SAPK/JNK pathways. We have previously shown that the antitumorigenic indolylcytochalasin, Chaetoglobosin K (ChK), inhibits the PI-3 kinase/Akt pathway in ras-transformed cells. The purpose of this study was to determine whether 1) ChK inhibits the SAPK/JNK pathway in ras-transformed and human lung carcinoma cells; 2) Rac1 is involved in ChK's effect on the PI-3 kinase/Akt and SAPK/JNK signaling pathways.

Methods: H2009 and H1299 human lung carcinoma and WB-ras1 liver epithelial cell lines were used. Western Blot analysis was performed using phosphorylation site-specific antibodies to monitor phosphorylation changes in SAPK/JNK, PI-3 kinase, and Rac1. Cell proteins were extracted using a 2% SDS total protein extraction method, separated on 12.5% polyacrylamide SDS gels, transferred to PVDF membranes, and incubated with SAPK/JNK, PI-3 kinase, phospho-SAPK/JNK, phospho-PI-3 kinase, phospho-Rac1 antibodies. Immunopositive bands were detected using alkaline phosphatase secondary antibody with the NBT/BCIP as substrates.

Results: The data show that ChK inhibited both PI-3 kinase/Akt and SAPK/JNK phosphorylation in ras-transformed cells and human lung carcinoma cells. In contrast, Wortmannin, a PI-3 kinase inhibitor, did not inhibit SAPK/JNK in ras-transformed or human lung carcinoma cells. ChK did not alter Rac1 activation.

Conclusions: This study demonstrated the dual effect of ChK on both the PI-3 kinase/Akt and SAPK/JNK signaling pathways in tumorigenic cells. ChK's lack of an effect on Rac1 activation suggests that Rac1 is not a link between these two pathways. The unique dual effect of ChK on these important pathways involved in carcinogenesis earmarks ChK for further studies to determine its molecular target(s). This work was supported by the National Institute of Health, 1RO1CA096973 and 1R15CA135415.
Evaluation of a City-wide Antimicrobial Management Program at Memorial Health University Medical Center:

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Purpose: Antimicrobial management programs (AMPs) have been associated with improved drug costs, shorter lengths of stay, and reduced total antibiotic use and resistance. A city-wide AMP is being implemented in Savannah, Georgia. This study will gauge the impact of this AMP on clinical and process outcomes at Memorial Health University Medical Center.

Methods: This is a retrospective chart review during 2 months of the pre-implementation time period and 2 months of the post-implementation time period. Any adult patient admitted during the months of November 2011 through February 2012 and who is treated with a carbapenem at any time during their antibiotic treatment course will be included in the study. Any patient who received a carbapenem for surgical prophylaxis or as outpatient therapy will be excluded. Outcomes to be assessed include defined daily dose (DDD) of carbapenem per 1000 patient days, duration of antibiotic therapy per 1000 patient days, percent of prescribed carbapenems that were appropriate (as defined by the AMP algorithm criteria), total antibiotic therapy cost per day, total duration of all antibiotic therapy in days, all cause mortality, resolution of cultures during single admission, and clinical response. Clinical cure or improvement is defined as the documentation of normalization of pretreatment signs and symptoms (WBC and temperature) at course discontinuation, or the improvement of pretreatment signs and symptoms (decreasing/trending downward WBC and/or temperature) at patient discharge.; and treatment failure as no improvement or worsening of pretreatment signs and symptoms, or the need for a change in therapy due to a lack of response. Total number of attempted interventions and total number of accepted interventions (post data only) will also be analyzed. Demographic data will be reported using descriptive statistics. DDD and duration of antibiotic therapy per 1000 patient days will be analyzed using a t test. A 2 proportion test will be utilized to analyze percent of carbapenems that were prescribed appropriately, all cause mortality, resolution of cultures during a single admission, and clinical response (cure/improvement vs. failure). The total duration of all antibiotic therapy will be analyzed using an ANOVA test.

RESEARCH-IN-PROGRESS

1/31/2012
Evaluation of Greater Pharmacy Involvement with Memorial Health University Medical Center’s Heparin Infusion Protocol

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Purpose: Intravenous (IV) heparin administration requires aggressive monitoring due to a narrow therapeutic index and variable inter-patient response to dose. Risk of bleeding complications and high inter-patient variability has placed heparin on the Institute for Safe Medication Practice’s high alert medication list. Patient responses to heparin therapy are monitored using the activated partial thromboplastin time (PTT). Dosing is determined through calculations based on patient weight and PTT value. Adjustment doses are titrated from the PTT. Complicated dosing puts patients at increased risk for complications with IV heparin therapy. This study will evaluate the impact of increased pharmacy involvement with Memorial Health University Medical Center’s (MUMC) IV heparin protocol in regards to percent of PTT within the therapeutic range as well as decreased need for rescue therapy.

Methods: This study is conducted as retrospective electronic medical record review. The patient population consists of adult inpatients admitted to MUMC in the months of July 2011 through January 2012 who are placed on the IV heparin protocol. Patients admitted during the months of July 2011-September 2011 will be compared to patients admitted during November 2011-January 2012. Data collection will include patient demographics, date and time the protocol is ordered, time the loading dose is given, time the infusion rate was started, lab values (platelet count, hemoglobin, hematocrit), the infusion rate adjustments according to PTT levels, therapeutic PTTs, non-therapeutic PTTs, protamine administration, and fresh frozen plasma administration. The primary outcome to be assessed will be percent of PTTs in the therapeutic range versus percent non-therapeutic. Non-therapeutic range will include both supra-therapeutic and sub-therapeutic levels. The patients’ PTT will be drawn per protocol. Secondary outcomes to be analyzed will include protamine administration and hematologic interventions to reverse heparin. Demographic data will be reported using descriptive statistics. A 2-proportion test will be utilized to analyze the primary and secondary outcomes.

RESEARCH-IN-PROGRESS
Comparison of Vancomycin Dose on Troughs in Pediatric Patients
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Purpose: The Infectious Disease Society of America (IDSA) published vancomycin dosing guidelines for the treatment of methicillin-resistant *Staphylococcus aureus* in adults and children in January of 2011. Although the guidelines state that vancomycin dosing information for children is limited and requires more study, IDSA recommends 15mg/kg/day IV every 6 hours (60mg/kg/day) for serious or invasive disease. Studies of vancomycin in pediatric patients support the IDSA dosing recommendations for children. The new recommendations differ from the traditional dosing regimen for children, which is 10mg/kg IV every 6 hours (40mg/kg/day). We believe that most pediatric patients at MUMC are initially dosed with the traditional vancomycin dosing regimen (40 mg/kg/day) and that many patients do not reach their desired vancomycin trough concentration after initiating vancomycin. Furthermore, we believe that initiating traditional dosing in pediatric patients increases the time to therapeutic vancomycin trough concentrations.

The objective of this study is to compare vancomycin dose and its effects on troughs in pediatric patients at Memorial University Medical Center (MUMC). We hope to determine an appropriate daily regimen that will achieve therapeutic levels by the time the first serum trough concentration is drawn. This information should be beneficial for pediatric clinicians and ultimately, we hope to use this information to dose pediatric patients so they achieve vancomycin trough levels in a timely and safe manner.

Methods: A retrospective chart review will be performed to review patients from August 2008 to August 2011. The inclusion criteria for this study is patients ≤ 18 years old and admitted to a pediatric unit at MUMC including patients transferred from non-pediatric units (ex. Adult ER). Any patient receiving dialysis will be excluded from this study. Computer generated lists will be used to identify patients. The primary outcome is to examine the efficacy of initial vancomycin dosing in pediatric patients by comparing the number of patients receiving high dose vs. traditional vancomycin dosing. High dose vancomycin will be defined as ≥50mg/kg/day and traditional dose vancomycin will be defined as <50mg/kg/day. Secondary outcomes will include adverse renal effects, time to therapeutic vancomycin levels, and percentage exhibiting toxicity.
Colony-stimulating Factor Pattern of Use in Prevention of Febrile Neutropenia in Cancer Patients

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Purpose: Colony-stimulating factors are naturally occurring hormones with the ability to enhance production and function of target cells including neutrophilic granulocytes. The purpose of this study is to evaluate the appropriate use of granulocyte-colony stimulating factors (G-CSF) as primary or secondary prophylaxis in patients with febrile neutropenia.

Methods: This study consists of two phases. During phase one, medical records were reviewed for patients admitted with the diagnosis of febrile neutropenia. Data review included febrile neutropenia prophylactic regimen, assessment and monitoring of G-CSF use, length and severity of neutropenia, and length of hospitalization. Phase two involves prospective pharmacist evaluation of chemotherapy regimens with recommendations for primary or secondary febrile neutropenia prophylaxis. Pharmacist review also includes appropriate use of G-CSF. Data from both phases will be compared and utilized to develop a comprehensive febrile neutropenia protocol.

Results: Phase one included 50 patients with febrile neutropenia. Mean length of hospitalization and febrile neutropenia was 6 days and 3 days, respectively. Ninety percent of patients received G-CSFs during hospitalization with 28.9% receiving inappropriate doses. Additional G-CSF doses were administered for 17.8% of patients with an absolute neutrophil count (ANC) > 1000/mm³. G-CSF were used in 85% of patients as primary prophylaxis and 62.5% as secondary prophylaxis.

Conclusion: Preliminary data demonstrates the need for pharmacist involvement in prevention and treatment of febrile neutropenia.
PURPOSE: Alert fatigue has emerged as a key contributor to medication errors and avoidable adverse drug events for users of computerized prescriber order entry (CPOE) systems and clinical decision support (CDS) systems. The primary objective of this study is to define a methodology to review the high-volume alerts being overridden during medication order entry, cross-reference the alerts against established drug information resources to determine clinical significance and make appropriate interventions to improve the quality of alerts in an effort to reduce the risk of alert fatigue. A secondary objective is to create a repository of the modifications made to the pharmacy system so the pharmacy department can maintain a record of the changes. The methodology to be defined could also be used to review medication alerts generated from current or future software systems used throughout the organization.

METHODS: Alert messages were extracted from the pharmacy order entry system and consolidated into a database then grouped by alert type. High-volume alert overrides, represented by the top 50% alert messages per alert type, were cross-referenced against established drug information references to assess their clinical significance. Clinically insignificant alerts were suppressed in the pharmacy system. Surveys were circulated to the pharmacy staff to gauge their level of satisfaction with the alerts, both before and after pharmacy system modifications.

RESULTS: The results of the pharmacy staff survey, before alert modifications, showed that the top two concerns were that there were too many alerts and that alert fatigue is a potential problem. Seven hundred ninety six unique alert messages, representing 48,490 overridden alerts, were reviewed. One hundred seventeen alerts were deemed clinically insignificant, which resulted in the suppression of 22,711 alerts.

CONCLUSION: We have defined a methodology to identify and review high-volume alerts to help minimize the risk of alert fatigue. Implementation of this methodology will need to be repeated periodically so that we can continue to provide our pharmacists with clinically relevant alerts.
Literally Knowing Our Risk: The Early Myocardial Infarction (MI) Check
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Purpose: To research and determine the validity of using the Early MI Check as a tool for medication therapy in lipid management as well as educate pharmacists on the validity of the test.

Methods: Literature review was designed to compile research on the Berkeley HeartLab’s Early MI Check Test. The data collection consisted of past trials involving alterations of the 9p21 chromosome and its relationship with cardiovascular health. Early MI Check research data was initially obtained from the Berkeley HeartLab testing center in Berkeley, California. All research articles reviewed were sited and listed by the Berkeley Heartlab in their testimonial for promoting their test and incorporating the outcomes with standard testing results. Other studies not sponsored by Berkeley HeartLab were obtained by reviewing their journal references and completing an international database search and a search within the American Heart Association Journals. Search criteria were also expanded to a 9p21 cardiovascular risks search in Pub Med and Science Direct databases.

Results: The 9p21 genetic variant carriers consist of approximately 73% of the population with 23% being homozygous carriers, and 50% heterozygous carriers. Studies show the 9p21 homozygous carriers have an MI odds ratio (OR) of 2.02 over non-carriers. Heterozygous 9p21 carriers have an MI OR of 1.49 when compared to non-carriers. OR’s are expanded to coronary heart disease (CHD) with homozygous carriers having an OR of 1.64 and heterozygous carriers having an OR of 1.26. Abdominal aortic aneurism (AAA) showed an OR of 1.21. Early MI hazard ratios were estimated at 19% for homozygous carriers and 14% for heterozygous.

Conclusion: The 9p21 comprehensive cardiovascular biomarker testing has proved effective at detecting associations among carriers and cardiovascular disease events. Studies show the mutation within the 9p21 chromosomal region as a risk indicator for early MI and development of coronary heart disease. Early MI Check test is an assessment that can be useful to potentially provide patients with an individualized risk assessment of having a cardiovascular event. Limitations from these studies included ethnicity among study participants and family history of cardiovascular events. The Early MI Check results do not confirm immunity or guarantee the patient will have an early MI, AAA, or CVD.
Evaluation of a Magnesium Infusion Protocol for Vasospasm Prevention in the Setting of Aneurysmal Subarachnoid Hemorrhage
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Purpose: Since November 1, 2010, Grady Health System (GHS) has piloted a magnesium sulfate infusion (MSI) protocol for prevention of vasospasm in patients presenting with aneurysmal subarachnoid hemorrhage (aSAH). In this protocol, the target serum magnesium concentration is 3 to 4 mg/dL, a range that is supported by safety and efficacy data. The purpose of this study is to assess the performance of the protocol for quality improvement.

Methods: This is a single-center, retrospective, medical record review. The electronic medical record system of GHS, EPIC, is being used to identify patients admitted between November 1, 2010 and March 31, 2012 with aSAH and initiated on the MSI protocol. Patients are excluded if they were on magnesium infusion for indications other than vasospasm prevention and if they were less than 18 years of age. The primary outcome measure is the percentage of serum magnesium levels not within the 3 to 4 mg/dL range. Secondary outcomes relate to safety, efficacy, and compliance with the protocol. All data will be recorded without patient identifiers and maintained confidentially. Descriptive statistics will be used in data analysis.

Results: Demographic data is as follows: median age 55 years; median weight 79.9 kg; ruptured aSAH in 72.7%; coiled aSAH in 72.7%; median Fisher Grade 3; median Hunt & Hess 3; median intensive care unit length of stay (LOS) 15 days. Data relating to the MSI protocol is as follows: 39% of the total Mg levels drawn were out-of-range; median of 6 protocol deviations; median time to target level was 19.32 hours; median rate required to maintain the target level was 0.7465 g/hr; median number of days on magnesium were 11.

Conclusions: Of the serum Mg levels drawn, over a third were out-of-range. Vasospasm occurred in almost a third of the patients. The rate of adverse events paralleled the low rate in clinical trials. In terms of compliance with the protocol since it was initiated, the rate of failure to check magnesium levels has decreased, to check magnesium levels on time has decreased, and to adjust the rate of magnesium infusion was decreasing, but is now on the rise and can be attributed to turnover in the nursing staff.
Metabolic Disturbances Associated with Antipsychotic Use in the Intensive Care Unit
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Purpose: Delirium is a common issue in the intensive care setting, affecting as much as 80% of the patients admitted to the intensive care unit (ICU). Co-morbidities and risk factors, such as age and the use of medications, can predispose a patient to the development of delirium. The recommended drug of choice for the treatment of delirium in the past has been haloperidol. More recently, however, atypical antipsychotics have been considered for the treatment of delirium. Metabolic disturbances are a concern with the administration of these agents. Case reports of patients receiving atypical antipsychotics have revealed that hyperglycemia, in particular, can occur in as little as three days after initiation. Acute elevations in blood glucose levels, defined as ≥180 mg/dL, are of particular concern in the ICU setting due to evidence suggesting that hyperglycemia in critically ill patients is linked to increased mortality and morbidity. The primary objective of this study is to determine the incidence of elevated glucose levels after the administration of atypical antipsychotics in the ICU setting. Secondary objectives for this study are: the incidence of elevated blood pressure readings, elevated triglyceride and cholesterol levels, and increased weight and waist circumference associated with atypical antipsychotics; the incidence of benzodiazepine administration; incidence of patients being discharged out of the ICU on benzodiazepines; the types of atypical antipsychotics prescribed for delirium treatment; and overall length of stay in the ICU.

Methods: A case-controlled, retrospective, observational chart review of patients with delirium before and after administration of antipsychotic medications will be performed. Inclusion criteria for this study include patients who are 18 years of age and older and any patient admitted to the ICU from June 2010 to June 2011 who received an atypical antipsychotic medication for delirium. Exclusion criteria include patients admitted to the ICU who received an antipsychotic medication on an “as needed” schedule and patients with prior antipsychotic use before their ICU stay. The desired sample size for this study will be 50 patients.

RESEARCH-IN-PROGRESS
Learning New Tricks: An Assessment of a Novel Versus Traditional Patient Counseling Strategies
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Purpose: Warfarin is an anticoagulant medication that requires patient counseling to ensure safe, effective use. Typical patient counseling sessions for warfarin address dose, frequency, drug interactions, side effects, and monitoring. In 2010, a warfarin music video was produced and published by a pharmacy faculty member to aid with patient counseling. The musical educational tool was developed to reinforce warfarin counseling points and to aid in long-term memory retention similar to tactics employed by commercial industries (e.g. product jingles, musical lyrics). The purpose of this study is to determine the most effective method(s) for warfarin counseling to improve subject matter retention.

Methods: Enrolled subjects without prior warfarin instruction are randomly assigned to receive warfarin counseling using a novel musical educational tool or traditional methods consisting of verbal education and/or printed reading materials. Upon completion of the counseling session, study subjects complete a questionnaire to assess retention and understanding of warfarin therapy. Possible questionnaire scores range from 100% (mastery of information) to 0% (no understanding) and are tabulated for analysis of the respective counseling techniques to identify the most effective method(s). A sample size of 60 is targeted for inclusion.

RESEARCH-IN-PROGRESS

2/14/2012
Outcomes of Pharmacists Thoroughly Screening Drug Allergy Versus Intolerance Efficiently
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Purpose: Drug allergy is a burden to patients, physicians, and pharmacists and presents a formidable barrier to optimal drug therapy. Often the terminology is inconsistent leading to mislabeling or misinterpretation of intolerance, adverse effect, or even side effect as an allergy. The most common drug allergy is to penicillin but the clinical implications of this documentation in a patient’s chart have wide variability.

The purpose of this study is to determine a true penicillin allergy versus patients at low risk for a reaction. This project serves to utilize pharmacist expertise in patient interview, documentation, and making appropriate recommendations to the intervening clinical staff. The goal is to provide specific, quality information on patient drug allergies versus intolerances versus sensitivities, and the respective reaction and outcome.

Methods: Eligible participants are inpatients of St. Joseph’s/Candler health system with any of the following terms: “penicillin(s)”, “cephalosporin(s)”, or any particular penicillin-containing drug or cephalosporin listed under “allergy” in their electronic medical record. The patient’s drug allergy list will be documented using the “Current Medical Record Reported Allergy Information” section of the assessment tool, then the patient will also be interviewed using the tool.

RESEARCH-IN-PROGRESS

2/14/2012
Comparison of Patient Care Outcomes Before and After Clinical Pharmacist Intervention in an Outpatient HIV Clinic
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**Purpose:** The purpose of this study is to evaluate the reproducibility of previous studies at an HIV clinic in Savannah, GA. The Chatham Care Center currently serves approximately 770 persons with HIV/AIDS, a subset of whom are at risk for non-adherence and non-compliance. There was no clinical pharmacy involvement at the clinic prior to the implementation of this study. The aim is to determine if the participation of a clinical pharmacist improves healthcare outcomes for this patient population.

**Methods:** This study consists of a retrospective and prospective observational chart review from November 2011 through March 2012 at the Chatham Care Center. Clinical pharmacy presence has been available approximately one day per week during the study period, with an expected total duration of approximately 20 weeks. Adherence will be evaluated at the end of the intervention period using the equation \([(pills dispensed/pills prescribed per day)/days between refills]\) x100. Improved compliance, number of office visits, CD4 count and HIV plasma RNA levels will also be evaluated.

**RESEARCH-IN-PROGRESS**

2/14/2012
Comparison of Methicillin-resistant Staphylococcus aureus 
Vancomycin Minimum Inhibitory Concentration 
with Three Diagnostic Methods in a City-wide 
Antimicrobial Management Program

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Purpose: Current guidelines addressing the treatment of methicillin-
resistant Staphylococcus aureus (MRSA) infections suggest 
consideration of agents other than vancomycin when the minimum 
inhibitory concentration (MIC) of this drug is 2 mcg/ml. In practice, this 
suggestion is confounded by differences between methods used to 
determine MIC. Within our city, two systems are used to determine MIC: 
Vitek 2 at St. Joseph's/Candler Health System and Microscan at 
Memorial University Medical Center. Recent studies show another 
vancomycin MIC test, Etest, to be a strong predictor of clinical outcomes. 
There is currently no data in our city comparing MRSA vancomycin MIC 
on Vitek 2, Microscan, and Etest.

Methods: This study will compare vancomycin MIC of MRSA isolates 
obtained from two health systems in a city-wide antimicrobial 
management program. Vancomycin MIC will be determined for 50 
isolates from each health system (100 total) on Vitek 2, Microscan, and 
Etest. An analysis of variance will be conducted to compare the average 
MIC across each of the three testing methodologies. Post hoc mean 
comparisons will be conducted if indicated.

RESEARCH-IN-PROGRESS

2/14/2012
Degradation of Antibiotics via Microwave Irradiation
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Purpose: Antibiotic resistance is of great concern to the medical community. Although it is not the most accepted mechanism of how microbes gain antibiotic resistance, one possibility is that of environmental exposure. Currently, hospitals across the nation have no federal regulations about how to dispose of unused antibiotics. Frequently they are simply discarded down the drain, which leads to our water supply. Some antibiotics, such as beta-lactam antibiotics, are known to be sensitive to heat and light, especially after reconstitution. This experiment is designed to test to see if microwave radiation can be used to degrade different antibiotics.

Methods: Six antibiotics are to be tested: penicillin G, cefazolin, doripenem, tigecycline, gentamicin, vancomycin. The antibiotics are reconstituted and a baseline concentration is established using high-performance liquid chromatography/ultraviolet spectroscopy (HPLC/UV). The individual antibiotics are then irradiated by the microwave for two-minute sequences until ten minutes is reached. Samples are taken and analyzed each time the microwave is paused at the two minute intervals. These analyses compare the ratio of the peak for the antibiotic on the HPLC/UV to the peak of an internal standard, by which a relative concentration can be determined. The overall results will quantitatively show the degradation of each antibiotic over the course of irradiation.

RESEARCH-IN-PROGRESS
Assessment of Pharmacy School Policies Regarding Substance Abuse and Chemical Dependency
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Purpose: Substance abuse and dependence is a significant health problem in the United States, specifically, among healthcare professionals. Schools of pharmacy are responsible for addressing substance abuse in professional curricula and for providing assistance to students, faculty, and staff with addiction and related disorders. The American Association of Colleges of Pharmacy (AACP) set forth guidelines regarding the development and implementation of policies regarding substance abuse and chemical dependency, which were updated in 2010. This research aims to evaluate current AACP guideline adherence among schools of pharmacy and identify areas of improvement.

Methods: A systematic search was completed to identify chemical dependency policies and procedures from all institutional members of AACP. Each policy was evaluated and compared to AACP guidelines for Addiction Related Disorders Policies and rated based adherence to the guidelines. Additionally, an anonymous survey of all AACP institutional members was conducted to assess current policies and attitudes toward these policies.

RESEARCH-IN-PROGRESS

2/15/2012
Purpose: The Infectious Disease Society of America consensus guidelines recommend a vancomycin steady-state trough concentration of 15 - 20 mg/L for complicated infections and greater than 10 mg/L for all other indications. The primary objective of this project is to determine the incidence of achieving therapeutic vancomycin concentrations based on current dosing methods at Emory Healthcare. Two key secondary objectives are to develop a population pharmacokinetic model (POP PK) and then use virtual model simulation to validate the model.

Methods: Institutional Review Boards for both Mercer University and Emory University approved this retrospective medical record review. Subjects admitted to Emory Healthcare between September 1, 2010 and August 31, 2011 who received intravenous vancomycin and had at least one serum trough concentration were included. Subjects receiving renal replacement therapy, those admitted to the intensive care unit, or those less than 18 years old were excluded. Subjects were then stratified by indication as having an aggressive target trough (15 - 20 mg/L) or a conservative target trough (10 - 15 mg/L). Demographics, medical histories, concurrent nephrotoxic medications, laboratory values, and vancomycin regimens were collected. Descriptive statistics were used to determine the incidence of achieving a goal trough concentration with the current dosing methods. A POP PK model will be developed using the dosing, plasma concentration and other correlating data using the NONMEM® software. After model qualification, model simulations will be conducted to understand the incidence of therapeutic levels of vancomycin in virtual subjects.

Results: Of the 209 subjects identified, 191 were included in the study. For the 135 subjects with an aggressive target, 30 subjects (22%) attained their goal. For the 56 subjects with a conservative target, 20 subjects (36%) achieved their goal. This results in an overall total of 50 subjects (29%) at - goal. For the 78 subjects with two or more troughs, only four subjects (5%) achieved both troughs in the target range. Development of the POP PK model is ongoing.

Conclusion: This study demonstrates a modest likelihood of achieving target trough concentrations with the current vancomycin dosing methods. The development of a POP PK may become a useful tool to improve vancomycin dosing.

2/15/2012
Retrospective Chart Review of Non-critical Care Patients Hospitalized for Acute COPD Exacerbation: Focus on Antibiotic Usage

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Purpose: To assess physician practices in our institution regarding antibiotic usage and the potential for pharmacist intervention for patients experiencing an acute exacerbation of COPD and compare these to current guidelines for treatment. Patients treated with antibiotics will be assessed for the three cardinal symptoms of acute exacerbation: increased cough, increased sputum, and increased sputum purulence in conjunction with factors determining a simple versus complicated case. Additionally, patients with multiple admissions and any positive culture data will be assessed for increases in the Minimum Inhibitory Concentrations. Increasing resistance is a colossal problem and with the information gathered by this study, guidelines for antibiotic use in this population will be developed.

Methods: A retrospective chart review will be conducted on any patient ≥ 18 years of age with an admission diagnosis of acute exacerbation of COPD admitted to a medical/surgical floor from 10/1/2008 through 9/29/2011. Any patient with any other primary admission diagnosis will be excluded as well as patients admitted to intensive care units or at any time diagnosed with infiltrates on chest x-ray, asthma exacerbation, pneumonia, or pulmonary embolism. Patients with any prior admission for acute exacerbation in the previous 5 years (since 2006) with any positive culture data will be evaluated for increases in minimum inhibitory concentrations.

RESEARCH-IN-PROGRESS

2/16/2012
Dabigatran Usage at St. Joseph’s/Candler Health System Anticoagulation Clinic
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**Purpose:** The recent approval of dabigatran for non-valvular atrial fibrillation has been much anticipated by some clinicians as it is thought to provide a convenient alternative to warfarin for select patients in need of oral anticoagulant therapy. The RE-LY trial showed warfarin naïve patients given renally dosed dabigatran had better outcomes in stroke prevention rates compared to those on warfarin. However, dabigatran was linked to increased rates of major gastrointestinal bleeds and demonstrated increased overall bleeding in patients over 75. The purpose of this study was to assess aspects of the use of dabigatran, including indications, contraindications, adverse effects, and dosing, and furthermore to determine the factors contributing to the initiation and subsequent discontinuation of dabigatran.

**Methods:** A retrospective chart review was conducted of all patients at the St Joseph’s Candler Health System Anticoagulation Clinic who were initiated on dabigatran from November 2010 through June 2011.

**Results:** Of 58 patients in the study, 13 (22%) discontinued dabigatran. Reasons for discontinuation included gastrointestinal bleeds (39%), rash (23%), cost concern (23%), concurrent diagnosis of prostate cancer (8%), and unreported reasons (8%). Ten discontinued due to adverse effects ((P=0.0002). The mean age was not statistically different between the patients who discontinued and those who did not. A majority of patients (51, 88%) were initiated on dabigatran for the primary indication of atrial fibrillation. Dosing of dabigatran was based on recent estimated creatinine clearance values (defined as eight weeks before initiation) in 6 of 58 patients. No renal function data, the sole dosing determinant, was available for 23 patients.

**Conclusion:** Discontinuation of dabigatran in this study is a statistically and clinically significant finding as it can be attributed to the adverse effects of dabigatran resulting from inappropriate patient selection and dosing. Therefore, more emphasis needs to be placed on the importance of renal dosing and consideration of patient age and past medical history, particularly bleed risk and primary indication for dabigatran therapy. Educating clinicians is imperative in order to improve patient outcomes.
Enhancing the Integrated Pharmacy Skills Laboratory Series
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Purpose: To utilize the post Intermediate Pharmacy Practice Experience (IPPE) student surveys to enhance the Integrated Pharmacy Skills Laboratory (IPSL) series.

Methods: The Integrated Pharmacy Skills Laboratory series is designed to integrate didactic learning with practical “hands on” laboratory experiences in preparation for the pharmacy students’ Intermediate Pharmacy Practice Experience. The skills gained in the Integrated Pharmacy Skills Laboratory courses should correlate with the skills required at a given IPPE rotation site. The investigators hope to correlate and analyze what experiences gave the 2010 student practical preparation for the workplace and what skills were not demonstrated during their IPPE in order to improve the IPSL series for the Class of 2011 A student survey was administered to the Class of 2010 and the Class of 2011 after returning from their IPPE. The survey consisted of 20 questions to provide data on the students’ perceived knowledge relative to the skills taught during the IPSL series.

Results: A five point Likert scale was used for the survey question responses. Response options included strongly agree, agree, disagree, strongly disagree, and not applicable. Ninety-three percent of the students in the Class of 2010 participated in the survey and fifty-three percent of the students in the Class of 2011 participated. After reviewing the Class of 2010 survey results, modifications were made to the enhance IPSL series. In the resulting Class of 2011 survey, the rating average improved in each of the survey questions.

Conclusion: Although no statistical significance was noted between the rating averages of the surveys for the Class of 2010 and Class of 2011, modifications were made to the IPSL series and an improvement was noted in the rating averages for all questions asked.

12/12/2011
Purpose: Prescription opioid analgesics play an important role in the management of moderate to severe pain. An unintended consequence of these agents is the nonmedical use of prescription pain relievers. In 2008, nonmedical use of pain relievers among persons aged 12 years or older was second only to marijuana in the U.S. We describe the rates of abuse, misuse, and diversion of tapentadol immediate release (CII) for the 18 months following launch in 2009.

Methods: The RADARS® System measures rates of abuse, misuse and diversion throughout the U.S. Data from the Drug Diversion, Survey of Key Informants Patients (SKIP), Poison Center, and Opioid Treatment Programs were analyzed to compare rates for tapentadol with other opioid analgesics from June 2009 through December 2010, utilizing both per 100,000 population (POP) and per 1,000 Unique Recipients of Dispensed Drug (URDD) as denominators.

Results: Based on data from the SKIP program from June 2009 to December 2010, non-medical use rates for tapentadol fluctuated between 0 and 0.572 per 1,000 people who filled a prescription (URDD) and 0 and 0.015 per 100,000 population (POP), reflecting non-significant changes over time (p=0.816 and p=0.867, respectively). Data from Poison Centers, Outpatient Treatment Programs, and Drug Diversion programs also showed similar non-significant trends in population and exposure rates (all p-values >0.05) during the observation period.

Conclusion: Since product launch, rates of abuse, misuse, and diversion of tapentadol have been low; however, continued monitoring of trends in the data is warranted.

2/21/2012
Trends in Non-Medical Use of Tapentadol Immediate Release by College Students

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Purpose: Prescription opioid analgesics play an important role in the management of moderate to severe pain. An unintended consequence of these agents is nonmedical use. In 2008, the prevalence of nonmedical use of pain relievers among persons aged 12 years or older was second only to marijuana in the U.S. We describe the rates and methods of non-medical use of tapentadol immediate release (CII) among college students following FDA approval in 2009.

Methods: The RADARS® System College Survey Program is an online questionnaire collecting data from approximately 2000 self-identified college-aged students throughout the US administered during the spring, summer, and fall terms. Responses were analyzed for trends in the rate and method of non-medical use of tapentadol compared with other opioid analgesics from June 2009 through March 2011.

Results: Non-medical use of tapentadol was highest in fourth quarter (4Q) 2009 (0.66 per 1,000 people who filled a prescription) and significantly decreased in the 4 subsequent survey periods (p≤0.001). Similarly, non-medical use per 100,000 population rate was highest in 4Q 2009 (0.013 per 100,000 population) and decreased, although not significantly to 0.004 in 1Q 2011 (p=0.22). The primary method of nonmedical use of tapentadol among college students is oral/transmucosal (78%) followed by inhalation and injection.

Conclusion: Since launch, rates of non-medical use of tapentadol by college students were low and are decreasing over time. The initial levels of reported non-medical use may represent a brief period of experimentation after introduction.