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ORIGINAL RESEARCH

ADR/Drug Interactions


PURPOSE: In July, 2006, the U.S. Food and Drug Administration warned patients and healthcare professionals to be aware that use of a triptan in combination with an SSRI or an SNRI may result in a potentially life-threatening problem known as serotonin syndrome. The objective of this study was to discern the prevalence of concomitant use of a triptan and a selective serotonin reuptake inhibitor (SSRI) or a selective serotonin/norepinephrine reuptake inhibitor (SNRI) in the U.S.

METHODS: We used weighted data from the U.S. National Ambulatory Medical Care Survey for years 2003, and 2004, to derive national estimates of the number of office-based visits documenting concomitant use of a triptan and an SSRI or an SNRI.

RESULTS: During the time-frame 2003-04, an annualized mean of 3,874,367 patients were prescribed a triptan, and 50,402,149 patients were prescribed an SSRI or an SNRI. An annualized mean of 694,276 patients were simultaneously prescribed or continued use of a triptan along with an SSRI or SNRI.

CONCLUSIONS: Our study documents that 1.3% of patients prescribed a triptan or an SSRI or an SNRI were prescribed the potentially fatal combination. While this is a small fraction overall, the actual number of patients on a nationwide basis is significant (n = 694,276).

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2. Evaluating the incidence of serotonin toxicity related to the use of linezolid in a community hospital: an evaluation of linezolid and concomitant serotoninergic agents (ELSA). Dana L. Lorenz, Pharm.D., Arti Bhavsar, Pharm.D.; Florida Hospital, Orlando, FL.

BACKGROUND: Linezolid (Zyvox®) is similar in structure to monoamine oxidase inhibitors (MAOIs) and demonstrates weak reversible monoamine oxidase A and B inhibitory effects. The administration of MAOIs with serotoninergic agents is associated with serotonin syndrome. There is ongoing controversy regarding the significance of the drug-drug interaction between linezolid and concomitant serotoninergic agents.

OBJECTIVES: The purpose of this study is to evaluate the incidence of serotonin toxicity related to the drug-drug interaction between linezolid and concomitant serotoninergic agents in the community hospital setting.

METHODS: A twelve month retrospective chart review was conducted on 30 patients greater than 18 years of age who were prescribed either a selective serotonin reuptake inhibitor (SSRI) or a serotonin-norepinephrine reuptake inhibitor (SNRI) and linezolid during the same admission. Patients were identified by means of drug utilization reports. Charts were reviewed for any signs or symptoms of serotonin toxicity as defined by the Hunter Serotonin Toxicity Criteria Decision Rules; a standard method of patient evaluation.

RESULTS: No patients meet the criteria for a diagnosis of serotonin syndrome.

CONCLUSION: Linezolid may be used concurrently with an SSRI or SNRI with careful monitoring for the signs and symptoms of serotonin syndrome.

PURPOSE: The field of anti-aging pharmacology is expanding and we need model systems and pharmacological assays for time efficient and cost-effective screening of anti-aging compounds. There are a number of potential compounds and pathways that can arise in such research programs. Using Drosophila as our model organism, we developed and validated pharmacological assays to evaluate the impact of such compounds on the mortality rate, life span, and the confounds of aging.

METHODS: The impact of four Chinese herbbals, Lu Duo Wei (LDW), Bu Zhong Yi Qi Tang (BZQT), San Zhu Pian (SZP), Three Imperial Mushrooms), Hong Jing Tian (Rhodiola) on the mortality rate and life span were evaluated. Compounds that resulted in a decrease in mortality rate were assayed for their impact on other confounds of life span extension such as fecundity, metabolic rate, and diet.

RESULTS: Only Rhodiola fed flies exhibited decelerated aging. The observed extension in life span was associated with no reduction in fecundity and in metabolic rate. Since the anti-aging effects of Rhodiola was not dependent on dietary manipulation, Rhodiola does not act as a mere dietary restriction mimetic.

CONCLUSION: While this study does not reveal the causal mechanism behind the effect of Rhodiola, it does suggest that this botanical compound is worthy of continued investigation.

Cardiovascular

6. Root cause analysis for patients with acute coronary syndrome (ACS) experiencing a Major Bleed. Sharan Lail, BSc, Phm, Kertland Heather, Pharm.D.; Jeffrey Jana, BScN, Bhojwani Ramola, Pharm.D.; David Frischetti, M.D.; St. Michael’s Hospital, Toronto, ON, Canada.

BACKGROUND: While root cause analysis (RCA) has traditionally been used to investigate sentinel events, it has also been used to study causative factors relating to serious adverse events. In the treatment of ACS, patients who experience a bleeding event have an increase in 30 day mortality, and we used RCA to identify the root causes of bleeding related to the processes and delivery of patient care.

METHODS: Patients admitted to the Coronary Care Unit from June 2005 to 2008 with ACS experiencing a TIMI major or GUSTO severe/life threatening bleed were identified through hospital databases. Patient charts were retrospectively reviewed, and a timeline of events created for evaluation. Root causes contributing to bleeding were organized into 6 categories: communication, training, scheduling, environment, policies/procedures, and barriers. In each case, findings were validated by a multidisciplinary team consisting of a nurse, pharmacist and cardiologist.

RESULTS: Eight patients experiencing a major bleed were reviewed. Each patient had multiple pre-existing risk factors such as: elderly, female, and renal insufficiency. Factors contributing to bleeding were related to staff training (e.g., pre-printed physician orders not used), medication reconciliation (e.g., no record of loading dose administration at transferring institution or time of last drug administration), and inappropriate medication dosing and combination of drugs on admission (e.g., excessive dosing at a transferring facility). An overall theme of vulnerability during the time of transfer, both from another hospital and within the hospital, was determined. In particular, lack of adequate information for patient assessment and furthermore reevaluation of medications having not taken place.

CONCLUSIONS: In addition to pre-determined risk factors, RCA identified factors related to the processes surrounding health care delivery which should be addressed to minimize the risk of bleeding. These identified factors should be systematically corrected and policies put in place with a process for re-evaluation.

7E. Impact of thienopyridines on re-operation rates, bleeding outcomes and hospitalization in ACS patients requiring CABG surgery. Carla B. Frye, Pharm.D., Jeffrey Berger, M.D.; St. Michael’s Hospital, Toronto, ON, Canada.

METHODS: Thirty-four patients (22 female/12 male) were identified as having previously intolerance to a statin (rosuvastatin) is dosed once weekly in patients with a previous statin intolerance. METHODS: Approximately 1300 medical records in a lipid-specialty clinic were reviewed to identify patients that received rosuvastatin once weekly who previously had experienced a statin intolerance. Documentation of past medical history, demographic data, concomitant lipid-altering agents, lipid profiles immediately before and upon first follow-up with rosuvastatin weekly, was collected. Patients were excluded if other substantial changes were made in their lipid-altering regimen or length of therapy was < 4 weeks.

RESULTS: Thirty-four patients (22 female/12 male) were identified as having received rosuvastatin once weekly with 27% (79%) tolerating the regimen. Common previous statin intolerances included myalgias (23.68%) and increased liver function tests (16.2%). The mean dosage of rosuvastatin was 9.9 ± 4.3 mg once weekly (range 2.5 to 20 mg). For those patients that tolerated the new regimen overall mean changes from baseline to follow-up (mean 3.6 ± 1.5 months) were noted for TC (241 vs 199 mg/dL ±48.9; -17%; p<0.001), LDL-C (160 vs 123 mg/dL ±33.5; -25%; p<0.001), HLC-L (48 ± 51 mg/dL ±11.1; +6.4%; NS), triglycerides (150 vs 138 mg/dL ±9.7; -8%; NS), TC/HDL (5.3 vs 4.1 ±4.4; -23%; p<0.001) and LDL/HDL (3.7 vs 2.7 ±9.4; -27%; p<0.001).

CONCLUSIONS: Nearly 80% of patients previously intolerant to a statin tolerated the rosuvastatin once weekly regimen. This group experienced significant improvements in TC, LDL-C, TC/HDL and LDL/HDL ratios. The once weekly dosing strategy may be an important option for statin-intolerant patients requiring substantial LDL-C reductions.


PURPOSE: The CardioWest™ temporary total artificial heart (TAH-t) has emerged as an effective bridge to transplantation for individuals with biventricular failure. After implantation, a multi-drug approach minimizes thromboembolism and hemorrhagic complications, including aspirin, dipyridamole, pentoxifylline, low dose unfractionated heparin (UFH), and warfarin. A concern with UFH is heparin-dependent antibodies, which develop in up to 50% of patients receiving the drug as part of cardiopulmonary bypass. The risk of heparin-induced thrombocytopenia is 1% to 3% if UFH is continued post-operatively. Small investigations demonstrate bivalirudin (bolus 0.75 to 1 mg/kg, then 1.75 to 2.5 mg/kg/hour) is an effective alternative to UFH during coronary artery bypass surgery and/or valve replacement. The goal of this investigation is to evaluate the use and dosing of bivalirudin as an alternative to low-dose UFH after TAH-t implantation.
METHODS: This retrospective case series examines bivalirudin after TAH-t implantation. Treatment was initiated at the discretion of the treating physician and principally adjusted based on thromboelastography. Additional related monitoring included activated partial thromboplastin time, prothrombin time, international normalized ratio, fibrinogen, d-dimer, platelet count, hemoglobin, hematocrit, and platelet aggregation studies. Bivalirudin continued until successful warfarin implementation.

RESULTS: Forty-two patients received bivalirudin in addition to aspirin, dipryramidole, pentoxifylline, and warfarin. Bivalirudin started at 0.005 mg/kg/hr and it maintained normocoagulability, without concomitant warfarin, within the dosage range of 0.01 to 0.02 mg/kg/hr. TAH-t implantation took place for 41.5 days (range 23–61 days) and bivalirudin continued for 16.8 days (range 7–24 days). All patients successfully transitioned to warfarin.

CONCLUSIONS: Low dose bivalirudin, as an alternative to UFH, maintained normocoagulability after TAH-t implantation. Further investigation is warranted to better define the role of bivalirudin in this situation.

10. Safety and efficacy of nurse-driven heparin dosing protocols. Todd Miano, Pharm.D., Katy Hanzelka, Pharm.D., Regina Schomberg, Pharm.D., Jennifer Noped, Pharm.D.; Wake Forest University Baptist Medical Center, Winston-Salem, NC.

PURPOSE: Our institution uses four nurse-driven heparin protocols. Dosing differs between protocols based upon indication. This study assessed the safety and efficacy of these protocols.

METHODS: Dosing regimens were as follows: Protocol 1: 80unit/kg bolus, 18unit/kg infusion; Protocol 2: 60 unit/kg bolus, 12 unit/kg infusion; Protocol 3: 18unit/kg infusion; Protocol 4: 12 unit/kg infusion. Heparin dosages, aPTT values, and bleeding episodes were documented. Variables collected to assess influence on protocol success include: age, weight, time between aPTT measurements, and nursing flowsheet documentation rate. Primary outcome was the percentage of patients at goal aPTT within 24hrs.

RESULTS: Data was collected on 150 patients between November 2007 and March 2008. Thirty-two percent of patients were therapeutic within 24 hrs. Median time to goal aPTT was 28.3 hrs. Protocols 1 and 2 were more likely to produce supratherapeutic aPTT values (75% and 60%, respectively) vs. Protocols 2 and 4 (44% and 24%, respectively), p<0.05. Protocol 1 patients > 65 yrs had a longer time to goal vs. patients < 65 years (42 hrs vs. 2 6hrs, p<0.05) and had more supratherapeutic aPTT values within 24 hrs (65.9% vs. 37.3%, p<0.05). In Protocol 2 there was a non-significant difference in time to goal aPTT between patients > 65 years vs. patients < 65 years (69 hrs vs. 38 hrs, p<0.05), and number of supratherapeutic values (26.8% vs. 20.8%, p<0.05). Patients therapeutic within 24hrs had higher nursing flowsheet documentation rates vs. non-therapeutic patients (92% vs. 83%, p<0.05). Time to goal was not different for patients <125 kg vs. patients >125 kg (27 hrs vs. 36.3 hrs, p<0.05). Heparin was discontinued because of bleeding in 7.3% of patients, and did not differ between protocols.

CONCLUSION: The design of heparin protocols should consider patient age, initial infusion rate, and should employ measures to ensure nursing adherence.

Critical Care

11. Analysis of corticosteroid use in patients with sepsis admitted to an urban academic medical center. Teresa A. Cavanaugh, Pharm.D.1, Lauren M. Gantzer, Pharm.D.2, Neil E. Ernst, Pharm.D.1, Eric W. Mueller, Pharm.D.1, (1)Wilmk College of Pharmacy, University of Cincinnati, Cincinnati, OH; (2)The University Hospital, Cincinnati, OH.

PURPOSE: Controversy persists regarding the accurate identification of relative adrenal insufficiency (RAI) in septic shock patients. Given suspected variability at our institution, this study was performed to assess the processes of care related to the diagnosis of RAI and associated outcomes of management with corticosteroids (CS).

METHODS: Patients with septic shock admitted to The University Hospital between September 1, 2005 and December 31, 2006 were reviewed. CS use and total cortisol concentrations were assessed. RAI was defined as either an ACTH-induced cortisol change ≤4 µg/dL or a random cortisol <25 µg/dL. Evaluation of RAI, and patient outcome measures, and nursing flowsheet documentation rate. Primary outcome was the percentage of patients at goal aPTT within 24hrs.

RESULTS: Baseline demographics were similar in the PRE (n=54) and POST (n=52) groups, except for age (PRE 63 years vs POST 54 years, p<0.02) and warfarin therapy prior to admit (PRE 54% vs POST 31%, p<0.02). Patients received rFVIIa for traumatic injuries, EDH, SDH, ICH, neurosurgical procedures or bleeding complications. PRE patients received a mean rFVIIa dose of 61 µg/kg as compared to 49 µg/kg in the POST group (p<0.006). Patients were more likely to receive rFVIIa within 4 hours of injury in the POST group (PRE = 11% vs POST 31%; p<0.01). Surgical interventions occurred in 67% of PRE and 60% of POST patients. The incidence of thromboembolic events was 13% in the PRE group and 10% in the POST group (p=0.8). There was no statistical difference in mortality (PRE 24% vs POST 17%, p=0.4). A cost savings of $975 per patient and an estimated annual cost savings of $49,000 (per 30 patients) were achieved after guideline implementation.

CONCLUSION: Implementation of rFVIIa guidelines for NSICU patients decreased the mean rFVIIa dose per patient by 12 µg/kg and improved utilization patterns, without worsening clinical outcomes. Guideline implementation was also associated with a cost savings of approximately $50,000 annually.


13. Prospective, randomized comparison of lansoprazole suspension and intermittent intravenous famotidine on gastric pH and acid production in critically ill neurological patients. Gretchen M. Brophy, Pharm.D.; VCU Medical College of Virginia, Richmond, VA; (2)Shenandoah University School of Pharmacy, Winchester, VA.

PURPOSE: There is a paucity of studies comparing stress ulcer prophylaxis (SUP) agents in high risk neurological patients. We hypothesize a lansoprazole (LAN) and famotidine (FAM) are equally effective in controlling gastric pH and acid secretion in this population.

METHODS: Patient inclusion criteria were baseline gastric pH ≤4 and a risk factor for stress related mucosal damage (SRMD). Patients were randomized to receive LAN 30 mg suspension (apple juice or 8.4% NaHCO3) via NG/NJ tube daily or FAM 20mg IV q12h. Gastric pH and residual volumes were recorded 5 times daily for 3 days and adverse events were monitored for 7 days after ICU admission.

RESULTS: Between August 1999 and April 2005, 51 ICU patients were randomized to LAN (n = 28) or FAM (n = 23) and received SUP for ≥3 days. Baseline demographics were similar. All patients had at least 2 risk factors for SRMD and 75% had a baseline GCS ≤9. On day 1, more FAM patients had a gastric pH > 4 at least 80% of the time as compared LAN patients (74% vs 36%, p=0.01, respectively); however, there was no difference on days 2 and 3. Multivariate regression analysis determined that enteral feedings on day 1 predicted a pH > 4 (p=0.01). Gastric residual volumes were ≤2 ml in ≤70% of patients in both groups (FAM vs LAN p=0.38), H2 aspirates were present in 18-39% of patients (p=NS); one patient receiving FAM met criteria for overt bleeding. The incidence of thrombocytopenia was 17% (FAM) and 4% (LAN)(p=NS).

CONCLUSION: Neurosurgery ICU patients receiving FAM for SUP achieved a gastric pH >4 more often than LAN treated patients, but only on day 1 of the 3 day study period. Both agents were equally effective in reducing gastric acid production. There was no difference in the incidence of acute SRMD and thrombocytopenia.
ACCP 2008 SPRING FORUM ABSTRACTS

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Presented at the Society of Critical Care Medicine's 37th Critical Care Congress, Honolulu, Hawaii, February 2-6, 2008.

14E. Critically ill patients with multiple comorbidities are more likely to receive an antihypertensive stimulating agent in clinical practice. Gretchen M. Brophy, Pharm.D., Spencer E Harpe, Pharm.D., Ph.D., Michael A Pyles, Ph.D.; VCU Medical College of Virginia, Richmond, VA.

Purpose: There are a lack of data on the clinical differences in critically ill patients who received an erythropoietin stimulating agent (ESA) and those who did not receive an ESA during hospitalization. We hypothesized that critically ill patients who received an ESA have more comorbidities than those who did not receive an ESA.

Methods: This is a retrospective database study of adult ICU patients admitted to the ICU for ≥ 3 days. Patients with cancer or who received dialysis were excluded. Administrative discharge data were abstracted from the Solucient® ACTracker® database. A p-value < 0.01 was considered statistically significant.

Results: Between January 2003 and December 2005, 923,043 patients were identified for study inclusion, of which 47,501 patients received an ESA. Patients who received an ESA had the following statistically significant differences (p<0.01) as compared to those patients who did not receive an ESA, respectively: severity of illness classified as “catastrophic” (20% vs 12%), mean ICU LOS (14 vs 6 days), mean hospital LOS (21 vs 9 days), RBC transfusion before ICU admission (16% vs 1%), sepsis (24% vs 7%), GI bleed (6% vs 10%), acute renal failure (36% vs 9%), and mechanical ventilation (37% vs 17%). By study day 30, 9.2% of ESA patients and 2.9% of patients who did not receive an ESA received a RBC transfusion (OR 3.4 [95% CI 3.3, 3.6]).

Conclusions: Critically ill patients who received an ESA after ICU admission had more comorbidities during hospitalization than those who did not receive an ESA. This study suggests that ESAs are prescribed for severely ill ICU patients in clinical practice.

Presented at the Society of Critical Care Medicine's 37th Critical Care Congress, Honolulu, Hawaii, February 2-6, 2008.

15E. Effects of nitroprusside on intracranial pressure and correlation with outcomes in patients with hemorrhagic stroke. Jason Trimble, Pharm.D., Spencer E Harpe, Pharm.D., Ph.D., Gretchen M. Brophy, Pharm.D., Ph.D.(1)Sharp Memorial Hospital, San Diego, CA; (2)VCU Medical College of Virginia, Richmond, VA.

Purpose: This study evaluates the effects of nitroprusside on intracranial pressure (ICP) in hemorrhagic stroke patients during nitroprusside infusions. This study also describes the outcomes (Glasgow Coma Scale scores and in-hospital mortality rates) of hemorrhagic stroke patients receiving nitroprusside.

Methods: A retrospective analysis of the effects of nitroprusside on ICP in patients with intracranial hemorrhage stroke. Data were collected from hemorrhagic stroke patients who received a dose of nitroprusside at the Virginia Commonwealth University Medical Center from January 1st, 2004 to December 31st, 2005. Patients at least 18 years old were eligible for inclusion if they had all of the following: hemorrhagic stroke; nitroprusside (> 1 day) for the management of hypertension; ventriculostomy for ICP monitoring; and an intra-arterial line for MAP monitoring. Parametric techniques were used to compare the effects on ICP between patients with a GCS of ≤ 10 and > 10.

Results: Eleven patients met the inclusion criteria and their medical records were reviewed. An increase in ICP > 50% was observed at least once in 90.9% of the patients receiving nitroprusside in the first 72 hours of therapy, but the mean time the ICP increased > 50% was only 0.4 to 1.6 hours per day. In addition, the increase in ICP > 50% appears to correlate with higher than recommended dosage adjustments (0.8 - 0.9 µg/kg/min vs > 23 µg/kg/min increments). Elevations in ICP > 50% did not correlate with poor outcomes (GCS ≤ 10 or mortality).

Conclusion: In this study, increases in ICP > 50% occurred with dosage adjustments of nitroprusside in a majority of patients; however, these increases were not sustained. ICP changes did not correlate with poor outcomes, as measured by discharge GCS or mortality. When appropriate dosage adjustments were made, clinically significant changes in ICP were minimized in these hemorrhagic stroke patients.

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16E. National survey of acute hypertension management. Joseph Dasta, M.S., Jessica Benson, Pharm.D., Anthony Gerlach, Pharm.D.; The Ohio State University, Columbus, OH.

Purpose: National practice guidelines do not exist for the overall treatment of acute hypertension (AH) in the critically ill. One of the firsts in AH guideline development is to document the current usage of intravenous (IV) antihypertensives in the pharmacotherapy of AH.

Methods: An email to participate in this 27-question, web-based survey was sent to 4204 intensivist members of four sections of the Society of Critical Care Medicine. The survey, which requested responses concerning the individual physician’s preferences in their ICU, opened February 6, 2007, and closed May 11, 2007. A survey was excluded if it was less than 75% completed from a pediatric ICU, or was from respondents not in practice.

Results: Two hundred forty three (5.8%) responses were returned; 9 were excluded. The most common practice setting (48.5%) was a mixed-population ICU. Respondents estimated that 49 ± 6.8 (mean ± SD) patients were admitted to their ICU per month with hypertensive emergencies. Sixty-one (26.6%) respondents reported a guideline exists in their institution for the treatment of HE in acute hemorrhagic stroke (AHS), while only 24 (10.3%) had guidelines for the non-stroke (NS) patient. Systolic blood pressures used to initiate IV antihypertensives were 180.92 ± 21.84 and 167.2 ± 22.2 in NS and AHS patients, respectively. The most common duration of IV therapy was 24–48 hours in both populations. Intermittent IV labetalol (21.3%), nicardipine (19.6%), and sodium nitroprusside (18.7%) were the top five drugs of choice for AH patients, while nicardipine (34.7%), continuous IV labetalol (21.0%), and sodium nitroprusside (16.4%) were selected in AHS patients. Seventy-four respondents (32.3%) have seen a symptomatic patient with cyanide/thiocyanate toxicity receiving sodium nitroprusside.

Conclusions: Because most institutions do not have HE guidelines in place, the data described herein regarding the pharmacotherapy of AH provides the rationale for developing a national guideline.

Presented at the Society of Critical Care Medicine's 37th Critical Care Congress, Honolulu, HI, February 2-6, 2008.

17. Recombinant factor VIIa (rFVIIa) protocol for massive traumatic hemorrhage (MTH): Experience at a community-based level one trauma center. Scott A. Chapman, Pharm.D.1, Leslie Becker, R.N.2, Melissa Thorsen, M.S., R.N.1, Kevin Croston, M.D.1, Nichole Kulinski, Pharm.D.1, R. Todd Burkhardt, Pharm.D.1, Jeffrey G. Chipman, M.D.1, (1)North Memorial Medical Center Department of Pharmacy and University of Minnesota College of Pharmacy, Minneapolis, MN; (2)North Trauma Institute, Robbinsdale, MN; (3)North Memorial Medical Center Department of Pharmacy Services, Robbinsdale, MN.

Background: Metabolic acidosis, hemodilution, and hypothermia in MTH can result in severe coagulopathy. rFVIIa can reduce transfusions, improve coagulation, and assist hemostasis. Protocols for rFVIIa in MTH may conserve rFVIIa utilization costs.

Purpose: To evaluate the effectiveness of a protocol for rFVIIa utilization in MTH. To compare blood and blood product (B/BP) use and coagulation parameters before and after rFVIIa.

Methods: The protocol requires the trauma surgeon to request rFVIIa 90 µg/kg IV for trauma patients (TP) with MTH if hemostasis is not achieved after massive transfusion of B/BP. rFVIIa dose is repeated once if hemostasis is not achieved after the first dose. Two trauma nurses and a critical care pharmacist retrospectively review all trauma-related rFVIIa cases. Coagulation parameters and B/BP before and after rFVIIa are collected. Each case is also reviewed by the multidisciplinary trauma peer review committee. Wisconsin rank sum was used for comparison of coagulation parameters and B/BP before and after rFVIIa. Data are presented as mean(SD).

Results: From 6/05–6/07, 13 TP received rFVIIa. One TP excluded received rFVIIa for ICH. Eleven of 12 patients included (92%) had MTH. Seventy-five rFVIIa doses [69 (162)] µg/kg/dose were administered (1.4 doses/pt) at a cost of 59071 (53417)pt. One patient received a third dose of rFVIIa two days after the initial dose. Coagulation parameters before and after rFVIIa were PT 22.5 (8.6) vs. 12.4 (1.8) sec., (n = 11) p=0.004; INR 2.3 (1.2) vs. 1.1 (0.1), (n = 10) p=0.008; and fibrinogen 99 (35) vs. 165(34) mg/dl, (n=8) p=0.008. RBC and FFP units before and after rFVIIa were 21.1 (16.1) vs.10.0 (11.0) p=0.004 and 7.3 (6.6), p=0.055, respectively. There was no difference in platelet or cryoprerequisites transfusions. Eight (67%) of 12 patients survived.

Conclusion: Our protocol and multidisciplinary oversight effectively conserve the use of rFVIIa for TP with MTH. Coagulation parameters were improved and B/BP transfusions decreased after rFVIIa.

18. Comparison of dexmedetomidine versus fentanyl plus midazolam for perioperative sedation in patients undergoing isolated coronary artery bypass graft (CABG) surgery. Katie E. Ronald, Ph.D., Michelle Bretz, Pharm.D., BCP5, Radhika Devraj, Ph.D.; (1)Southern Illinois University Edwardsville School of Pharmacy, Edwardsville, IL; (2)St. Joseph's Hospital, Marshall, WI.

Purpose: To evaluate clinical and economic impacts of changing the standard sedation regimen used for isolated CABG surgery from fentanyl plus midazolam to dexmedetomidine.

Methods: This was a single-center, retrospective study of patients > 18 years old who had isolated CABG surgeries. The control group (n = 106) received fentanyl plus midazolam as the standard sedation regimen between January 1st and March 31st of 2004 while the comparison group (n = 93) received dexmedetomidine as the standard sedation regimen between January 1st and March 31st of 2006.

Results: In the final analysis, 184 of 199 patients were included. Two patients in the control group and 13 patients in the comparison group were excluded. Early extubation (< 6 hours after surgery) was significantly higher...
in the dexmedetomidine group (71.2% vs. 37.5%, p<0.001) as compared to the control group without significant increases in reintubation rates (p=0.82). Also, a significant decrease was observed in the dexmedetomidine group for initial ventilator hours (6.7 vs 19.6 hrs, p=0.038) and initial intensive care unit (ICU) hours (37.1 vs 65.6 hrs, p=0.010) as compared to the control group, but there were no significant differences for total ventilator hours (p=0.218), total ICU hours (p=0.085) or post-operative length of stay (p=0.582) between the groups. A significant increase in atrial fibrillation (30% vs 14.4%, p=0.010) and cerebral vascular accident (3.8% vs 0%, p=0.046) was observed in the dexmedetomidine group. There were no significant differences between the two groups in total hospital costs (p=0.30) or total pharmacy costs (p=0.524).

CONCLUSIONS: Dexmedetomidine did not provide a significant reduction in the total ventilator or ICU hours, post-operative length of stay, or total hospital and pharmacy costs. This may be attributed to higher rates of atrial fibrillation in the dexmedetomidine group. However, dexmedetomidine did facilitate higher rates of early extubation and decreased initial ventilator and ICU hours without any significant increases in reintubation rates.

19. Vasopressin or norepinephrine effects compared to control on surgical outcomes in septic shock patients. Joanna L. Stollings, Pharm.D., BCPS, Lance J. Oyen, Pharm.D., BCPS, CCCM, Daniel C. Cullinane, MD, Mark D. Sawyer, MD, MPH, Sections on Critical Care Pharmacy Services, Mayo Clinic, Rochester, MN; (2)Department of Surgery, Mayo Clinic, Rochester, MN; (3)Department of Biostatistics, Mayo Clinic, Rochester, MN.

INTRODUCTION: The use of Arginine vasopressin (AVP) as initial therapy in septic shock and its impact on gastrointestinal (GI) perfusion and surgical anastomosis success or complications is unknown.

HYPOTHESIS: The primary objective was to evaluate surgical success and complications in patients receiving Arginine vasopressin (NE), or no vasopressor (control) within 28 days following GI surgery with resulting septic shock.

METHODS: Retrospective, case control (2:1) of all patients receiving fixed dose AVP compared to titrated NE and a control within 72 hours following GI surgery at a tertiary care academic medical center over 8 consecutive years. Matches were paired by at least 2 of the 3 following criteria: surgical wound classification, surgical type, and age. Included patients were adults (> 18 years old) who had a major surgery. Exclusion criteria receiving Arginine vasopressin (NE), or no vasopressor (control) within 28 days following GI surgery with resulting septic shock.

RESULTS: 26 AVP patients were matched to 26 patients receiving NE and 52 control patients. There was no statistically significant difference in rate of surgical success and complications between patients receiving AVP and NE. APACHE III scores, length of ICU stay, and length of hospital stay were not statistically significant different between the NE and AVP groups. However, there was a statistically significant difference in hospital mortality (73 in the NE group, 45 in the AVP group, p=0.02).

CONCLUSIONS: There appears to be no difference in surgical success or complications between septic shock patients treated with AVP compared to NE. Vasopressin induced perfusion to the GI tract appears no worse than NE.

20. Use of metoprolol continuous infusion for control of heart rate in surgical intensive care unit patients. Priti N. Patel, Pharm.D., BCPS, Erin M. Timpe, Pharm.D., BCPS, Randy C. Hatton, Pharm.D., FCCP, BCPS; (1)MD Anderson Cancer Center, Houston, TX; (2)Southern Illinois University Edwardsville School of Pharmacy, Edwardsville, IL; (3)Shands at the University of Florida, College of Pharmacy, Gainesville, FL.

PURPOSE: The primary outcome of this study was to assess the scope of coverage of compatibility drug information references by comparing the percentage of drug-dose drug or drug-fluid pairs that were included in each reference. Multiple compatibility references are commercially available. No comparative analysis has been performed on the currently available references. The goal of this study was to evaluate the scope and depth of coverage of available compatibility references.

METHODS: Drug-drug and drug-fluid pairs were selected by querying a drug information database for questions relating to compatibility. Duplicate pairs, contrast media, and non-drug chemicals were excluded. The primary outcome was whether the pair was included in each of the databases, reported as a percentage. Secondary outcomes are a descriptive summary of the clinical performance for each reference.

The following eight references were included in the analysis: Handbook on Injectable Drugs (print database and electronic version), Trissel’s™ 2 Clinical Pharmaceutics Database, Micromedex® IV INDEX®, Clinical Pharmacology™ IV Compatibility Section, Facts and Comparisons 4.0 IV Check™, and CompoundingToday.com (76% of all pairs included). The remaining databases, King Guide (62%) and Clinical Pharmacology (56%), contained fewer study pairs. The Handbook of Injectable Drugs contained a similar percentage (58%). The manufacturer’s labeling performed poorest (13%).

CONCLUSIONS: Several references use the IV compatibility information from Trissel’s™ 2 Clinical Pharmaceutics Database as their source; therefore, these references include the same percentage of pairs. These references reported information on the most pairs. Other popular references were able to identify fewer pairs, and manufacturer product labeling rarely contained compatibility information.

22. Assessment of internet resources for warnings against use of red yeast rice dietary supplement following issuance of an FDA consumer warning. Priti N. Patel, Pharm.D., BCPS, Lisa Patel, Pharm.D., Candidate; St. John’s University, Queens, NY.

PURPOSE: To assess the number of internet websites that warn patients against using red yeast rice dietary supplement following an FDA consumer warning.

METHODS: An internet search engine (www.google.com) was used to search for websites giving information on red yeast rice. The first 40 websites were evaluated to determine if the website contained information on the FDA consumer warning issued August 2007 against the use of red yeast rice due to the presence of lovastatin in the products. The following information was included: name of website and address; type of site (i.e., government, educational facility, general health information website, website selling products); does it mention lovastatin; does it contain information on the FDA warning; does it mention the date of last revision; intended audience for the site (i.e., healthcare professional or patient).

RESULTS: Of the 40 websites evaluated, 4 were government-sponsored sites, 1 came from an educational facility, 20 were general health information sites, and 15 were sites selling products. The government sites had the best information overall, as 3 of the 4 mentioned both lovastatin and the FDA warning. The majority of sites selling products had the poorest quality of information and did not mention either lovastatin (12 of 15; 80%) or the FDA warning (14 of 15; 93%). The one educational facility site mentioned lovastatin but not the FDA warning. Of the 20 general health information sites, 16 mentioned lovastatin (80%) and nine mentioned the FDA warning (45%). Overall, of the 40 websites evaluated, 11 stated their date of revision as August 2007 or after and 9 of these were complete information on the FDA warning.

CONCLUSIONS: The results indicated that government-sponsored websites tended to have reliable information. Among the various types of websites, the strongest indicator of overall reliability of information was date of last revision.
23. Evaluation of research training and productivity among junior pharmacy faculty in the US. Kelly C. Lee, Pharm.D., BCPS, Shareen Y. El-Ibiary, Pharm.D., BCPS, Karen S. Hudmon, Dr.P.H., M.S., R.Ph. 1, 2

1 (University of California, San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences, San Diego, CA; 2University of California, San Francisco, School of Pharmacy, San Francisco, CA; 3Purdue University School of Pharmacy and Pharmaceutical Sciences, Indianapolis, IN.

PURPOSE: To estimate the extent of research training and productivity among junior pharmacy faculty.

METHODS: Junior faculty in Pharmacy Practice or Clinical Pharmacy departments at the US pharmacy schools were surveyed to assess the extent of previous or current clinical research training and current research productivity. Sociodemographics, education, training received prior to academic appointment, perceived pressures to conduct research, and confidence in conducting research were assessed. The web-based survey was administered to faculty by the American College of Clinical Pharmacy, with three email reminders for nonresponders.

RESULTS: Respondents (n=349, 36% response rate) averaged 34 years of age, 86% had a Pharm.D. degree, and 70% were female. Over 70% were in tenure track positions and for 84%, their current academic appointment was their first. Over 60% completed a pharmacy practice residency and 46%, a specialty residency. In a typical week, 92% reported spending 29% time in clinical service and 38% time in clinical/didactic teaching. Research accounted for 14% of total time, however, it was ranked as most important for promotion and tenure. In addition, 66% reported not having received formal research training at their institution, and 34% reported no informal training. Over 60% have not received funding as the first investigator, average publication rate was 3 peer-reviewed research articles during the career. Most reported that they could meet the teaching and service expectations of their department for promotion and tenure but could not meet research expectations. Potential barriers for productivity were lack of start-up funding, administrative support, and training. Most (89%) felt that they were adequately compensated for their duties and cited minimal mentorship at their institution. Most felt that their careers were rewarding.

CONCLUSIONS: Based upon those surveyed, most junior pharmacy faculty indicate a lack of research training and mentorship needed to meet the expectations for promotion and tenure.

24. Utilization of alternative teaching methods to facilitate a laboratory course taught to multiple campuses through distance education. Abir O. Kanaan, Pharm.D., Karyn M. Sullivan, B.S. Pharm, MPH, Linda M. Spooner, Pharm.D., BCPS, Matthew A. Silva, Pharm.D., BCPS, Massachusetts College of Pharmacy and Health Sciences, Worcester, MA.

PURPOSE: Clinical Laboratory and Physical Assessment (PA) is a required course offered in the second professional year of the pharmacy curriculum at our institution. The course incorporates hands-on skills recorded on one campus, and broadcast through a distance education system to a satellite campus. The distance education configuration presents challenges for course coordinators: 1. skills are not clearly viewed with typical image compression and video codes, 2. faculty teaching simultaneously in different classrooms are inconsistent in demonstrating core assessment skills due to various teaching styles, 3. standardized digital recording is necessary for faculty to demonstrate consistency when teaching a laboratory course. We hypothesized that standardized digital recording and simultaneous broadcast would enhance student practical exam scores and facilitate delivery of this course in a distance education environment.

METHODS: Each laboratory session was digitally recorded to clearly demonstrate and capture all techniques on digital video disc (DVD). All students viewed these clips during scheduled 3-hour PA classes to ensure all were exposed to the same instruction and technique. Students were given the opportunity to practice each required skill by watching the video. Multiple faculty facilitated the lab sessions and assessed student skill mastery before resuming the video. The t-test was used to calculate the differences between practical exam scores before and after the implementation of recorded content.

RESULTS: The majority of students enrolled in the course before and during recording was 118 and 156 respectively. The mean score for the final practical before and during recording was 86.83±16.3 (SD) compared to 95.55±8.96 (SD) (95% CI, p<0.001).

CONCLUSIONS: Student practical exam scores increased using the digital recording method as compared to live, multi-instructor delivery. Digital recording and simultaneous DVD playback is an alternative method to live teaching in a laboratory course that ensures consistency and standardization between two campuses utilizing distance education.

25. Evaluation of first-year pharmacy students’ attitude toward emergency contraception in two different geographic regions. Patricia Wigs, Pharm.D., BCPS, Sharleen Y. El-Ibiary, Pharm.D., BCPS, Jeff Guo, Ph.D. 1, Karissa Kim, Pharm.D. 2, Ray Jang, Ph.D. 2, 1 (1)James L. Winkle College of Pharmacy, University of Cincinnati, Cincinnati, OH; (2)University of California, San Francisco, School of Pharmacy, San Francisco, CA.

PURPOSE: To assess and compare the attitudes of 1st year pharmacy students towards emergency contraception (EC) in two geographically and culturally dissimilar locations.

METHODS: First year pharmacy students at the University of Cincinnati (UC) James L. Winkle and the University of California San Francisco (UCSF) School of Pharmacy were interviewed regarding their attitudes of EC, comfort in providing EC, and knowledge of EC. Surveys were distributed and completed during class. All students had not completed any therapeutics courses. Comfort with filling other ethically challenging medications, perception of the effectiveness and whether the students change their perception of appropriateness if the patient was a family member were also evaluated. Pearson and Spearman correlation and χ² tests were conducted to assess associations between pairs of study variables.

RESULTS: Ninety-two (49%) of UC students and 118 (63%) of UCSF students elected to participate in this comparison. Politically, UCSF students were more likely to identify themselves as liberal (46.2%), and the majority of UC students considered themselves to be middle of the road (52.2%). Statistically significant differences were noted in beliefs that emergency contraception should be available over-the-counter (33% UC vs. 88% UCSF; p<0.001), age restrictions for over-the-counter EC sales and appropriate candidates for EC. Consensual unprotected intercourse (33% UC vs. 82% UCSF), patient inability to handle financial responsibility of a child (64% UC vs. 86% UCSF), and delayed initiation of a birth control method (63% UC vs. 88% UCSF) were selected as appropriate reasons for EC use (p value < 0.005).

CONCLUSIONS: Based on our study, several differences in attitudes, knowledge and comfort in filling ethically challenging medications were found in the 2 locations. The results may suggest that culture and location within the U.S. has a bearing on attitudes, knowledge, and comfort in providing emergency contraception.

26. Four-month Retention of 2nd-year Pharmacy Students’ Automated External Defibrillator Performance and Confidence. Karen J. Kopacek, R.Ph. 1, Anna Lepzyd Dopp, Pharm.D. 2, Orly Vardeny, Pharm.D. 1, John Dopp, Pharm.D. 1, John Gray, Pharm.D., Candidate 1, J. Jason Sims, Pharm.D. 2

1 (1)Pharmacy Practice Division, University of Wisconsin School of Pharmacy, Madison, WI; (2)Extension Services in Pharmacy, University of Wisconsin School of Pharmacy, Madison, WI; (3)University of Wisconsin School of Pharmacy, Madison, WI; (4)Medtronic, Minneapolis, MN.

INTRODUCTION: Nearly 250,000 people die from sudden cardiac arrest (SCA) annually in the United States and up to 80% of events occur in the home environment. Automated external defibrillators (AEDs) are now being placed in the homes of those at highest risk for SCA. Similar to educating on blood glucose and blood pressure monitors, AED education provides an opportunity for pharmacists to ensure proper and safe medical device use. We sought to assess pharmacy students’ retention of AED use following didactic and practical experience.

METHODS: An initial AED lecture was included as part of a cardiovascular pharmacotherapy course. Evaluators then assessed students’ ability to successfully perform CPR and deliver a defibrillation shock within 90 seconds as a single rescuer with a LIFEPAK500 T AED. Using a Likert scale, students ranked their self-perceived effectiveness and skills to successfully deliver an appropriate defibrillation shock. Evaluations were performed at baseline, three weeks and at four months to determine short and long-term retention.

RESULTS: Students’ (n=103) mean±SD time to successful shock delivery was significantly lower at three weeks (50 ± 17 seconds) compared with baseline (74 ± 25 seconds) and remained lower when measured four months later (47 ± 18 seconds, p<0.05 for both). Students’ self-perceived level of knowledge and skills assessments were significantly improved at three weeks compared to baseline (p<0.05 for all vs. baseline) and remained high after four months (p<0.05 vs. baseline).

CONCLUSIONS: Pharmacy students successfully delivered defibrillation shocks in less than 90 seconds and this ability was retained after four months. Students’ self-perceived AED knowledge and skills remained high over time. As one of the most frequently accessed healthcare providers, pharmacists should be trained on the function and use of AEDs. Future studies are needed to assess education, performance and retention of AED competencies in practicing pharmacists.

27. Student perceptions on usefulness of plagiarism prevention software as an educational tool in a first-year doctor of pharmacy course. Maria C. Pruchnicki, Pharm.D., BCPS, Jennifer L. Rodis, Pharm.D., Amy Reutsch, Pharm.D. Candidate, The Ohio State University College of Pharmacy, Columbus, OH

PURPOSE: To assess student perceptions of effectiveness of web-based plagiarism prevention software (www.Turnitin.com) to increase awareness and offer formative opportunities for writing improvement, with an emphasis on plagiarism prevention.

METHODS: Instructors for a drug information course required to two first-year professional student cohorts (residential and online) to use Turnitin as part of a drug information assignment. Students were asked to view a training
would like to repeat the activity. Four students suggested this activity would be most appropriate after their related classroom lectures to reinforce concepts. All residents valued this activity because it best simulated a “real-life” scenario.

CONCLUSION: Students and residents felt unprepared to participate in codes and use of the clinical patient simulation laboratory to develop student and resident code skills appeared useful. The faculty should implement additional simulation laboratory scenarios to augment didactic teaching and prepare pharmacy residents.

30. UGA learning outcomes: a survey of APPE preceptor value of outcomes and student achievement of learning outcomes. Robin L. Southwood, Pharm D, BCPS, Lori Duke, Pharm.D; University of Georgia, Athens, GA.

METHODS: To assess the relevance that APPE preceptors assign to UGA learning outcomes and preceptor evaluation of student mastery of these outcomes.

METHODS: A nine question electronic survey was emailed to 344 active APPE preceptors. Survey questions included: 1) Practice experience; 2) APPE student numbers; 3) Duration of preceptor activities; 4) Practice site; 5) Alumni status; 6) Faculty status; 7) Value of competency statement to practice site; 8) Student performance of competency at beginning of APPE; 9) Student performance at the end of APPE. A five point Likert scale was used for 87-8.

RESULTS: Surveys were completed by 112 (32%) of APPE preceptors. Sixty-seven of the preceptors participated in > 10 years. Fifty-one percent had been a UGA APPE preceptor > 5 years; Fifty-one percent took > 5 APPE students per year; Seventy-one percent provided hospital based APPEs. Professionalism and communication were the most highly valued learning outcomes. Student demonstration of professionalism was rated as 62.4% at the beginning of APPE and 80.7% at the conclusion of APPE. Student communication skills were categorized as very well by 33% of preceptors at the beginning of APPE and by 78.9% at the conclusion of APPE. Comprehending the consequences of substance abuse was rated as not important or less important by 22.7% of preceptors. Eighty-six percent stated that practicing in a legal and ethical manner was very important.

CONCLUSIONS: The data best represents the views of hospital-based pharmacist APPE preceptors. The response rate among retail-based pharmacy APPE preceptors was too small to allow subgroup analysis. The preceptors placed a lower than expected value on awareness of the consequences of substance abuse to their daily practice. Preceptors in all segments felt that students improved performance during their APPE at their practice site. Paid and volunteer faculty expressed similar values of competencies.

Geriatrics
31. Decreased prescribing of high risk medications for older veterans. Jason J. Zillich, Pharm D.1, Kenneth Shay, D.S.S., M.S.2, Barbara Hyduke, M.S.A.1, Thomas A. Emmenderfer, Pharm D.1, Allen M. Mellman, M. S.1, M.D.2, R. Counsell, MD.3, Mark A. Supiano, M.D.4, Peter A. Woodbridge, M.D.3, M.B.A.3, Pamela Reeves, M.D.5,1; 1Roudybush VA Medical Center, Center for Excellence in Implementing Evidence-Based Practices, Indianapolis, IN; 2U.S. Department of Veterans Affairs, Office of Geriatric and Extended Care, Ann Arbor, MI; 3VA Central Ohio Healthcare Network 11, Ann Arbor, MI; 4U.S. Department of Veterans Affairs, Pharmacy Benefit Management, Battle Creek, MI; 5Indiana University School of Medicine, Indianapolis, IN; 6(University of Utah School of Medicine, Salt Lake City, UT; 7)Roudybush VA Medical Center, Indianapolis, IN.

PURPOSE: The purpose of this implementation project examines the effectiveness of an intervention to decrease prescribing of high risk (HR) medications.

METHODS: This quality improvement project was a single group, pre/post intervention design within a regional network of eight academic medical centers and 21 VA outpatient clinics. Eligibility included all outpatient veterans > 65 years receiving 1 or more HR medications (amitriptyline, imipramine, doxepin, chlordiazepoxide, and diazepam) and the clinicians who prescribed them A two-stage intervention was implemented. First, a real-time warning message to prescribers appeared whenever one of the HR drugs was ordered; and second, a personally addressed letter from the Chief Medical Officer asking prescribers to consider discontinuing the HR medication along with a copy of the Beers criteria article, a list of suggested alternatives to HR medications, and a list of older patients, receiving the HR medications, who had upcoming appointments with these prescribers. The primary outcome was the absence of prescribed HR medication for all patients in the cohort during the post-intervention period. A secondary outcome was the absence of prescribed HR medication for each patient within a subgroup of the cohort whose prescribers received the second-stage intervention.

RESULTS: There were 2,753 unique patients in the cohort. More than fifty percent (n = 1,396, 50.7%) of the patients had the HR medications discontinued, resulting in a significant decrease in the number of patients prescribed HR medications for each patient within a subgroup of the cohort whose prescribers received the second-stage intervention.
Hematology/Anticoagulation

32. Inpatient management of supratherapeutic international normalized ratios (INRs): an assessment of adherence to and impact of the American College of Chest Physician (ACCP) guidelines. Elizabeth A. Newton, Pharm.D., Michael J. Jonkman, Pharm.D.; (1)Wake Forest University Baptist Medical Center, Winston-Salem, NC; (2)Advantage Health Physician Network and Saint Mary's Health Care, Grand Rapids, MI; (3)Saint Mary's Health Care, Grand Rapids, MI.

PURPOSE: To assess adherence to the ACCP guidelines for the management of elevated INRs and its impact in hospitalized patients taking warfarin.

METHODS: A random sample of 93 inpatients (January through November 2006) with INRs greater than three was retrospectively analyzed. Adherence to the ACCP guidelines was assessed by comparing any changes in warfarin therapy or vitamin K administration (dose and route) in response to the INR elevations to the course of action recommended by the guidelines. Comparisons of time to return to therapeutic INR (TRT-INR) and length of stay (LOS) between guideline adherent and non-adherent group were conducted. Outcomes were analyzed to detect differences in adherence based upon level of INR elevation (3.1–4.9, 5.0–8.9, 9.0 and greater) and the presence or absence of bleeding.

RESULTS: Overall, 54% of interventions for elevated INRs were consistent with ACCP guidelines. Adherence was highest in patients with INRs between 3.1 and 4.9 (60%), and lowest in patients with INRs between 5.0 and 8.9 (40%). TRT-INR averaged 1.9 days in the adherent group versus 9.9 days in the non-adherent group (p=0.008). LOS after treatment for elevated INR was longer in the non-adherent group (3.7 days) when compared with the adherent group (3.1 days) (p<0.002). Non-adherent interventions included: warfarin restarted at same dose (30%), vitamin K administration using non-adherent group (3.1 days) when compared with the adherent group (3.1 days) (p=0.002). Non-adherent interventions included: warfarin restarted at same dose (30%), vitamin K administration using non-recommended route (27%), administration of vitamin K when not indicated (11%), holding warfarin for longer than recommended (12%), or a combination of non-adherent interventions (20%).

CONCLUSIONS: Multiple opportunities exist to improve the management of elevated INRs in inpatients taking warfarin. This study suggests that improving the management of elevated INRs by following the ACCP guidelines can result in decreases in the TRT-INR and to a decreased LOS.

33. Etiology of elevated INR and effective warfarin dosing in the inpatient setting. Inna Shalito, Pharm.D.; (1)Wake Forest University Baptist Medical Center, Winston-Salem, NC; (2)Advantage Health Physician Network and Saint Mary’s Health Care, Grand Rapids, MI; (3)Saint Mary’s Health Care, Grand Rapids, MI.

PURPOSE: To assess adherence to the ACCP guidelines for the management of elevated INRs and its impact in hospitalized patients taking warfarin.

METHODS: A random sample of 93 inpatients (January through November 2006) with INRs greater than three was retrospectively analyzed. Adherence to the ACCP guidelines was assessed by comparing any changes in warfarin therapy or vitamin K administration (dose and route) in response to the INR elevations to the course of action recommended by the guidelines. Comparisons of time to return to therapeutic INR (TRT-INR) and length of stay (LOS) between guideline adherent and non-adherent group were conducted. Outcomes were analyzed to detect differences in adherence based upon level of INR elevation (3.1–4.9, 5.0–8.9, 9.0 and greater) and the presence or absence of bleeding.

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CONCLUSIONS: Multiple opportunities exist to improve the management of elevated INRs in inpatients taking warfarin. This study suggests that improving the management of elevated INRs by following the ACCP guidelines can result in decreases in the TRT-INR and to a decreased LOS.

34. Validation of a nomogram for argatroban in heparin-induced thrombocytopenia: A pilot project. Jonathan E. Hunchuck, B.Sc., ACPR; Maureen A. Smythe, Pharm.D.; (1)Wayne State University, Suite 2190, Detroit, MI; (2)Department of Clinical Pathology, William Beaumont Hospital, Royal Oak, MI; (3)William Beaumont Hospital, Royal Oak, MI.

INTRODUCTION: Argatroban is used in the management of heparin-induced thrombocytopenia (HIT) with a recommended starting dose of 2 µg/kg/min (except with hepatic impairment). Although about 15% of ICU patients meet the clinical criteria for suspicion of HIT, argatroban dosing recommendations in this population are lacking. A previous evaluation in our institution found that ICU patients require lower argatroban doses than recommended by current guidelines.

METHODS: After institutional review board approval, patient data were prospectively collected on all patients who were started on argatroban for HIT. Full informed consent was obtained in all cases. The initial dose of argatroban was chosen by ICU hematologist staff for appropriateness, clarity, and ease of use. Therapeutic anticoagulation with argatroban (TAA) was defined as 2 consecutive aPTT in TR. Consecutive patients at a tertiary care university-affiliated institution were prospectively selected for argatroban for suspected or confirmed HIT and had their dosing dictated by the guidelines. Compliance to the guidelines was assessed by comparing any changes in argatroban administration of warfarin metabolic inhibitors in the case group may have contributed INR elevations.

RESULTS: There were 60 patients enrolled in the study, 30 in case and 30 in control group. Patients were divided into a case and a control group. Patients were included in the case group if they were on warfarin during hospitalization, had at least one INR > 5 and were older than 18 years. Inclusion criteria for the control group were similar except the patient did not develop INR > 5. Patients were divided if they were admitted with INR > 3.5 on warfarin or INR > 1.5 not on warfarin, had goal INR > 5. Patients were divided into a case and a control group. Patients were included in the case group if they were on warfarin during hospitalization, had at least one INR > 5 and were older than 18 years. Inclusion criteria for the control group were similar except the patient did not develop INR > 5. Patients were divided if they were admitted with INR > 3.5 on warfarin or INR > 1.5 not on warfarin, had goal INR > 3.5, or received direct thrombin inhibitors within 7 days. Once the index event, INR > 5 for case group and day of discharge for control, was identified, the patients’ medical records were reviewed seven days prior to identify diseases, drugs, and/or dosing strategies that may potentiate the effect of warfarin leading to INR>5.

RESULTS. There were 60 patients enrolled in the study, 30 in case and 30 in control group. Of the risk factors assessed, end-stage liver disease was the only variable that had a statistically significant effect on the elevated INR (P=0.05). The variables of increased age above 70 (P=0.02) and co-morbidities of warfarin metabolism (P=0.01) trended towards significance. Changes in INR over a time period can be predictive of development of INR > 5. INR increase over 1 in 24 hours was statistically significant (P=0.001) in predicting development of INR > 5. The ranges of INR change below 1 were not significant.

CONCLUSIONS: This study demonstrated that absolute INR increase by more than 1 in 24 hours may be predictive of developing INR > 5. Higher co-administration of warfarin metabolic inhibitors in the case group may have also contributed INR elevations.
38. Effects of policosanol when used in a lipid-specialty clinic. James M. Backus, Pharm.D., Janelle F. Ruisinger, Pharm.D., Cheryl A. Gibson, Ph.D., Patrick M. Moriarty, M.D.; University of Kansas Lipid, Atherosclerosis, Metabolic and LDL-Apheresis Center, Kansas City, KS.

PURPOSE: Policosanol is a popular herbal supplementation used for cholesterol health. Randomized, controlled trials performed primarily in Cuba demonstrated significant reductions in total cholesterol (TC) and low-density lipoprotein cholesterol (LDL-C) by 16 and 24%, respectively, while increasing high-density lipoprotein cholesterol (HDL-C) by 10%. However due to a recent multi-center, randomized, placebo-controlled trial indicating negligible benefit, efficacy of this agent is now controversial. Our objective was to determine changes in lipid profiles (TC, LDL-C, HDL-C, triglycerides, TC/HDL and LDL/HDL ratios) when policosanol was utilized in a lipid-specialty clinic.

METHODS: Medical records of patients receiving policosanol were identified. Documentation of past medical history, demographic data, concomitant lipid-altering agents, and lipid profiles immediately prior to policosanol use and initial follow-up while receiving policosanol, was collected. Patients were excluded if other substantial changes were made in their lipid-altering regimen.

RESULTS: A total of 32 patients (15 male/17 female) met study criteria. Mean patient age was 58.6 ± 10.3 years, six (19%) had coronary artery disease, six (19%) had diabetes mellitus, 19 (60%) had hypertension and 24 (75%) were taking other lipid-altering agents. Mean duration of therapy was 4.1 ± 1.9 months and average daily dose of policosanol was 20mg (range 10-40mg). No statistically significant changes were noted for TC (221.44 ± 44 vs 221.53 mg/dl ± 30.34; 0.04% increase), LDL-C (140.44 ± 44 vs 145.09 mg/dl ± 29.01; 3.58% increase), HDL-C (57.53 ± 7.78 mg/dl ± 7.12; 0.43% increase), triglycerides (137.22 vs 124.06 ± 38.93; 9.99% decrease), TC/HDL (3.99 vs 4.07 ± 0.66; 1.90% increase) and LDL/HDL (2.57 vs 2.72 mg/dl ± 0.59; 5.84% increase) from baseline to follow up.

CONCLUSIONS: Policosanol was ineffective at improving any major lipid parameter when used in a lipid-specialty clinic. Our results are consistent with a recent randomized, controlled trial indicating policosanol exhibits minimal effect on lipid values.

HIV/AIDS


INTRODUCTION: Enfuvirtide (ENF) safety and efficacy have been evaluated only in controlled trials.

OBJECTIVES: 1) To characterize patients for whom ENF is prescribed, 2) assess ENF’s safety, tolerability, and associated clinical outcomes in HIV-infected veterans.

METHODS: A retrospective chart review of all veterans prescribed ENF between 4/03–7/05 was performed. Patient demographics, prescription dates, encounter dates, and CD4 and VL data were obtained from the VA HIV clinical case registry; antiretroviral (ARV) history, resistance results, injection training, tolerance and discontinuation reason were obtained from chart review. Exclusions included receipt of study ENF; or follow-up outside VA.

RESULTS: Of 275 evaluable subjects, 97% were male, 57% Caucasian, 31% African American. 60% had previous OIs, 91% received 2 prior ARV regimens, and 87% had VL>5000 at initiation. Baseline mean CD4 and log VL were 181 and 5.34; 86% of patients started new ARVs with ENF (52% with known active agent). 70% of patients had injection site reactions (11% treatment-limiting). Injection training was documented in 83% of cases; re-training occurred in <4%. New/worsening side effects occurred in 56% of patients: 32% GI, 19% musculoskeletal, 10% respiratory, 4% skin/soft tissue. Hospitalizations occurred in 37% of subjects, 18% of which were respiratory diagnoses. QOL improvements were reported in 42%. CD4 and VL improvements occurred in 71% and 79% of patients; 67% had improvements in both. Mean change in CD4 and log VL from baseline to 6 months was +44 and -1.94; 55% achieved VL<400. Ethnically, 41% African American, 36% Caucasian, and 23% of patients remained on ENF. Reasons for discontinuation were 30% toxicity, 27% patient request, 20% suboptimal response/progression, 11% death, and 12% other.

CONCLUSIONS: Nearly three-quarters of patients achieved virolologic or immunologic improvement and almost half experience QOL improvements after starting ENF. Despite tolerability issues, many veterans remain on therapy for extended durations.
40. Efficacy and safety of linezolid in methicillin-resistant Staphylococcus aureus (MRSA) complicated skin and soft tissue infections (cSSTI): a meta-analysis. Mark Bonthaung, Pharm.D.1, Lisa M. Rubin, Pharm.D.2, Donald Hsu, Pharm.D.1, Ryan Quiss, Ph.D.3, Anand V. Law, Ph.D.4, (1)Veterans Affairs San Diego Health System, San Diego, CA; (2)Western University of Health Sciences, College of Pharmacy, Pomona, CA.

PURPOSE: To determine the efficacy and safety of linezolid in methicillin-resistant Staphylococcus aureus (MRSA) complicated skin and soft tissue infections (cSSTI).

DESIGN: Meta-analysis of prospective comparative trials. Heterogeneity testing was performed using Cochran’s Q method. Analysis was performed using the random effects model. Three primary outcomes were evaluated: microbiologically evaluable (ME) cure, modified intention-to-treat (MITT) cure, and clinically evaluable (CE) cure. Adverse events measured were: nausea, diarrhea, vomiting, constipation, anemia, and thrombocytopenia.


RESULTS: Systematic literature search identified seven prospective comparative trials of linezolid (N=400) and its comparators (N=405) for the treatment of MRSA cSSTI. Patients receiving linezolid experienced a higher cure rate compared to its comparators in ME cure (odds ratio [OR] 2.13, 95% confidence interval [95% CI] 1.20–3.76, p=0.009), MITT cure (OR 1.12, 95% CI 0.53-2.38, 97.7%, p=0.774) and CE cure (OR 1.63, 95% CI 1.01-2.64, p=0.044). No differences in adverse events were seen between linezolid and its comparators for: nausea (OR 1.54, 95% CI 0.88–2.70, p=0.135), diarrhea (OR 2.22, 95% CI 0.84–5.85, p=107), vomiting (OR 1.53, 95% CI 0.87–2.71, p=0.14), constipation (OR 0.53, 95% CI 0.24–1.24, p=0.146), and anemia (OR 1.34, 95% CI 0.64-2.81, p=0.432). One study reported seven patients with thrombocytopenia, but none of the patients had their treatment discontinued.

CONCLUSION: Linezolid was associated with higher cure rates versus its comparators in terms of ME and CE cure. MITT cure did not show statistically significant differences in cure rates between linezolid and its comparators. There was no difference in adverse events between linezolid and its comparators; however, thrombocytopenia was reported in seven patients receiving linezolid. Overall, linezolid was both efficacious and safe in eradicating MRSA in cSSTI which also resulted in symptomatic (CE) cure.

41E. Association between the cell wall integrity pathway and chitin content in the attenuation of caspofungin activity in Candida glabrata. Jason M. Cota, Pharm.D., M.S.1, Jodi L. Grabski, Pharm.D., M.S.2, P. David Rogers, Pharm.D., Ph.D.3, Thomas D. Edlin, Ph.D.3, Nathan P. Wiederhold, Pharm.D.4. (1)The University of Texas at Austin College of Pharmacy and The University of Texas Health Science Center at San Antonio, San Antonio, TX; (2)University of Tennessee, Memphis, TN; (3)Drexel University, Philadelphia, PA.

PURPOSE: Attenuation of caspofungin activity at elevated concentrations is associated with up-regulation of the cell wall integrity (CWI) pathway and increased chitin in Candida albicans. We examined the response of the CWI pathway and chitin to caspofungin exposure in Candida glabrata (CG).

METHODS: The XTT colorimetric assay was used to assess viability in CG 200989 (WT) and CG 200989 clsl2 strains following caspofungin exposure (0–32 µg/mL). For gene expression and chitin quantification, yeast cultures were grown and harvested in triplicate using a colorimetric assay.

RESULTS: Maximum reduction in WT CFU viability was observed at caspofungin 1 µg/mL (84% viability reduction vs. control). Caspofungin activity was attenuated at concentrations of 4–32 µg/mL. This attenuation was absent in CG clsl2. Increased expression of SLT2 (4-fold), CHS3 (2-fold), and SKT5 (3.5-fold) was observed following caspofungin exposure in WT CG. In the WT CG clsl2, SKT5 expression was increased by 1.3 fold following caspofungin exposure, while CHS3 expression did not increase. Similarly, chitin content in CG clsl2 did not increase following caspofungin challenge. In contrast, a 3- to 4.5-fold increase in chitin was observed in WT CG at all caspofungin concentrations.

CONCLUSIONS: The attenuation of caspofungin activity observed in CG WT at elevated caspofungin concentrations was absent in CG clsl2. Furthermore, no increases in chitin content or CHS3 expression were observed in CG clsl2 in contrast to CG WT. This suggests a link between the CWI pathway, increased chitin content and the attenuation of caspofungin activity at higher concentrations in CG.


42. Time between blood culture collection and positive result reported for Candida species. Juliana M. Fernandez, Pharm., D.; David E. Nix, Pharm.D.; Brian L. Erstad, Pharm.D.1, Wanda Petty, B.S.1; (1)University of Arizona College of Pharmacy and University Medical Center, Tucson, AZ; (2)University of Arizona College of Pharmacy, Tucson, AZ; (3)University Medical Center, University of Arizona, Tucson, AZ; (4)University Medical Center, Tucson, AZ.

BACKGROUND: Candidemia and delay to appropriate therapy contributes to increased morbidity and mortality. Current literature addresses the delay between blood culture collection and final identification, however fails to delineate differences among species. The purpose of this study was to quantify the time to yeast detection and identification relative to blood culture collection and determine whether differences exist among species.

METHODS: In this retrospective study, all cases of Candida isolation over two years were reviewed. The time-delays between blood culture and detection of Candida growth were quantified as well as the additional time required for final species identification. Initiation of antifungal therapy was assessed in relation to culture collection, detection of yeast, and final identification. The appropriateness of therapy at each time point was also analyzed.

RESULTS: The majority of Candida infections were caused by either C. albicans (n = 43) or C. glabrata (n = 20). Results (mean ± SD) are provided below and all were significant (p<0.001).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>C. albicans</th>
<th>C. glabrata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to yeast detection (h)</td>
<td>35 ± 18.2</td>
<td>79 ± 22.1</td>
</tr>
<tr>
<td>Time to final identification (h)</td>
<td>85.8 ± 30.87</td>
<td>151.4 ± 44.42</td>
</tr>
<tr>
<td>Time to appropriate therapy (h)</td>
<td>43.3 ± 27.6</td>
<td>7 ± 37.5</td>
</tr>
</tbody>
</table>

Results of other species were similar to that of C. albicans.

CONCLUSIONS: The time-delay between time of blood culture collection and yeast detection as well as final identification was significantly longer for C. glabrata isolates when compared to C. albicans. As a result, mean time to appropriate antifungal therapy was significantly longer in patients with C. glabrata isolates.


PURPOSE: Infections caused by CA-MRSA have become increasingly common over the past five years. Recent reports indicate that CA-MRSA strains have been infiltrating the healthcare setting and can be responsible for nosocomial MRSA infections. Several CA-MRSA infections in NEPA have resulted in severe and fatal outcomes. Measuring the prevalence of this pathogen could improve patient outcomes by earlier recognition of the potential for CA-MRSA and the provision of appropriate empiric antimicrobial therapy, as well as provide guidance to confirm the need for proper prevention and control.

METHODS: From June 2007 to August 2007, consecutive positive MRSA specimens were collected from two hospital systems in NEPA. The isolates were analyzed to identify methicillin-resistant (MRSA) and community-acquired MRSA (CA-MRSA) strains by checking for resistance to Pantone-Valentine Leukocidin (PVL) and SCCmec sequences by PCR, and Smal profile by PFGE.

RESULTS: Of the 74 MRSA specimens analyzed, 39 (52.7%) were HA-MRSA (USA100, SCCmec-II) and 35 (47.3%) were CA-MRSA (USA300, SCCmec-IV) with an average patient age of 74 and 39, respectively. PVL sequences were present in all but one (97.1%) of CA-MRSA and in 2 (5.1%) of HA-MRSA. Thirty-two (35%) of the 90 isolates from patients residing in healthcare facilities (HC) were CA-MRSA. Most (84.6%) of the CA-MRSA from HC were from infected tissue or wound (TW) specimens. Twenty-two (64.7%) of the 34 isolates from outpatients (O) were CA-MRSA. All (100%) of the CA-MRSA from O isolates were from TW specimens. ICR was not present in any of the CA-MRSA but 2 (5.7%) specimens were resistant to clindamycin. ICR was present in 18 (46.2%) of HA-MRSA and the rest were resistant.

CONCLUSIONS: CA-MRSA is prevalent in NEPA in outpatients as well as in healthcare settings. The presence of a tissue or wound infection increases the likelihood of CA-MRSA. In our hospitals, clindamycin remains effective for CA-MRSA but not HA-MRSA.

44. Pharmacodynamic target attainment rates for 9 antibiotics against Escherichia coli, Klebsiella spp., and Pseudomonas aeruginosa isolates in USA hospitals. Jared L. Crandon, Pharm. D.1, Joseph L. Kuti, Pharm. D.2, Robert N. Jones, M.D.1, David P. Nicolau, Pharm.D, FCP,3; (1)Center for Anti-Infective Research and Development, Hartford Hospital, Hartford, CT; (2)JMI Laboratories, North Liberty, IA.

PURPOSE: We determined pharmacodynamic target attainment rates for 9 antibiotics against selected Gram-negative bacilli and compared these results with the 2004 OPTAMA assessment.

METHODS: A 9,000-patient Monte Carlo simulation utilizing data from
population pharmacokinetic studies was employed to estimate the pharmacokinetic profiles for standard and/or prolonged infusion (PI) dosing regimens of cefepime, ceftriaxone, ciprofloxacin, erythromycin, imipenem, levofloxacin, meropenem, and piperacillin-tazobactam. MIC data were obtained from 15 USA hospitals participating in the 2006 MYSTIC study for 640 E. coli, 618 Klebsiella spp., and 606 P. aeruginosa isolates. Cumulative fraction of resistance (CFR) was calculated using bactericidal pharmacodynamic breakpoints for each antibiotic and compared with results from the 2004 OPTAMA study.

RESULTS: Against E. coli, all regimens had a CFR $>92\%$ except for the fluoroquinolones (range: 69.4–72%), reduced $6\%$ from 2004. The presence of Klebsiella spp. harboring carbapenemases (KPC) associated with multi-drug resistance resulted in a $27\%$ drop in CFR of standard dosing regimens relative to 2004. Amongst Gram-negative bacilli to common antibiotics resulting in disproportionate decreases in pharmacodynamic target attainment. The use of PI for $\beta$-lactams may help overcome these decreases.

45. Surveillance of gram-negative isolates the intensive care unit: an eleven year study to identify trends in minimum inhibitory concentration

Mineralocorticoid receptor (MR) antagonists are important drugs used in the treatment of hypertension and heart failure. However, the effect of MR receptor antagonists on the renal proximal tubule remains poorly understood. In this study, we investigated the effects of spironolactone and eplerenone, two MR receptor antagonists, on renal sodium reabsorption in rats with acute renal ischemia. We found that both MR receptor antagonists decreased renal sodium reabsorption, but eplerenone was more potent than spironolactone. These findings suggest that MR receptor antagonists may have a beneficial effect on sodium reabsorption in the proximal tubule of rats with acute renal ischemia.

46. Urodilatin and acute ischemic renal failure

Urodilatin is a potent natriuretic, diuretic and vasodilator. Its paracrine origins also implicate it in renal homeostasis. The authors sought to evaluate this possibility in an animal model of acute ischemic renal failure. Urodilatin and acute ischemic renal failure.

CONCLUSIONS: Longitudinal monitoring of antimicrobial MIC data can provide more detailed information than monitoring antimicrobial susceptibility information alone.

Neurology

48. Total valproic acid concentrations from oral enteric-coated divalproex sodium are predictive within epilepsy patients from day-to-day at the same time of day. Ronald C. Reid, Pharm.D., Ivan Osorio, M.D., R. Edward Hogan, M.D., (1)Abbot Laboratories Global Pharmaceutical Research & Development, Abbott Park, IL; (2)Comprehensive Epilepsy Center, University of Kansas Medical Center, Kansas City, MO; (3)Director, Adult Epilepsy Section, Dept. of Neurology, Washington University in St. Louis, St. Louis, MO.

PURPOSE: Inter-subject variability in drug pharmacokinetics is well recognized. However, certain drugs exhibit large intra-subject kinetic variation, e.g., clindamycin, warfarin, ethosuximide (Wagner, J Pharmacokinet Biopharm 1973), theophylline (Rogers, J Peds 1985) and phenytoin (Birnbaum, Neurology 2003). Intrasubject variability ("fickleness") has consequences, both clinically (in terms of therapeutic drug monitoring) and industrially (sample size calculation in bioequivalence studies). Another antiepileptic drug, divalproex sodium, frequently requires dosing adjustments. In this study, we investigated the predictability of VPA levels in the same patient.

METHODS: Twenty-four euveolic Sprague-Dawley rats were anesthetized and underwent unilateral nephrectomy. The renal vessels of the remaining kidney were clamped for 60 minutes, followed by reperfusion. Serum lactate levels were bimodal post clamping, an immediate post clamp peak (300% increase), rapid decline and then a slow continual rise. Urinary Na+ remained low post clamping. < 10 mmol/L. The persistent elevations in vasoactive peptides accompanied by elevated renal vein lactate suggests ongoing attempted stabilization of renal perfusion through activation of renal homeostatic mechanisms. The associated presence of high levels of urinary Urodilatin in the urine of low urinary Na+ suggests a potential role of this urodilatin, rather than purely as a regulator of Na+ homeostasis as has been suggested previously. It's relatively early appearance may facilitate it as both a biomarker of renal stress and identify those patients who might respond to exogenous natriuretic peptides in this situation. More study is warranted to determine this.

47. Short and long term impact of pharmacist's counseling on hemodialysis patients' drug knowledge, compliance and adherence to prescribed regimen: pre-post intervention study. Oussayma Mouhachen, Pharm.D., RCPS, Mounir Aitchan, Pharm.D, Lucy Ashdjian, Pharm.D, Wael Abi Gharem, Pharm.D; (1)Massachusetts College of Pharmacy, Boston, MA; (2)American University of Beirut Medical Center, Beirut, Lebanon; (3)Lebanese American University, Byblos, Lebanon; (4)St George Hospital, Ashrafieh, Lebanon.

PURPOSE: To assess the potential short and long-term impact of pharmacy counseling and interventions on hemodialysis patients' drug knowledge, and adherence to prescribed regimen.

METHODS: This was a single-center, pre/post intervention, unblinded study. During Phase I (Pre, April 2006), on all 60 hemodialysis patients, pharmacists collected data on patient drug knowledge, compliance and adherence to prescribed medication regimen. The intervention consisted of patient education and counseling. Data was collected at the beginning of each treatment session with a questionnaire along with medication chart reconciliation. A month later, in Phase II, data was collected and compared to Phase I. The same was done at 1 year (Phase III).

RESULTS: Two patients were lost in Phase II and five in Phase III. Overall, drug knowledge was assessed as appropriate in 66% of patients in Phase I and it increased to 85% in Phase II and back to 65% in Phase III. Knowledge of bone metabolism medications was the lowest in Phase I at 57% compared to 66% and 77% with anemic and cardiac medications. Knowledge of bone, anemia, and cardiac medications improved in Phase II to 73%, 89% and 93% respectively and in Phase III the values became 49%, 68%, and 77%. Regarding overall compliance with all medications in the pre-Phase, 7% were fully compliant, and 85% were 60–100% compliant. In Phase II, overall compliance with all medications improved as 23% patients became fully compliant and 75% patients between 60–90% compliant. In Phase III, 49% patients became fully compliant and 25% between 60–90% compliant. Similarly, compliance with bone metabolism, anemia, and cardiac medications improved to 64%, 79% and 74% respectively in Phase II then to 75%, 90.5%, and 92% in Phase III.

CONCLUSION: Overall, pharmacists interventions had a positive impact suggesting the service need to be provided on a continuous basis.
posture & fluid intake with diurexpan administration). Samples were analyzed for VPA in batch via Emit assay (%CV ≤ 65 mg/L). RESULTS: The average %CV over 5 days for total trough VPA, 8 AM-2 PM & 2 PM-AM, was 9.2%, 10.4%, 16.4% & 23.2%, respectively. VPA Cmin was lower and Tmax more variable at night vs. day. One patient had %CV as high as 37% at one evening time point across 5 days, without clinical consequences. Diurnal variation (differences in Cmin, Cmax) in total VPA was observed when comparing 8a & 8p.

CONCLUSIONS: Total plasma VPA trough concentrations from conventional divided doses are variable (not fickle) vs. from day-to-day over a short time period. Greater variability in trough VPA (%CV) occurred at later times in the day, from day-to-day.

49. Evaluation of high-dose atorvastatin for prevention of vasospasm in aneurysmal subarachnoid hemorrhage. Joseph Y. Yehara, Pharm.D.1, Thuy D. Nguyen, Pharm.D.1, Miguel Salazar, Pharm.D.2, Pharm.D.1, Kevin W. Garey, Pharm.D.1, M.S.1, Hesham Morsy, M.D.1, Elissa F. Wible, M.D.1, George A. Lopez, Ph.D., M.D.1, 2, 3; 1(1) St. Luke’s Episcopal Hospital, Houston, TX; (2)University of Houston College of Pharmacy, Houston, TX; (3)Baylor College of Medicine, Houston, TX.

PURPOSE: To investigate the pharmacotherapeutic and pharmacoeconomic impact of atorvastatin 80 mg daily as prophylaxis therapy for vasospasms secondary to aneurysmal subarachnoid hemorrhage (SAH).

METHODS: This is a retrospective cohort study on 26 patients admitted with aneurysmal SAH between July 2006 and July 2007. Patient data was stratified into two groups: traditional medical management, or traditional medical management plus atorvastatin 80 mg daily given within 72 hours of admission and continued for at least 21 days or until discharge. Pharmacotherapeutic outcomes were measured by vasopasm confirmation via cerebral angiography and neurological outcomes at discharge. Pharmacoeconomic outcomes were measured by duration of intensive care unit (ICU) stay correlated with a fixed cost per day.

RESULTS: The patient population was equally distributed between the treatment and the control groups. There was no significant difference in the frequency of vasospasms between the treatment and the control groups (61% vs. 58%, p=0.24). However, the severity of vasospasms tended to be milder in the treatment group compared to the control group. There was no significant difference in average cost of care in the treatment group compared to the control group ($17,900 vs. $14,500, p=0.24). Furthermore, average length of stay in the ICU did not differ significantly between the two groups (13.8 days for the treatment group vs. 11 days for the control group, p=0.24).

CONCLUSION: In this study, atorvastatin 80 mg daily seems to offer no significant pharmacotherapeutic or pharmacoeconomic benefit over traditional therapy. However, there was a trend towards milder vasospasms in the atorvastatin group. A larger study is needed to validate our findings.

Oncology

50. Evaluation of the modification of diet in renal disease (MDRD) and Cockroft-Gault (C-G) formulas in the Calvert equation for carboplatin dosing. Brandon Lawler, Pharm.D.1, David L. Blumberg, Pharm.D.1, Dr. Robin Front, Pharm.D.2, Theresa Schulz, Ph.D.1, Whitney Jones, Pharm.D., Candidate2; 1(South Carolina College of Pharmacy - USC Campus, Columbia, SC; 2(University of South Carolina College of Pharmacy, Columbia, SC.

PURPOSE: Traditionally, the original C-G (C-Gm) formula has been used for renal function estimation in the Calvert equation for carboplatin dosing. The primary objective of this study is to determine whether differences exist in estimations of renal function and carboplatin dosing between the C-Gm, modified C-G (C-Gm), and 6-variable MDRD formulas in a non-small cell lung cancer (NSCLC) population.

METHODS: This was a retrospective study conducted in an adult population of NSCLC patients at a Veterans Administration Hospital. Patients with a documented clinic visit who had received at least one dose of carboplatin for NSCLC from January 2002 to December 2006 were screened for study inclusion. Patients were not duplicated in the study. Patient data were entered into the C-Gm, C-Gm, and 6-variable MDRD formulas in order to determine estimations of renal function for each study subject. These estimations were then applied to the Calvert equation to calculate carboplatin doses. The primary endpoints were the differences in renal function estimates and carboplatin dose calculations between the formulas. Paired t-tests were used to assess differences between means.

RESULTS: A total of 128 patients were included in study analysis. This was a predominantly Caucasian (62%), male (90.7%), population, with a mean age of 63 years. The difference in mean renal clearance (ml/min) between the C-Gm vs. MDRD formulas (85.18 vs. 80.45, p=0.028) and the C-Gm vs. C-G formulas (85.18 vs. 79.36, p=0.001) was statistically significant. No significant differences were detected when comparing calculated carboplatin doses.

CONCLUSIONS: Differences exist between the C-Gm, C-Gm, and 6-variable MDRD formulas in estimating renal function in this NSCLC population. Application of individual patient results could potentially result in clinically significant carboplatin dosing modifications in select patients. A prospective controlled study would aid in determining the optimal formula for renal function estimations in carboplatin dosing.

Pain Management/Analgesia

51. Evaluating the impact of a pharmacist/physician intervention program on patient satisfaction with pain management practices compared with usual care treatment in hospitalized general medicine patients. Mark A. Douglass, Pharm.D.1, Gal M. Burnske, Pharm.D., B.CPS2, Gail Wilkes, R.N.C., M.S., A.O.C.N.3, Daniel P. Allford, M.D., M.P.H.1, Jeffrey L. Greenwald, MD1; (1)Northeastern University Department of Pharmacy Practice/Boston Medical Center, Boston, MA; (2)Boston Medical Center, Dept of Pharmacy, Boston, MA; (3)Boston Medical Center, Boston, MA.

PURPOSE: Pain management practices at our medical center have been less than optimal, despite the implementation of institutional pain management guidelines. We sought to assess pain management intensity and satisfaction scores between patients who received treatment by medical house officers who participated in a pharmacist/physician co-lead educational program compared to patients who received usual care treatment.

METHODS: Prior to their four week acute care medicine rotation, pharmacists treated patients in the intervention study group participated in a four hour problem-based interactive pain management forum, developed and implemented by clinical pharmacists and physician pain management specialists. Patients in the control group were treated by physicians who had not undergone the educational activity. Prior to hospital discharge, patients in both study groups were asked to rate pain management intensity (0-10 numerical rating scale) and satisfaction (1, very poor to 5, very good) were compared.

RESULTS: Twenty nine patients in the intervention study group and 24 patients in the standard care group completed the pain management satisfaction survey. Mean pain intensity scores improved significantly from hospital admission to discharge in both active (8.62 to 4.45, p<0.0001) and control groups (8.67 to 4.67, p=0.0001), but not between groups (p=0.77). Additionally, no significant difference was noted between the groups with respect to satisfaction scores (4.07 to 3.92, p=0.56).

CONCLUSION: Patients at our institution reported significant improvements in their pain intensity scores throughout hospitalization. A smaller than expected sample size may have contributed to a non-significant difference between study group pain intensity and satisfaction scores. Pharmacists/physician collaborative efforts to improve institutional pain management practices are ongoing.


PURPOSE: To evaluate the efficacy and safety of once-daily extended-release (ER) tramadol for the treatment of osteoarthritis pain in an elderly population by post hoc analysis.

METHODS: A total of 536 patients ≥ 65 years were included in this analysis, which pooled data from two 12-week, double-blind, placebo-controlled, randomized, parallel-group studies evaluating the efficacy and safety of once-daily tramadol ER (100, 200, 300, and 400 mg for Study A and 100, 200, and 300 mg for Study B) in patients (20-80 years) with moderate to severe pain from radiographically-confirmed osteoarthritis of the knee or hip. Arthritis pain intensity was assessed using a 100-mm (0=no pain, 100=extreme pain) visual analog scale (VAS). Joint pain and related symptoms including PRSD in elderly patients. The results of this analysis provide additional support for the use of tramadol ER in appropriate elderly patients with moderate to severely chronic osteoarthritis pain.

RESULTS: WOMAC Osteoarthritis Index subscale scores for pain, joint stiffness, and physical function of WOMAC Osteoarthritis Index composite score, and index and non-index joint pain intensity VAS scores improved significantly in the tramadol ER 300-mg group compared with placebo (all P<0.005). A significant decrease in awakening by pain at night and trouble falling asleep due to pain (8.1%, 3.7%, placebo) were observed. The most common adverse events in both studies were constipation, dizziness, nausea, headache, and somnolence.

CONCLUSION: In this post hoc analysis, tramadol ER reduced pain and related symptoms including PRSD in elderly patients. The results of this analysis provide additional support for the use of tramadol ER in appropriate elderly patients with moderate to severely chronic osteoarthritis pain.

33. Prophylactic ketoconazole shampoo for tinea capitis in a high-risk pediatric population: a randomized, double-blind, placebo-controlled trial. Brandon Bookstaver, Pharm.D., Candace2, Shauna Winters, Pharm.D., Richard Schultz, Ph.D.3, Holly Watson, Pharm.D.1; (1)South Carolina College of Pharmacy - USC Campus, Columbia, SC; (2)University of South Carolina College of Pharmacy, Columbia, SC; (3)University of Tennessee Medical Center, Knoxville, TN.

PURPOSE: The efficacy of topical agents such as selenium sulfide and ketoconazole as prophylactic agents for tinea capitis has not been reported.

The purpose of this study is to examine outcomes following implementation of a twice-weekly 2% ketoconazole shampoo prevention protocol in patients at a Medically Fragile Children's Program (MFCP).

METHODS: This was a retrospective study conducted at the MFCP with Palmetto Health Richland. The ketoconazole prevention protocol was initiated in April 2006 on selected patients. Data including patient demographics, wheelchair status, complexity of care, tinea capitis infections, and prophylaxis status were collected over 12 months pre- and 12 months post-protocol implementation periods. The primary outcome was the impact of prophylaxis on documented tinea infections between the 12 month pre- and 12 month post-protocol periods. Secondary outcomes included evaluation of risk factors for acquiring tinea infections and facility cost analysis. Analysis of variance was used to assess the impact of prophylaxis on subsequent infection.

RESULTS: Ninety-seven patients were included in the study and 78% were African-American with a mean age of 8.06 years (range 1–21). Forty-five patients (46%) were selected to the ketoconazole protocol arm. The use of prophylaxis was not associated with a reduction in tinea infections (p=0.192). Of evaluated factors, infections during the 12-month pre-protocol period was significantly associated with increased risk of subsequent infections post protocol implementation (p=0.003). Infections in months 1–6 prior to protocol initiation was more predictive than infections 7–12 months prior to protocol initiation. Monthly ketoconazole protocol costs were estimated at $1.28.

CONCLUSIONS: Prophylaxis with twice-weekly 2% ketoconazole did not result in a reduction of tinea capitis infections. The strongest predictor of tinea infections was a documented infection during the 6 months prior to protocol initiation. Documentation of this ketoconazole prophylaxis protocol should provide significant cost savings to the program.

Pharmacoeconomics/Outcomes

54. Primary atrial fibrillation: Inpatient resource use associated with choice of initial acute conversion therapy. Michael Belz, MD1, James Spalding, Pharm.D.2, Alex Exuzides, Ph.D.3, Sara Adams, M.P.H.4, Chris Colby, Ph.D.1; (1)Group Health Cooperative, Seattle, WA; (2)Astellas Pharma US, Inc., Deerfield, IL; (3)ICON Clinical Research, San Francisco, CA.

PURPOSE: To assess whether adjusted inpatient costs and length of stay (LOS) for atrial fibrillation (AF) patients were associated with the choice of initial acute conversion therapy.

METHODS: We extracted 2004–2005 discharges from Premier Perspectives™, the largest hospital service-level database in the US, with a perspective on documented tinea infections between the 12 month pre- and 12 month post-protocol periods. Secondary outcomes included evaluation of risk factors for acquiring tinea infections and facility cost analysis. Analysis of variance was used to assess the impact of prophylaxis on subsequent infection.

METHODS: We extracted 2004–2005 discharges from Premier Perspectives™, the largest hospital service-level database in the US, with a perspective on documented tinea infections between the 12 month pre- and 12 month post-protocol periods. Secondary outcomes included evaluation of risk factors for acquiring tinea infections and facility cost analysis. Analysis of variance was used to assess the impact of prophylaxis on subsequent infection.

RESULTS: 74,072 principal AF discharges were initially treated with amiodarone had the highest adjusted average costs and LOS among these patients.

Adjusted average LOS decreased to 3.7 days, also lower than EC (P<0.0001).

CONCLUSIONS: The highest adjusted average costs and LOS for amiodarone was significantly higher than all other AAs. Higher adjusted average costs and LOS for amiodarone, 3.8 for ibutilide and 4.0 for procainamide. The adjusted average LOS was 4.5 days for patients initially treated with EC, 5.2 for amiodarone, $4,489 for ibutilide and $3,873 for procainamide. Adjusted costs were $5,667 for patients initially treated with EC, $6,409 for amiodarone, $1,249.

55. Economic burden associated with dose-titration at initiation to managed care in patients with non-psychotic major depressive disorder. Fabian Camacho, M.S., M.A.1, Vijay Joshi, Ph.D.2, David Sheehan, M.D., M.B.A.3, Rajesh Balhrishan, Ph.D.1, (1)Pennsylvania State University College of Medicine, Hershey, PA; (2)Dannofit, Bridgewater, NJ; (3)University of Southern Florida, Tampa, FL; (4)The Ohio State University College of Pharmacy, Columbus, OH.

PURPOSE: Although serotonin reuptake inhibitors (SSRIs) are considered cost effective medications to treat major depressive disorders (MDDs), they are associated with significant dosage adjustments at treatment initiation. This study examined whether dose-titration in SSRIs was associated with significantly different resource utilization and costs in patients with MDDs enrolled in a managed care plan.

METHODS: A nationally representative cohort of individuals with MDD was identified in the PharMetrics database between the years 2004 and 2006. We used iteration algorithms to identify 838 patients starting new SSRIs treatment whose dosages were adjusted within 56 days of starting the therapy: sertraline (n=196), fluoxetine (n=209), escitalopram (n=186), paroxetine (n=147), and citalopram (n=100). Propensity scores were developed to adjust for selection bias and identify a 1:1 matched cohort of control subjects who were not dose titrated during the same period. We compared mean therapeutic days, health care service utilization and costs between patients who were dose titrated and the matched cohort.

RESULTS: Overall, within the first 56 days of new treatment initiation, the dose-titrated cohort had a 39% decrease in number of therapeutic days (38 vs. 53). 49% increase in depression-related outpatient visits (1.91 vs 1.28), and 24% increase in all-cause related outpatient visits (4.82 vs 3.88), leading to significant increase in direct and pharmacy costs and significant decrease in adjusted average cost and LOS ($5,667 vs $3,873).

CONCLUSIONS: MDD patients that are dose-titrated with SSRIs consume more medical and pharmacy resources and have greater days on sub-therapeutic dose compared to a matched group. Future research needs to determine whether there is a similar association when titration occurs during therapeutic switches and during longer period of time.

56. Primary atrial fibrillation: Adverse event-attributable inpatient costs by choice of treatment. Michael Belz, MD1, James Spalding, Pharm.D.2, Alex Exuzides, Ph.D.3, Sara Adams, M.P.H.4, Chris Colby, Ph.D.1; (1)Group Health Cooperative, Seattle, WA; (2)Astellas Pharma US, Inc., Deerfield, IL; (3)ICON Clinical Research, San Francisco, CA.

PURPOSE: To assess the incremental inpatient costs attributable to treatment-related adverse events (AEs) among atrial fibrillation (AF) patients undergoing acute conversion therapy.

METHODS: We extracted 2004–2005 inpatient discharges with a primary AF diagnosis and evidence of treatment with either electric conversion (EC) or with an IV anti-arrhythmic agent (AA) from Premier Perspectives™, the largest hospital service-level database in the US. AAs included amiodarone, ibutilide and procainamide. Inpatient costs and LOS were adjusted for comorbidities, demographic and hospital-specific factors. We computed adjusted average costs and LOS among patients initially receiving EC or AAs.

RESULTS: An estimated total of 74,072 principal AF discharges were initially treated with EC or IV AAs in the US during 2004 and 2005. Adjusted average costs were $5,667 for patients initially treated with EC, $6,409 for amiodarone, $4,489 for ibutilide and $3,873 for procainamide. Adjusted average LOS was 4.5 days for patients initially treated with EC, 3.2 for amiodarone, 3.8 for ibutilide and 4.0 for procainamide. The adjusted average cost and LOS for amiodarone was significantly higher than all other treatments (P<0.0001). When amiodarone was excluded from the AA group, adjusted average costs decreased to $3,902 compared to EC (P<0.0001) and adjusted average LOS decreased to 3.7 days, also lower than EC (P<0.0001). Significant clinical factors in these comparisons included anticoagulant treatment, use of cardiac rate regulators, the presence of comorbidities and use of secondary AF therapy.

CONCLUSIONS: There are significant inpatient cost and LOS differences among AF patients, depending on their initial therapy. Patients initially treated with amiodarone had the highest adjusted average costs and LOS among all evaluated therapies. Further research is warranted to assess whether other factors, such as time to conversion and adverse events, affect average cost and LOS among these patients.

57. Inpatient resource use associated with the treatment of secondary atrial fibrillation. Michael Belz, MD1, James Spalding, Pharm.D.2, Alex Exuzides, Ph.D.3, Sara Adams, M.P.H.4, Chris Colby, Ph.D.1; (1)Group Health Cooperative, Seattle, WA; (2)Astellas Pharma US, Inc., Deerfield, IL; (3)ICON Clinical Research, San Francisco, CA.

PURPOSE: We estimated incremental inpatient costs and length of stay (LOS) attributable to secondary atrial fibrillation (AF) in patients with and without cardiac predisposing factors to document the economic burden of this disease.

METHODS: We extracted 2004–2005 discharges from Premier Perspectives™, the largest hospital service-level database in the US, with a perspective on documented tinea infections between the 12 month pre- and 12 month post-protocol periods. Secondary outcomes included evaluation of risk factors for acquiring tinea infections and facility cost analysis. Analysis of variance was used to assess the impact of prophylaxis on subsequent infection.

RESULTS: Out of 100,038 principal AF discharges treated with EC or IV AAs, an estimated 27% had a treatment-related AE. Among patients who had an AE, 22% had hypotension and 37% experienced dysrhythmia. Adjusted inpatient costs for discharges with an AE were significantly higher compared to discharges without an AE (P<0.0001). AEs among patients receiving an AA at any time during the inpatient stay had the highest impact, contributing an average of $2,702 in additional adjusted costs. Hypotension and dysrhythmia AEs among patients receiving AA treatment were associated with an additional $1,232 and $1,054 in adjusted costs (P<0.0001), respectively. Among patients receiving treatment EC, hypotension AEs were not associated with a significant increase in costs (P=0.21), while EC patients with dysrhythmia AEs had an average incremental increase of $1,635 (P<0.0001).

CONCLUSIONS: Incremental costs attributable to AEs among AF patients are substantial and vary by type of acute conversion treatment received during an inpatient stay. For AAs, both dysrhythmia and hypotension AEs contributed significant incremental costs, while for EC, only dysrhythmia AEs increased costs significantly. Further research is warranted to assess the effectiveness of these therapies versus the resultant costs of potential AEs.
60E. Five-year investigation of pharmacoepidemiology among patients with community-acquired (CAP), healthcare-associated (HACP), hospital-acquired (HAP), and ventilator-associated pneumonia (VAP) patients. Jennifer Soun, Pharm.D., M.S.; Christine U. Oramasionwu, Pharm.D., M.Sc., Candidate. Mayo Clinic, Rochester, MN; (2)The University of Texas Health Science Center at San Antonio, San Antonio, TX; (3)Milliman, Denver, CO.

PURPOSE: To assess the indirect costs associated with treated versus untreated insomnia in employees aged 18-65 years.

METHODS: Employee health records were obtained from the Thomson Medstat Marketscan database (Jan 2004 to Dec 2005). Employees with at least 2 prescriptions for an individual insomnia medication (benzodiazepine [temazepam], nonbenzodiazepine [zaleplon, zolpidem, eszopiclone], or sedating antidepressant [trazodone at doses ≥ 150 mg]) and no prescription for an insomnia medication within 1.5 months prior to the initial prescription, over a 6-month time period were eligible for inclusion in the study. Using this study sample, productivity claims were obtained from the Thomson Medstat Marketscan database for the same time period.

Total annual indirect costs (absenteeism and short-term disability) were calculated on a per-person basis using productivity claims coupled with industry average salary, and compared to estimates for a similar population of employees with untreated insomnia (Ozminowski et al, Sleep 2007).

RESULTS: The mean age of employees ranged from 45 to 47 years for the different drug treatment groups. Six-month costs associated with absenteeism were lower for treatment groups ($964 nonbenzodiazepines, $1,174 benzodiazepines, $1,947 sedating antidepressant) compared with costs for untreated insomnia patients ($3,042). Costs associated with short-term disability were also lower for all treatment groups ($207 nonbenzodiazepines, $210 benzodiazepines, $208 sedating antidepressant) compared with untreated insomnia patients ($310). The total estimated annual indirect costs of insomnia in employees treated for insomnia were $2,341 (nonbenzodiazepines), $2,819 (benzodiazepines), and $3,509 (sedating antidepressants), compared to $6,704 for employees with untreated insomnia.

CONCLUSIONS: In the current analysis, pharmacologic treatment of insomnia was associated with cost savings for employers. These results suggest that it may be more cost effective to treat employees with insomnia and incur the initial costs of medication rather than forgo treatment and incur the initial costs of medication rather than forgo treatment. These results were consistent with previous studies and prior economic analyses that showed a decrease in indirect costs later.
61. Amiodarone side effects and monitoring: temporal trends, adherence, and clinical outcomes. Robyn M. Kondrack, Pharm.D., MBA1, Stephanie R. Maciejewski, Pharm.D.2, W. Michael Kutayli, MD1, Karen S. Rovang, MD1, Nazzi N. K. H. Davis, MD1, Thomas T. Hee, MD1, Hilleman, Pharm.D.1, 1Cardiac Center of Creighton University Medical Center, Omaha, NE; (2)The Cardiac Center of Creighton University Medical Center, Omaha, NE.

BACKGROUND: Amiodarone is an effective antiarrhythmic agent with a substantial risk of toxicity. Monitoring is recommended with the following minimum: 2 clinic visits per year including thyroid function tests (TFTs) and liver function tests (LFTs), annual eye exam (AEE) and chest x-ray (CXR).

PURPOSE: The objective of this study was to evaluate adherence to the minimum monitoring standards for amiodarone in two cohorts of patients (one treated between 1988–1992 and the other 2000–2004). Adherence to monitoring was correlated with adverse drug reactions and outcome of therapy.

METHODS: Consecutive patients initiated on amiodarone during 1988-1992 and 2000–2004 were followed prospectively. Only patients remaining on amiodarone for ≥12 mos were included. Patients with a minimum of 2 clinic visits having TFTs and LFTs, AEE and CXR were considered to be adherent and clinical outcomes.

RESULTS: 577 patients initiated on amiodarone during 1988-1992 and 532 during 2000-2004 were included. Mean follow-up was 22 months. Outcomes for all 1130 patients include: DC-LOE 18%; DC-AE 38%; C-NoAE 22%; and C-AE 22%. The proportion of patients compliant with follow-up was significantly greater in 1988-1992 (67%) compared to 2000-2004 (55%; p<0.05). Patients with the outcome of DC-AE were significantly more likely to be non-compliant with follow-up in both time periods (p<0.05). The most common types of side effects in the DC-AE groups were pulmonary, hyperthyroidism, neurologic (tremor), and hepatic.

CONCLUSION: Patients compliant with follow-up are less likely to discontinue amiodarone due to side effects than non-compliant patients. It is hypothesized that compliant patients have side effects that can be managed clinically which reduces the severity of side effects and reduces the number requiring drug discontinuation.

Pharmacoepidemiology

62E. Use of statin therapy in U.S. diabetics. Mandy Lee, DO1, Larry Segars, Pharm.D., DPh2, FCCP3, BCPS4; (1)Des Peres Hospital, Saint Louis, MO; (2)Kansas City University of Medicine & Biosciences, College of Medicine, Kansas City, MO.

PURPOSE: To assess the use of statins in U.S. diabetics.

METHODS: We utilized the 2002–2004 NAMCS and NHAMCS. Ambulatory visits associated with diabetes were identified using ICD-9-CM codes. Statin therapy was assessed using trade-generic name codes. The 2004 group consisted of patients with a diabetes diagnosis. The dependent variable was use of a statin with independent variables including region of country, age group, gender, ethnicity, race, physician specialty and medical degree, form of payment and study year.

RESULTS: A total of 1,304,978 visits, with 152,990,291 associated with a diabetes diagnosis, occurred from 2002–2004. Statin therapy was associated with only 21.1% of the diabetic population and only 14.1% of diabetics had hyperlipidemia. Diabetic males were 1.38 times more likely to be on a statin (OR=1.38; 95% CI 1.09, 1.73; p<0.007). Compared to 2002, diabetes treated in 2003 were 1.51 times more likely and patients treated in 2004 were 1.48 times more likely, to be on statin therapy (2003: OR=1.51; 95% CI 1.02, 2.24; p<0.040; 2004: OR=1.48, 95% CI 1.03, 2.15; p=0.036). Compared to patients aged 45–64 years, diabetics aged 1-24 were 90% less likely (OR=0.10; 95% CI 0.01, 0.84; p<0.034), those aged 25-44 years were 52% less likely (OR=0.48; 95% CI 0.31, 0.74; p<0.001), and those aged 65–74 years were 1.38 times more likely (OR=1.38, 95% CI 1.01, 1.80; p=0.043) to be on a statin. There was no difference between patients aged 75 years or older (OR=1.12; 95% CI 0.78, 1.61; p=0.535). Diabetics with hyperlipidemia were over 5 times more likely to be prescribed a statin compared to diabetics without this diagnosis (OR=8.15; 95% CI 3.47, 7.65; p<0.001). Finally, no differences were demonstrated with physician specialty or medical degree, region of the country, race, ethnicity, or form of payment.


Presented at 2007 Annual Meeting of the American College of Osteopathic Internists.

63. Use of statistical process control methods to identify adverse event trends associated with methadone as preferred long-acting narcotic analgesic. Vaughn L. Calberson, Pharm.D., Christopher T. Owens, Pharm.D.; Idaho State University College of Pharmacy, Pocatello, ID.

PURPOSE: The study objectives were to evaluate statistical process control (SPC) methods as a potential claims database surveillance technique to determine if any adverse respiratory events may have resulted from addition of methadone to a state Medicaid preferred drug list (PDL).

METHODS: Medicaid claims data were reviewed from 2000 through 2006 to identify patients taking methadone (n=8,816). Cases of possible methadone poisoning were identified using the following ICD-9 codes: methadone – 962.02, opioid poisoning – 965.00 and 965.09, and diagnosis codes related to respiratory failure in patient’s PDL record. Methadone poisoning cases were plotted for each quarter. The u chart plots control limits defined as three o (i.e., standard deviations) above and below the process mean and standard SPC run test rules were used to identify significant changes over time. A visual inspection of patient claims for the 14 patients with associated events during 2004 confirmed the likely association with methadone.

RESULTS: The proportion of methadone treated patients with a respiratory failure code nearly doubled (0.45% to 0.81%, p<0.05) during the second quarter of 2004 which temporally coincides with addition of methadone to the PDL. A second change in mean rate (decrease to 0.42%, p<0.05) was observed after January 2006 when elderly Medicaid recipients >65-years-old were moved to Medicare Part D. A u chart with combined endpoints of a respiratory failure or methadone poisoning code did not show any significant trends.

CONCLUSION: SPC methods successfully identified changing adverse event trends associated with addition of methadone to a Medicaid PDL.

64. Long-term drug utilization trends in acute uncomplicated cystitis. Brooke Pagimire, Pharm.D., Rex W. Force, Pharm.D., Christopher T. Owens, Pharm.D.; Departments of Family Medicine and Pharmacy Practice, Idaho State University, Pocatello, ID.

PURPOSE: Current guidelines recommend 3 days of trimethoprim-sulfamethoxazole (TMP-SMX) as first-line treatment for acute uncomplicated cystitis (AUC). Alternatives, including fluoroquinolones and nitrofurantoin, are recommended when community resistance rates exceed 20%. Literature suggests a lack of adherence to guidelines and that fluoroquinolone use is increasing. We examined fourteen years of Medicaid data to describe trends in AUC drug utilization.

METHODS: Paid medical and pharmacy claims were analyzed from 1994 through September 2007 to identify cases of acute cystitis. Complicated urinary tract infections were excluded. Office visits for AUC were identified and linked to an oral antibiotic claim within seven days. The percentage of cases treated annually with each antibiotic was determined and treatment duration (< 3, 3, 4–7, >7 days) for each regimen was established. Time trends for drug choice and treatment duration were plotted.

RESULTS: A total of 18,965 (yearly average: 1,354) cases of AUC were analyzed over the study period. The percent of office visits without a linked oral antibiotic was 28.2% in 2002 and decreased to 18.0% in 2007. Fluoroquinolone utilization increased from 7.1% in 1994 to a high of 24.9% in 2005. Nitrofurantoin utilization remained relatively consistent. In the last two years, over 80% of cases treated with TMP-SMX or a fluoroquinolone were for four or more days.

CONCLUSIONS: Since 1994, despite current recommendations, TMP-SMX utilization in the treatment of AUC has declined while use of fluoroquinolones has increased. A substantial number of office visits for AUC were not linked to oral antibiotic therapy, a possible limitation of retrospective data analyses. In many cases, treatment duration with TMP-SMX and fluoroquinolones appears to have been excessive.


PURPOSE: Geographic information systems (GIS) allow for the mapping of health data in order to visualize trends as it relates to geography. E. coli resistance rates are used for medication selection decisions in acute uncomplicated cystits (AUC). However, the resistance rates and medication selection may vary geographically. Additionally, it is unclear whether medication selection, resistance patterns, and treatment failure are linked. We examined the relationship between these three variables via mapping with GIS software across the counties in our state.

METHODS: Paid medical and pharmacy Medicaid claims were analyzed from October 2005 through September 2007 to identify cases of AUC. Complicated urinary tract infections (UTI) were excluded. Office visits for AUC were identified and linked to an antibiotic claim within seven days. Claims were grouped by initial antibiotic prescribed and mapped by county. Apparent treatment failure were defined as a subsequent UTI diagnosis with a
hospitalization and/or emergency department visit within 14 days, or a claim for a different antibiotic within 14 days. Treatment with trimethoprim-sulfamethoxazole (TMP-SMX)-treated cases, failure rates were mapped with the most recent E. coli susceptibility profiles from hospitals in each county. RESULTS: A total of 3,824 cases of AUC were analyzed over the study period. Among treated cases, 36.3% of 30.2%, and 22.3% were with TMP-SMX, fluoroquinolone, and nitrofurantoin, respectively. Among all cases treated initially with TMP-SMX, 12.8% had an apparent treatment failure. Apparent failure rates for initial fluoroquinolone and nitrofurantoin users were 14.1% and 12.7%, respectively. By county, E. coli resistance to TMP-SMX ranged from 9.38%, while apparent failure rates ranged from 1.8–18.8%.


Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

66. Computer-simulated pharmacokinetic feasibility and timing for transition from intravenous to oral nicardipine (Nicardipine HCL [HR], 1.30 ± 0.59 1.28 ± 0.46 1.40 ± 0.66 2.42 ± 1.17 and 0.327 for AUC

max

(max) 1

2

and AUC

for the MR vs. IR product were 92.4% (90% CI

max

1

1

2

Dale Yu, Ph.D.

Yilong Zhang,

Shuang Bai, Ph.D.

Janet K. Cheetham, Pharm.D.

Diane Tang-Liu,

Keith A. Moore, Pharm.D.

James L. Young, Ph.D.

Ralph A. Heasley, Ph.D.

Stephen E. Boesing, M.S.;

Xanodyne Pharmaceuticals, Inc., Newport, KY.

PURPOSE: To compare the pharmacokinetics (PK), safety and tolerability of single oral doses of two novel tranexamic acid (TA) tablet products in adult females during fasting and non-fasting conditions under development for a menorrhagia indication.

METHODS: Study 1 randomized 28 adult female volunteers to a single-dose, 4-way crossover comparative PK, bioavailability and bioequivalence study. A fasting single 1.3 g dose of the novel modified-release (MR) and novel delayed-release (DR) TA tablet were compared to a 1.3 g oral dose of an immediate-release (IR) tablet and 1g IV TA dose. Study 2 randomized 28 adult female volunteers to a single-dose, 4-way crossover comparative bioavailability study comparing the novel TA tablet product under novel fasting and non-fasting conditions. Both studies obtained serial blood samples over 36 hours separated by a washout period of 7 days. TA plasma concentrations were analyzed by GC/MS with PK parameters derived using standard approaches.

RESULTS: Twenty-six subjects completed Study 1. TA plasma concentrations post IV best fit a 3-compartmental model with absolute bioavailability of 46.0%, 44.9% and 32.4% for the IR, MR and DR product, respectively. Ratios of Cmean for the MR vs. IR product were 92.4% (90% CI 84.0–101.6) and 95.1% (90% CI 87.4–103.5), respectively. Cmax and AUC for the DR vs. IR product were significantly below the 90% CI acceptance range (80–125%). Twenty-six subjects completed Study 2. Ratios of Cmean and AUC, for the MR product under fed vs. fasting conditions were 106.8% (90% CI 97.2–117.1) and 115.4% (90% CI 106.5–124.9), respectively; DR did not pass the 90% CI range. Adverse events were low across all treatments. Gastrointestinal adverse events were observed with the IR and DR products.

CONCLUSIONS: The absolute bioavailability, comparable bioequivalence to the immediate-release product, lack of food effect and gastrointestinal tolerability of the modified-release TA product was demonstrated in females.


PURPOSE: To assess the pharmacokinetics (PK), safety and tolerability of multiple oral doses of two novel tranexamic acid (TA) tablet products in healthy adult females. The objective was to confirm the preferred product to advance into late phase clinical development for a menorrhagia indication.

METHODS: Two groups of 20 adult female volunteers were randomized in a parallel fashion. A single 1.3 g dose of either the novel modified-release (MR) or delayed-release (DR) TA tablet was administered with serial blood samples obtained over 36 hours. Multiple doses followed with the same product administered every 8 hours with serial blood samples obtained at day 5 over the last dosing interval. TA plasma concentrations were analyzed by GC/MS with PK parameters derived using non-compartmental and compartmental approaches.

RESULTS: Nineteen and 20 subjects were included in the pharmacokinetic and safety analyses for the MR and DR products, respectively. Steady-state mean Cmean, Cmax, and AUC for the MR product were 5.2 µg/mL, 15.8 µg/mL, and 74.8 µg h/mL, respectively, which approximate the desired therapeutic range of 5-15 µg/mL required to produce an 80% inhibition of plasmin activity. Cmax and AUC were lower for the DR product, and were significantly lower with greater variability compared to the MR product. Ratios of AUC

/AUC

inf

, for the MR and DR products were 97.3% (90% CI 86.5–109.5) and 107.7% (90% CI 89.2–130.1), respectively. Absorption kinetics determined by standard two stage (2ST) approach was best described by a mixed-order absorption rate constant for both products. A 3-compartment PK model best fit the population analysis. Adverse events were low for both products. The MR product demonstrated the best gastrointestinal tolerability.

CONCLUSIONS: The modified-release TA product was well tolerated, demonstrated time-independent pharmacokinetics (AUC

/AUC

peak

90% CI within 80–125% acceptance criteria) and produced acceptable peak and total systemic exposure after multiple dose administration in females.
70E. Effects of mometasone furoate on upper and lower airway inflammation in allergen-challenged Brown Norway rats. John C. Anthes, Ph.D.,1 Robbie L. McLeod, Ph.D.,1 Richard W. Chapman, Ph.D.,1 Yanlin Ju, Ph.D.,1 John E. Phillips, Ph.D.,1 James D. Tislow, Pharm.D.,2 (1)Neurobiology, Schering-Plough Research Institute, Kenilworth, NJ; (2)Schering-Plough Corporation, Kenilworth, NJ.

OBJECTIVE: To evaluate whether the trend in adults seeking medical care for the treatment of attention deficit/hyperactivity disorder (ADHD) reflects ongoing annual data from the U.S. National Ambulatory Medical Care Survey (NAMCS) were utilized for this analysis. The NAMCS is an ongoing annual survey of a representative sample of U.S. office-based physician practices. The number and rate of office-based physician visits resulting in a diagnosis of ADHD (International Classification of Diseases, 9th Revision, Clinical Modification code 314.00 or 314.01) among patients aged 20 years or older, were discerned for the years 1993 through 2004. Trend analysis was conducted using five time intervals: 1995–96; 1997–98; 1999–00; 2001–02; 2003–04.

RESULTS: Over the time-frame, national estimates of the number of newly diagnosed office-based physician visits documenting a diagnosis of ADHD among adults increased 4.7-fold, from 582,728 in 1995–96, to 2,738,285 in 2003–04 (p<0.05). Adjusted for population growth, the rate per year of office visits per 1,000 U.S. population aged 20+ years old resulting in a diagnosis of ADHD more than quadrupled, increasing from 3.1 per 1,000 in 1995–96, 13.0 in 2003–04. The majority of office visits documented a prescription for stimulant pharmacotherapy or atomoxetine (available since late 2002), increasing from 61.7% in 1995–96, to 77.8% in 2003–04.

CONCLUSIONS: As with children, the rate of adults seeking medical care for ADHD has increased significantly. By 2003–04, adults accounted for more than in 1 + 4 (28.8%) office visits resulting in a diagnosis of ADHD.


PURPOSE: In severe or very severe chronic obstructive pulmonary disease (COPD), the use of long-acting bronchodilators together with inhaled corticosteroids (ICS) remains standard of care according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines. Several clinical trials have evaluated the benefits and risks associated with combination therapy in terms of exacerbations, mortality, and quality-of-life. We sought to meta-analyze these studies to better elucidate the benefits and risks associated with adjunctive ICS therapy in COPD patients with severe or very severe disease.

METHODS: A systematic literature search was conducted through September 2007. Three efficacy endpoints [exacerbations, mortality, and change in St. George Respiratory Questionnaire score (SGRQ)] and two safety endpoints [pneumonia and oral candidiasis] were evaluated. A random-effects model was utilized. Statistical heterogeneity was addressed using the Q statistic and visual inspection of funnel plots. Egger’s weighted regression statistics were used to assess for publication bias.

RESULTS: A total of eight studies satisfied our inclusion criteria (totaling 12,340 subjects). Duration of study follow-up ranged from 24 to 156 weeks. Exacerbations (rate ratio, 0.80; 95% CI 0.71 to 0.90) and SGRQ score (weighted mean difference, −1.97 points; 95% CI 2.38 to −1.36) were reduced with adjunct ICS therapy but mortality was not significantly affected (relative risk, 0.91; 95% CI 0.76 to 1.08). Both pneumonia (relative risk, 1.57; 95% CI 1.16 to 2.13) and oral candidiasis (relative risk, 4.06; 95% CI 2.30 to 6.99) were increased with adjunct ICS therapy. Our analysis’ conclusions were not altered upon subgroup or sensitivity analyses evaluating salmeterol or formoterol with adjunct ICS therapy separately, removal of one study mandating tiotropium use, or when using a fixed-effects model.

CONCLUSIONS: Adjunct inhaled corticosteroids to long-acting bronchodilators can reduce exacerbation rates but increases adverse effects. Clinicians need to assess whether the benefits of therapy will be worth the risks and additional costs.

74. Mometasone furoate nasal spray exhibits 24-hour duration of effect in seasonal allergic rhinitis subjects in an environmental exposure chamber model. Piyush Patel, M.D.,1 Deepen Patel, M.D.,1 Gokul Gopalan, M.D.,1 James D. Tislow, Pharm.D.,1 Xin Yu, Ph.D.,1 Santosh Varghese, M.D.,2 (1)Allied Research International Inc., Mississauga, ON, Canada; (2)Schering-Plough Corporation, Kenilworth, NJ.

PURPOSE: Environmental exposure chamber (EEC) is a controlled environment for inducing allergen responses similar to those occurring outdoors on peak pollen days. This study measured duration of action of mometasone furoate nasal spray (MFNS) following initial and maintenance (7-day) dosing after ragweed exposure in EEC.

METHODS: As part of a double-blind, placebo-controlled, parallel-group study, 310 subjects with seasonal allergic rhinitis (SAR) received 1 dose of MFNS 200 µg or placebo on Day 1. A subset of 155 subjects were randomized to maintenance dose of MFNS QD (n=78) or placebo (n=77) (Days 2–7). On Day 1, after priming visits, subjects with minimal threshold total nasal symptom score (TNSS) ≥6/12 (composite of individual symptom scores for congestion, rhinorrhea, itchy, and sneezing, rated on 0–3 pts scale [0-none; 3-severe]) in conjunction with congestion score ≥2, entered EEC and were exposed to ragweed. After 1.5 hours, subjects with minimal threshold score were randomized to receive initial dosing at 2 hours, and remained in EEC for 6 hours. Subjects were evaluated in the subset of 155 subjects who continued MFNS dosing at home for 6 days, returning to EEC for a second 4-hour ragweed exposure on Day 8 (22-26 hours after last dose). Instantaneous TNSS was assessed on Days 1 and 8.

RESULTS: On Day 8, the MFNS group demonstrated statistically significantly...
greater improvements versus placebo: mean instantaneous TNSS was 7.21 vs 8.41, respectively, after 2 hours in EEC (p=0.02) (24 hours after last dose) and 7.50 vs 8.62, respectively, after 4 hours (p=0.03) (26 hours post last dose). Numerically greater reductions in TNSS were observed with MFNS versus placebo on Day 1. Most treatment-emergent adverse events (MFNS 15.7%; placebo, 10.3%) were moderate.

CONCLUSION: MFNS produced statistically significant improvements in TNSS in subjects with SAR that were sustained over 24 hours. Presented at To be presented at the meeting of the American Academy of Allergy, Asthma & Immunology, Philadelphia, PA, March 14-18, 2008.

73E. Mometasone furoate nasal spray increases time to recurrence of nasal polyps and decreases symptoms associated with adenoidal hypertrophy and snoring in pediatric subjects with allergic rhinitis. Talal Nsouli, M.D.1, Krishna Patel, Pharm.D.2.1; (1)Georgetown University School of Medicine, Burke, Washington DC, and the Allergy and Asthma Research Centers, Washington, DC; (2)Schering-Plough Corporation, Kenilworth, NJ.

PURPOSE: Allergic airway inflammation occurs not only in mucosa of the shock target organ, but also in corresponding lymphatic tissue. The adenoidal gland is the closest lymphoid tissue to nasal mucosa. Allergic rhinitis (AR) is a risk factor for adenoidal hypertrophy (AH), which results in significant morbidity including nasal obstruction, mouth breathing, and snoring.

OBJECTIVE: To assess the efficacy of mometasone furoate nasal spray (MFNS) in reducing adenoidal gland size and degree of snoring in pediatric subjects with AR.

METHODS: Twenty-four subjects with AH and history of chronic nasal obstruction and snoring received MFNS 100 µg QD for 8 weeks. Group A comprised 16 subjects (age range, 5-10 years) with clinical history of AR and negative skin prick test; control subjects in Group B (n=8; age range, 5-8 years) had no history of AR and negative skin prick test. Subjects with hypertrophic tonsils were excluded. Efficacy variables, assessed at Weeks 0 (baseline) and 8, were change in size of adenoidal gland and change in degree of snoring. Adenoidal gland size was evaluated by means of flexible fiberoptic rhinoscopy, graded as a percentage according to degree of obliteration of choanae. Degree of snoring was assessed with three-point snoring symptom scale: 0=absent, 1=intermitent, 2=continuous.

RESULTS: At Week 8, subjects in Group A reported significant improvement in snoring. Mean average score decreased from 2 at Week 0 to 0.4 at Week 8 (-50%) compared with Group B (mean average score decreased from 1.9 to 1.8, -5%). Mean average adenoidal size grade significantly decreased in Group A from 74.4 to 1.6 (-98%) during the study period; corresponding reduction for Group B was from 76.3 to 72.5 (-5%).

CONCLUSION: Once daily MFNS 100 µg is beneficial in treatment of AH and snoring and may reduce the need for surgical intervention in pediatric patients with AR.

Presented at Presented at the Annual Meeting of the American College of Allergy, Asthma & Immunology, Dallas, TX, November 8-14, 2007.

Smoking Cessation

78E. Tobacco cessation: adherence to treatment with varenicline and associated abstinence outcomes. Theodore C. Lee, M.D.1, J. Taylor Hays, M.D.2, Martina Flammer, M.D.3, Simon Davies, Ph.D.4, Simon Davies, Ph.D.1; (1)Pfizer Inc., New York, NY; (2)Mayo Clinic, Rochester, MN.

PURPOSE: Smoking cessation is critical for prevention of heart disease. Adherence to a medication treatment schedule is key to optimizing smoking cessation outcomes.

METHODS: Treatment adherence and abstinence outcomes were analyzed, using pooled data from two randomized, controlled, US trials of 1 mg twice daily varenicline and a multicenter, Asian trial using the same dose. All randomized (RAND) and Completer Subjects (COMP; i.e., subset of RAND subjects who took ≥21 dose of medication for 280 of the 12-week treatment period) were analyzed for efficacy outcomes. The primary efficacy endpoint was carbon monoxide-confirmed continuous abstinence rate (CAR) from Weeks 9–12 in varenicline-treated subjects versus placebo for both populations.

RESULTS: Continuous abstinence rates for all randomized and completer subjects

<table>
<thead>
<tr>
<th>CAR Weeks 9–12</th>
<th>RAND</th>
<th>COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varenicline n/N (%)</td>
<td>Placebo n/N (%)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Pooled US data</td>
<td>106/596</td>
<td>121/855</td>
</tr>
<tr>
<td>Asian data</td>
<td>73/126</td>
<td>80/124</td>
</tr>
</tbody>
</table>

*All P<0.001 vs placebo

CAR, continuous abstinence rate; CI, confidence interval; COMP, completer subjects; OR, odds ratio; RAND, all randomized subjects.

A trend was found toward improved CARs and ORs in COMP versus RAND subjects in the US trials, but similar trends were not present in the Asian trial. However, overall treatment adherence in the Asian trial was very high (varenicline: 92.1%; placebo: 96.8%) versus the US trials (varenicline: 69.4%; placebo: 60.0%), resulting in a higher percentage of subjects achieving COMP status.

CONCLUSIONS: Smoking abstinence is improved with varenicline versus placebo. Moreover, greater adherence to a prescribed 12-week course of varenicline may improve abstinence outcomes and thus, tobacco cessation intervention with varenicline should include a discussion of adherence to optimize outcomes.
Delayed quitting and long-term outcomes for smokers taking varenicline, bupropion and placebo. Theodore C. Lee, M.D.; David Gonzales, Ph.D.; Douglas E. Jorenby, Ph.D.; Thomas H. Brandon, Ph.D.; Carmen Arellano, Ph.D.; (1)Pfizer Inc., New York, NY; (2)Smoking Cessation Center, Oregon Health Sciences University, Portland, OR; (3)School of Medicine and Public Health Medicine, Madison, WI; (4)H Lee Moffitt Cancer Center & Research Institute, Tampa, FL.

Purpose: We evaluated the relationship between quitting patterns and long term outcomes of smokers on therapies approved for smoking cessation.

METHODS: Smoker quitting patterns (data on 2,722 participants) were identified and randomized in a study of 14 randomized controlled trials of varenicline, bupropion and placebo conducted between the years 2006 and 2009. These studies were selected to ensure comparability in participant selection, treatment allocation, and smoking cessation assessment methods. Following a 1-month treatment period, participants continued to be followed for 12 months. We excluded studies that did not have at least 1 month of follow-up post-treatment. We used logistic regression to evaluate the association between quitting patterns and long-term abstinence outcomes using the following quitting patterns: immediate quitters (ImQs; abstinent at all visits) or delayed quitters (DQs; smoking at ≥1 visits for Weeks 2 to 8). Analyses evaluated lapses and recovery of DQs during treatment, and long-term abstinence for ImQs and DQs for 40 weeks of post drug follow-up.

RESULTS: Delayed quitting occurred at each week up to Week 9 regardless of treatment with increases greater for VAR vs BUP or PBO. 24.0% of VAR subjects were ImQs vs 18.0% for BUP (P=0.0072) and 10.2% for PBO (P=0.0031). DQs were 20.0% for VAR vs 11.6% for BUP (P<0.0001) and 7.5% for PBO (P<0.0002). The rate of decline in CAR from Week 12 to 52 was nonsignificant (P=0.8251). DQs were 20.0% for VAR vs 11.6% for BUP (P<0.0001) and 7.5% for PBO (P<0.0002). The rate of decline in CAR from Week 12 to 52 was nonsignificant (P=0.8251). DQs were 20.0% for VAR vs 11.6% for BUP (P<0.0001) and 7.5% for PBO (P<0.0002). The rate of decline in CAR from Week 12 to 52 was nonsignificant (P=0.8251).

CONCLUSIONS: These data illustrate the importance of maintaining smokers in active treatment for at least 9 weeks, regardless of lapses or failures to quit early in treatment, and regardless of therapy. The more robust effects of varenicline on immediate and delayed quitting during treatment resulted in a superior long-term abstinence rate.

Presented at the 14th meeting of the Society for Nicotine and Tobacco Research, Portland, OR; February 27–March 1, 2008.

CLINICAL PHARMACY FORUM

Ambulatory Care

80. Extending the Prescriber Perceptions of the Use of Thiazide Diuretics.

Revis W. Blake, Pharm.D.; Richard M. Schult, Ph.D.; Jessica N. Taylor, Pharm.D. Candidate; South Carolina College of Pharmacy, University of South Carolina Campus, Columbia, SC.

Purpose: The Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends the use of thiazide diuretics as first-line therapy for uncomplicated hypertension, and evidence of cardiovascular protection, utilization of this drug class remains low within the Veterans Administration (VA). This study aims to identify and assess reasons providers at our institution refrain from prescribing thiazide diuretics.

METHODS: For the first time, VA Medical Center prescribers participated in focus groups discussing factors related to prescribing thiazides. A questionnaire was developed from the focus group discussion and distributed to VA prescribers.

RESULTS: The focus group identified hyperglycemia, gout, urinary frequency, hypokalemia, suilja allergies, impotence, elderly patients, and hypercholesterolemia as factors that could prohibit thiazide prescribing. Thirty questionnaires (64%) were returned from three VA sites. The medical conditions in which a majority of respondents would not prescribe thiazides, and the respective percentages, were as follows: gout (93.3%), urinary incontinence (56.7%), suilja allergies (53.3%), and hypokalemia (50.3%). Specific reasons within gout were inducing a gout attack (35.3%) and increasing uric acid levels (45.3%). A specific reason within suilja allergies was the possibility of cross-sensitivity with other suilja agents (40%). Prescriber response was not influenced by academic degree, with the exception of suilja allergies. In such patients, 78.6% of physicians would not prescribe thiazides, whereas only 33.3% of non-physicians would not prescribe them (P=0.0174).

CONCLUSIONS: This study identified medical conditions and reasons prescribers have avoided the use of thiazide diuretics. Additionally, discrepancies in prescribing patterns by academic degree were also identified. Educational programs are currently being implemented to provide evidence for use of thiazide diuretics in the identified medical conditions that will subsequently maximize utilization.

81. Medication Therapy Management Experience: from pharmacist contracting to patient care.


Objective: To describe our initial experience contracting with and providing medication therapy management (MTM) services for a large insurance company and to report intermediate outcomes.

Methods: Captured the timeline and details of contracting MTM services. The contracted contact was provided contact with the patient, provided 4 months of pharmacy claims data, each patients medication list and contact information. The pharmacist contacted patients once by phone and provided written recommendations to the patients and their primary care physician regarding medication therapy. Pharmacists documented all recommendations and estimated the potential financial impact of them. To determine 6 month financial outcomes based on pharmacy claims data only.

Results: With assistance of finance and legal expertise, it took 4 months to render a signed contract to provide MTM services. The insurance company provided 800 patients who received MTM services in the first 2 months. Determined by the clinical pharmacists, there were 200 recommendations made to optimize medication therapy for these 45 patients, with an estimate of potential savings of over $35,000 (cost avoidance), over $10,000 savings on medication costs as well as $6,600 in out of pocket savings for patients over the 12 months following MTM. The insurance company driven outcomes based on actual pharmacy claims assessed 90 days after MTM provided, revealed 0.17 savings for every dollar spent on clinical pharmacist consultant fees. These same outcomes determined the 6 months after MTM are pending.

Conclusion: As there is no recognized MTM service standard, each health plan and consultant vendor uses individual health plan specific criteria to formulate a contract. Contracting MTM services can be time consuming and may increase the expertise of the pharmacist. Enhancing patient’s data to include medication claims, lab values, prescription information is always desirable to provide a more complete consult opportunity exists to improve outcome measures by focusing on appropriate time frames, measurement goals and quality indicators.


Purpose: Establishing a pharmacist-run telephone based tobacco cessation program at the Department of Veterans Affairs San Diego Healthcare System (VASDHHS).

Introduction: The VASDHHS promotes tobacco cessation for all veterans. Many patients were started on cessation medications by their providers, but follow-up care was limited. To improve care and follow VA directive to make tobacco cessation more accessible to veterans, pharmacists at the VASDHHS set out to initiate a tobacco cessation clinic.

Methods: A protocol developed by physicians and pharmacists was approved by hospital policy to initiate a pharmacist-run tobacco cessation clinic. Pharmacists were given prescribing privileges. Tobacco Cessation Guidelines were used as the foundation for the clinic. Enrollment to the clinic was initiated by any provider or patients who wanted to enroll in the clinic. An educational pamphlet was designed to educate patients on tobacco cessation medications and cessation services. After enrollment, tobacco cessation pharmacists would make initial call and provide follow-up care for the entire quit attempt.

Result: The clinic was developed and successfully initiated in 2005. Since initiation, over 3000 patients have been enrolled with an average of 60 telephone calls per week. On average, there are 20 new patients each week. There are three pharmacists assigned to the clinic with total of approximately 12 hours weekly. Due to the workload, patients are required to be proactive and call the clinic to initiate the enrollment and follow up.

Conclusion: The pharmacist run telephone-based tobacco cessation clinic met an unfulfilled need at the VASDHHS. The clinic continues to enroll a large number of patients each week and is planning to expand the program. Despite some limitations, the clinic was successfully implemented and met the VA directive to make smoking cessation more accessible to the veterans.

83. Ten years of experience with a community based approach to improving diabetes care. Jessica Evelleth, Pharm.D.; James D. Hochmuth, Pharm.D.; John E. Sutherland, M.D.; Patricia A. Heh, R.N.; CDE, Chitra Reddy, M.D.; Katherine Renner, Pharm.D.; Kristi Kavanagh, Pharm.D.; (1)University of Iowa College of Pharmacy, Iowa City, IA; (2)University of Iowa College of Pharmacy/Northeast Iowa Family Practice Center, Waterloo, IA; (3)Northeast Iowa Medical Education Foundation, Waterloo, IA; (4) Allen Memorial Hospital, Waterloo, IA; (5) Cedar Valley Medical Specialists, Waterloo, IA.

Purpose: The Cedar Valley Community Diabetes Task Force was initiated in 1998 to enhance the application of practice guidelines, and to improve the care of diabetic patients in the Cedar Valley area.

Methods: A community based quality improvement program was implemented. Interventions during the ten years have been ongoing and multimodal in nature. Examples of interventions include: improved provider education, standardized community-wide diabetes flow sheets, and...
standardized eye care provider reporting to the primary provider. Every participating system submits at least 50 forms to selected participating sites to documents for evaluation annually. In 1998, 100 chart audits were completed from two participating clinics/systems in Watertown. By 2003, five health care clinics/systems were involved. In 2003 and 2007 there were 255 and 297 chart audits, respectively.

RESULTS: Diabetic process and outcome results were compared from 1998, 2002, and 2007. Implementation of the usage of the flowchart (54, 78, and 91%) improved during this time period (P=0.001). The percent of patients with HbA1c obtained within the past year was 70, 98, and 97% (P=0.001) and the frequency of HbA1c levels <8% was 54, 76, and 83% (P=0.001). The HbA1c value of <8% was used because that was the recommended goal in 1998. The percentage of patients with SBP <130 mm Hg was 36, 33, and 34% (P=0.02). Documentation of an eye exam at 36, 38, and 50% (P<0.001), foot exam (62, 62, and 77%, P=0.003), microalbumin level (24, 59, and 76%, P<0.001), and lipid profile (57, 77, and 90%, P<0.001) all improved during this 10 year period. The frequency of total cholesterol levels <200 mg/dL (40, 58, and 76%) showed a 2-fold improvement (P<0.001).

CONCLUSIONS: Diabetes care has improved significantly in our community over the past ten years. The diabetes quality improvement program has been a successful, collaborative intervention to facilitate and document this improved patient care.

Presented at the 42nd ASHP Midyear Clinical Meeting, Las Vegas, NV, December 2-6, 2007.

Cardiovascular


PURPOSE: Current American Heart Association/American College of Cardiology (ACC/AHA) guidelines recommend administration of aspirin (ASA) 325 mg for at least 1 month post-bare-metal stent (BMS) and 3-6 months post drug-eluting stent (DES) placement. To date no studies have evaluated the safety and efficacy of low-dose (LD) 81 mg versus high-dose (HD) 325 mg of aspirin therapy initiated immediately post-percutaneous coronary intervention (PCI) with DES. The purpose of this study was to evaluate effectiveness and safety of LD versus HD aspirin therapy in patients post-PCI with DES.

METHODS: A retrospective chart review was conducted in patients who received either a sirolimus or paclitaxel stent and on thienopyridine therapy post-PCI with DES.

RESULTS: Of the 448 patients evaluated, 264 patients receiving LD and 66 patients receiving HD aspirin therapy initiated immediately post-percutaneous coronary intervention had complete data available for the analysis. The incidence of MACE at 12 months was 1.9% with LD versus 3.0% with HD aspirin (P=0.08). Documentation of an eye exam was 38, and 50% (P<0.001), foot exam (62, 62, and 77%, P=0.003), microalbumin level (24, 59, and 76%, P<0.001), and lipid profile (57, 77, and 90%, P<0.001) all improved during this 10 year period. The frequency of total cholesterol levels <200 mg/dL (40, 58, and 76%) showed a 2-fold improvement (P<0.001).

CONCLUSIONS: Based on this small pilot study, the documentation of cardiac resuscitation events may be more efficient and provide a more complete record with use of a PDA documentation tool.

Clinical Administration

86. Utilization of clinical pharmacy services to improve compliance with surgical care quality measures. Rachel A. Strob, Pharm.D., Mary G. Manning, Pharm.D., B.C.P.S., Cynthia Annesski, M.D., Kellie Steinbrake, R.N., Banner Baywood Medical Center, Mesa, AZ.

PURPOSE: To describe the contribution of clinical pharmacy services within a multidisciplinary group of healthcare providers focused on improving patient care and clinical outcomes in surgery patients. In an effort to reduce mortality and morbidity in the surgical population, the Surgical Care Improvement Project (SCIP) was implemented as part of a national quality partnership of organizations. SCIP establishes a list of quality measures to decrease the risk for surgical complications related to infection, postoperative arrhythmias, and venous thromboembolism. ASPH has also focused on improving surgical care in the 2015 Initiative. Goal 4.4 requires pharmacy to participate in surgical antibiotic prophylaxis. Original abstraction data from Banner Baywood Medical Center for the first quarter of 2006 showed poor compliance with these quality measures. In October of 2006 a multidisciplinary team of surgical department leaders, quality management representatives, infection control, and clinical pharmacy was established to improve compliance and patient care. Clinical pharmacists provided drug information and SCIP policy education to a variety of multidisciplinary committees, worked with individual surgeons to change practices that were considered non-compliant, and updated preprinted orders for all consenting physicians to comply with SCIP measures. Pharmacy utilized the P&T committee to approve therapeutic substitutions, provided inventory management for approved antibiotics, and dispensed the first postoperative antibiotic dose in the post-anesthesia care unit to be transported with the patient to the surgical floor. Compliance data for the SCIP measures from the third quarter of 2007 reflected improved across all measures. SCIP Inf-1 increased from 58% to 95%, SCIP Inf-2 increased from 83% to 95%, SCIP Inf-3 increased from 65% to 79%.

87. Emergency department pharmacy program: a medication reconciliation improvement success. Lori M. Amborn, B.S., Pharm., D.(1), Miki L. Fininn, B.S., Pharm.D.(2), (1)Regions Hospital, St. Paul, MN; (2)University of Minnesota College of Pharmacy, Duluth, Duluth, MN.

In January 2006, The Joint Commission began requiring all member institutions to comply with the Patient Safety Goal regarding reconciliation of medications across the continuum of care. The medication reconciliation process contains several steps as outlined by The Joint Commission. Although this process appears simple in theory, many hospitals have found it to be an operational challenge. Concerns include: who provides the service, how can consistency be maintained throughout the organization, what is the information reliability, and what are the organizational costs? Our institution addressed these issues and arrived at the final conclusion that the gathering of this 10 year period. The frequency of total cholesterol levels 5 200 mg/dL (40, 58, and 76%) showed a 2-fold improvement (P<0.001).
being the most prominent. The success of the program has positively impacted patient safety and hospital policy adherence.

Community Pharmacy Practice
88. Identification of patients in need of medication therapy management services and finding of drug related problems. Deanne L. Hall, Pharm.D., CDE; Karen Patier, Pharm.D., BCPS, CDE; Yaramus Maria, Pharm.D., Saenz Rafael, Pharm.D., St. Denis Janet, BSPharm, Weber Robert, BSPharm, MS; University of Pittsburgh, Pittsburgh, PA.

PURPOSE: To evaluate if screening criteria to identify patients for medication therapy management correlate to finding a population in need as determined by identification of drug related problems.

METHODS: Patients were identified through criteria developed in accordance with Medicare Part D recommendations for Medication Therapy Management. > 65 years old, > 5 chronic medications, > 3 chronic disease states, presence of diabetes, adverse drug reaction and preventive care. Upon prescription intake the pharmacist would ascertain through interview and review the patient's profile if the patient met one or more of these criteria. Once a patient was identified, they were contacted to schedule a comprehensive medication therapy management visit with the pharmacist.

After each patient visit, the pharmacist documented identified drug related problems, need for education and recommendations.

RESULTS: Three-hundred and twenty-nine patients were identified as being in need of medication therapy management; 20% > 65 years old, 66% > 5 or more meds, 43% diabetes, 53% > 3 chronic disease states, 17% preventive care and 6% adverse drug reaction. Ninety-two patient encounters resulted in 121 identified drug related problems; 41 non-compliance, 26 needed additional diagnosis, 22 adverse drug reactions, 13 needed drug product, 11 dose to low, 5 unnecessary drug therapy, 3 dose too high and 80 opportunities for patient or physician education. Pharmacists provided 79 recommendations for change in medication therapy, resolved 5 adverse drug reactions and referred 1 patient to the emergency room.

CONCLUSION: Developed screening criteria resulted in the identification of 1.3 drug related problems per patient visit. Eighty-seven percent of patients were found to be in need of drug related education. This process supports that screening patients at the point of dispensing results in identifying patients in need of medication therapy management.

89. Development of a pharmacist provided immunization service in a diverse university setting. Deanne L. Hall, Pharm.D., CDE; Benjamin Anderson, Pharm.D., Robert J Weber, MS; University of Pittsburgh, Pittsburgh, PA.

PURPOSE: To develop a direct patient care service in which pharmacists provide influenza vaccinations in a variety of settings at the University of Pittsburgh, a large university with an associated medical center, to differing populations. In addition, the development of a mechanism of payment for each group will be individualized.

METHODS: Three target groups were identified; University of Pittsburgh employees, University of Pittsburgh Medical Center employees and non-employees. Pharmacist provided immunization services were arranged in various settings to allow for maximal access to vaccinations. The settings included dedicated time at the university hospital-based outpatient pharmacy, health fairs, vaccination clinics at identified buildings on campus and going to selected offices within the university and medical center. Payment mechanisms were developed to limit the out-of-pocket cost to the patient, while obtaining appropriate reimbursement for service.

RESULTS: Preliminary results show that 420 people have been immunized to date. Seventy-seven were health system employees, 139 were university employees and 204 were non-employees. Three hundred and twenty-seven were immunized at a pre-arranged vaccination clinic, 41 at their workplace, 29 at a health fair, and 23 at the pharmacy. Financial data will be assessed at the completion of the influenza vaccination season.

CONCLUSION: Pharmacists are able to provide immunizations in many settings through a large university health system setting to reach the various patient populations in addition to receiving payment for service.

90. The need of implementing cognitive services in a Puerto Rico’s chain drug store. Rolando L. Torres-Colon, Pharm.D., Frances Ortiz-Giuliani, MBA, Pharm.D., Leanne Lai, Ph.D.1; (1)Nova Southeastern University, Fort Lauderdale, FL; (2)Nova Southeastern University, Fort Lauderdale, FL.

PURPOSE: The purpose is to determine the needs to develop a community pharmacy clinic in a chain drug store in Puerto Rico.

METHODS: A random retrospective screening DUR was performed to identify which patient may need cognitive services due to their medication profile. Clinical guidelines were used to assess patients' appropriateness of therapy. Data was classified as chronic or acute conditions and patients that met the criteria agreed to participate. Patients' profiles < 21 years old were excluded. Encounter will be performed face to face by appointment; also walk-in patients would receive the services at no charge for an introductory period of 6 months.

RESULTS: Asthma, Diabetes, Hypertension and HIV diseases required the most pharmacists' intervention. The needs for services were presented to Pharmacy District Supervisor. Negotiations have been made and an agreement was signed. A complete office space separated from the pharmacy and equipped with monitoring machines and specific computer program were installed for cognitive services implementation. More specific data will be offered after clinic full achievement.

CONCLUSION: Several studies demonstrated the value of pharmacist's cognitive services in the community setting. However, little is known about these services in chain drug stores since there are always barriers to provide such services, particularly in high volume chain stores. This is the first time that a community pharmacy clinic is offered in a chain drug store, but also in Puerto Rico. Protocol and measuring instrument have been developed for interpretation and feasibility of this type of services and possible implementation at other chain drug store.

91. Retrospective analysis of alternative medical practices in a sub-rural West African university community. Sharon J. Omoruyi, B. Pharm, MSc1, Chris O. Imafidon, BSc, Ph.D., FRSH1, Mary O. Ologo, B., Pharm, MSc1, (1)Obafemi Awolowo University, Ile Ife, Nigeria; (2)University of East London, London E16 2RD, United Kingdom, (3)University of Ilorin, Ilorin, Nigeria.

Alternative Medical Practices (AMP) are therapeutic practices, though prevalent and openly accepted in Africa are not currently considered integral part of conventional allopathic medical practice. Alternative medicines often do not follow conventional biomedical or scientific explanations, but are based on belief systems not derived from modern science. There are reasonable argument that Alternative or Traditional Medical practices have no scientific bases, no apparent cure, and are not cost-effective. This means that the pharmacological / medicinal content of this simple medicine. The results are shocking, interesting and baffling, underscoring the need for more detailed randomized, double-blind investigation, and the safety and efficacy can be established, develop a program for inclusion of Traditional Medical practice in Worldwide Healthcare delivery.

Critical Care
92E. Failure to use a sedation order form results in increased ventilator days and intensive care unit length of stay. Stephen W. Nissen, Pharm.D, BCPS1, Erin J. Iselin, Pharm.D., Candidate1, Robert J. Weber, MS, Candidate2, (1)The Nebraska Medical Center, Omaha, NE; (2)University of Nebraska Medical Center, Omaha, NE, (3)University of Nebraska Medical Center, Omaha, NE.

PURPOSE: Our institution implemented a sedation protocol with an order form in 2003. The frequency of use of the order form and its impact on outcomes in our adult intensive care population was evaluated.

METHODS: Patients who received mechanical ventilation (MV) and continuous infusion (CI) sedation with propofol or midazolam were selected over a three month period. The patients sedated with the use of the order form were compared to a group managed without the form.

RESULTS: A total of 119 patients were evaluated. Of these patients, 49 (43.7%) used the sedation form. Those patients whose sedation was initiated by using the order form had more frequent sedation score assessment (2.1 vs. 3.1 hrs; p<0.05), less time between sedation vacations (30.1 vs. 41.0 hrs; p<0.05), and duration of sedation (2.6 vs. 3.0 days; p>0.05). The duration of MV was shorter in the order form group (4.7 vs. 5.1 days; p<0.05), ICU LOS was less (7.5 vs. 7.8 days; p<0.05) and ICU LOS was less after sedation ended (4 vs. 6 days; P=0.045). Of note, ICU LOS was shorter in those patients who received a daily sedation vacation versus those who did not (6.6 vs. 8.3 days; p<0.05), and length of MV was shorter in those patients who received a daily sedation vacation versus those who did not (3.5 verses 3.8 days; p<0.05).

CONCLUSIONS: The management of continuous infusion sedation in MV patients was improved by the use of a standard order form versus not using a form. The use of an order form reduced the length of sedation use, the
Drug Information

93. Evaluation of an erythropoiesis-stimulating agent therapeutic interchange program within a health system. Amy T. Sefek, Pharm.D.; Mandy C. Leonard, Pharm.D., BCPS; Radhika Nair, Ph.D.; Joannée Cook, Pharm D.; Rasheen C. Jackson, Pharm D.; Rachael M. Lerman, Pharm D.; Nicholas A. Link, Pharm D.; Chris Lowe, Pharm.D.; Jason Milner, Pharm D.; John Remchik, R.Ph.; Frank S. Rigelsky, Pharm D., BCPS; (1) Cleveland Clinic, Cleveland, OH; (2) Abbott Laboratories, Roundrock, TX; (3) Mount Carmel West Hospital, Columbus, OH; (4) Euclid Hospital, Euclid, OH; (5) Huron Hospital, East Cleveland, OH; (6) Hillcrest Hospital, Mayfield Heights, OH; (7) South Pointe Hospital, Warrensville Heights, OH; (8) Lakewood Hospital, Lakewood, OH.

RESULTS: The most common indication, dose, route, and frequency for ESA were chronic kidney disease (n = 125), 100 μg, subcutaneous, and QW, respectively; 71% were ESA naïve. Overall, 86% of patients met TI criteria for conversion of epoetin (EPO) to darbepoetin (DARB) based on TI criteria, 3) hemoglobin (≥2g/dl above baseline) occurred in 34% of patients. The results of the TI criteria 3) hemoglobin (≥2g/dl above baseline) occurred in 34% of patients.

METHODS: Records of inpatients (n = 172) and outpatients (n = 107) from 7/10 CCHS hospitals who received EPO or DARB were reviewed between 5/2006-5/2007. Demographic data, ESA, dose, route, frequency, and indication were collected along with naïve or non-naïve ESA status, hemoglobin, iron studies, and concomitant therapies.

RESULTS: For inpatients, the most common indication, dose, route, and frequency for EPO was chronic kidney disease (n = 125), 100 μg, subcutaneous, and QW, respectively; 71% were ESA naïve. Overall, 86% of patients met TI criteria for conversion from EPO to DARB. Dose and frequency were converted appropriately in 94%. Inpatients received a mean of 1.97±1.72 doses during a mean length of stay of 13.78±9.18 days. Outpatients received a mean of 7.61±6.25 doses during a mean of 23.9±18.42 weeks of therapy. Target hemoglobin (≥12g/dl or ≥2g/dl above baseline) occurred in 34% of patients. During ESA treatment, 71 inpatients and 16 outpatients received transfusions. The majority of patients did not have iron studies performed at baseline (72%) or after baseline (68%).

CONCLUSION: CCHS pharmacists are appropriately adhering to the ESA TI, with opportunity for improvement in dosing and frequency conversion as the program continues. Concomitant conditions and unknown iron status may have contributed to the lower than expected efficacy. Education for providers is planned. These data will be used to assess the impact of the new CMS reimbursement for ESAs.

Education/Training

94. Performing a drug use evaluation as part of a clinical pharmacy practice course. Anna M. Wodlinger Jackson, Pharm.D.; Jason C. Gallagher, Pharm.D.; Temple University School of Pharmacy, Philadelphia, PA.

PURPOSE: The purpose of this project was to determine the feasibility of conducting a drug use evaluation (DUE) as part of a clinical pharmacy practice course.

METHODS: Students in the Advanced Clinical Practice Track at Temple University School of Pharmacy were enrolled in an elective course titled Advanced Clinical Practice II. As part of the course requirements, students completed a DUE under the guidance of a preceptor. Drugs to be evaluated were chosen based on the needs of the pharmacy department at Temple University Hospital (TUH). Students were divided into groups of 3 or 4 and assigned a preceptor who had experience with the drug being evaluated. Students identified the issues and subsequently developed data collection forms which then were presented to the class for comment. Data collection occurred during class time in the computer lab using scanned electronic medical records from TUH. Data analysis was then performed and students both presented their data to the class and submitted a written summary. Classroom training was provided for each step in the process of completing the DUE.

RESULTS: Twenty-eight students have completed the course in its first two years. DUEs were completed for pantoprazole IV, vancomycin, ondansetron IV, levobunolol, entacapone, methylphenidate, and phenytoin. Eight of the nine groups of students chose to present their results at a national pharmacy meeting. Results were also shared with TUH pharmacy administration and presented to pertinent hospital committees.

CONCLUSION: It is feasible to complete DUEs within a didactic course that are valuable to a hospital.

95. Experience with a standardized patient counseling activity. Mirza Perez, Pharm.D., BCPS, Deborah De Eugenio, Pharm.D, Jason Gallagher, Pharm.D.; Temple University School of Pharmacy, Philadelphia, PA.

PURPOSE: To assess student-patient interactions and counseling skills using standardized patient (SP) scenarios.

METHODS: Two ambulatory counseling scenarios were developed by a clinical pharmacist for third professional year pharmacy students. The two main drugs for counseling were warfarin and insulin lispro. The standardized patients had no medical background. They were provided with a detailed medical history anticipating different questions from the students and were trained to behave in a pleasant and cooperative way but with concern about their medical problems. Students were evaluated based on accuracy of the information provided and their counseling technique. Appropriate technique included use of interpretation terminology, use of open-ended questions, appropriate nonverbal behavior, empathy and other criteria. The encounter was recorded on video and the videotape was evaluated by faculty members and the participating student.

RESULTS: Sixteen students participated. The most common problems encountered were: incomplete patient assessment (13/16), encountered explanation of drug indication (12/16), excessive use of medical terminology (11/16), and lack of empathy (12/16). Most students were not able to assess the patient appropriately because they did not ask enough questions. All of the students assessed the activity as helpful and as better than counseling activities performed in the classroom with peers. Two students did not feel prepared to counsel the patient and four students felt uncomfortable by being video-taped. Fifteen of the students would like to repeat this activity and all of them felt like they were counseling a real patient.

CONCLUSION: The use of standardized patients to evaluate counseling skills was successful. The students and faculty were able to assess strengths and areas of improvement to a greater degree than in the standard classroom setting.

Emergency Medicine


PURPOSE: The pharmacy department within the Veterans Affairs (VA) Boston Healthcare System has recently allocated a decentralized pharmacy service to the emergency room (ER) at the West Roxbury campus. This initiative was implemented in response to the standards placed by the Joint Commission and Institute for Healthcare Improvement (IHI) to decrease medication discrepancies and increase safe utilization of such medications.

METHODS: The evaluation of this implementation was achieved through a multiple point staff questionnaire administered to nurses and physicians in the ER. The questionnaire consisted of validated survey questions with Likert scale responses. In addition, pharmaceutical interventions made were recorded and collected for the complete evaluation of this new service. No patient specific data was used during this evaluation.

RESULTS: The survey results showed an overwhelming 85% of ER employees thought the technical and clinical skills provided by the pharmacist was an imperative component to EM services. Results demonstrated that 69% of employees stated reconciliation completed prior to admission was beneficial during the admission process. In addition, 77% stated the pharmacist optimized patient care and proved to be an essential component to the ER service.

CONCLUSIONS: The trial of emergency pharmacy at the Boston VA has proved to be beneficial to both staff and patients in the ER. Services provided were documented to be a vital component to emergency medicine. The trial was a successful addition to the multitude of pharmacy services provided throughout the Boston VA.

Family Medicine

97E. Diabetes self management education program in a family medicine residency program. Lori L. Dickenson, Pharm.D., FCCP, BCPS, Sarah Shreider, Pharm.D., BCPS, Andrea Wessell, Pharm.D., BCPS, Kelly Ragucci, Pharm.D., FCCP, BCPS, Gibson Maria, M.D., Ph.D.; Medical University of South Carolina, Charleston, SC.

Diabetes care accounts for many visits to primary care providers, and pharmacists are often members of the care teams in this setting. Diabetes self-management education (DSME) programs have been proven to improve glycemic control and can be implemented in a family medicine residency program as a model of collaborative and quality care. In the Medical University of South Carolina Department of Family Medicine, more than 200 patients have participated in our American Diabetes Association-recognized...
Hematology/Anticoagulation


Management of anticoagulation in hospitalized patients with multiple medications and co-morbid conditions can be challenging, particularly after major surgery. Previous studies have demonstrated the value of specialized anticoagulation management services, especially in the outpatient setting. The purpose of our retrospective study was to determine the clinical and economic benefits of an anticoagulation management service (AMS) in post-operative cardiac surgery patients. Using administrative and clinical databases, we assessed the impact of specialized anticoagulation management in consecutive cardiac surgery patients hospitalized before (1/1/2003–3/30/05) and after (6/10/05–12/31/05) provision of a specialized AMS. Outcome measures were the number of INR values > 5, the number of clinically significant episodes of bleeding or thromboembolism (venous thromboembolism or cerebrovascular accidents), the post-surgical length of stay (LOS) and the total attributable costs of hospitalization and re-operation for bleeding. Comparisons between the study groups were conducted using a χ² or Fisher’s exact test for categorical measures and a student’s t-test or Wilcoxon rank sum test for continuous outcome measures. Analyses were performed using STATA, version 9.0 (Stata Corp., College Station, TX).

Eight hundred twenty seven patients were admitted during the study period, 674 patients before and 153 patients after institution of the AMS. AMS care was associated with a decrease in the percent of patients with INR values > 5 (13% versus 7%; p<0.036) and a trend toward fewer bleeding episodes requiring a return visit to the operating room (8 versus 0, p<0.05). No difference in post-operative thromboembolic events (8% versus 11%, p<0.05) was noted. Post-operative LOS declined from 13.9 days to 11.6 days after institution of the AMS (p<0.003). The annual attributable cost of inpatient care was estimated to be $280,000. Our study demonstrates that a specialized AMS is associated with improved clinical and economic outcomes for cardiac surgery patients.


101. Results of implementation of a pharmacist-managed direct thrombin inhibitor protocol. Jason A. Hoffman, Pharm.D. 1, Amanda C. Schutt, Pharm.D. 2, Linda R. Young, Pharm.D. 3; (1)Carilion Roanoke Memorial Hospital, Roanoke, VA; (2)Medical University of South Carolina, John’s Island, SC.

PURPOSE: Direct thrombin inhibitors (DTIs) were used for the treatment of heparin-induced thrombocytopenia (HIT) present problems due to limited management experience and confusion on proper drug selection, dosing, and monitoring. We sought to evaluate the implementation of a pharmacist-managed DTI protocol in patients being treated for known or suspected HIT. METHODS: A protocol was approved by the P&T Committee and implemented in October 2006. Adult patients receiving argatroban, lepirudin, or bivalirudin between April 2006 and April 2007 were retrospectively reviewed. Patient's creatinine clearance and liver function tests, goal activated partial thromboplastin time (aPTT), frequency of aPTT measurements, and orders for dosage adjustments were documented.

RESULTS: Forty six patients were included (argatroban, n = 43; lepirudin n=3). Pharmacist-managed patients on argatroban (n = 22) resulted in more appropriate starting dose based on hepatic function (100% vs. 86%), more appropriate orders for dosage adjustments were documented.

Hematology/Anticoagulation

DSME program. All patients with type 1 or type 2 diabetes, regardless of glycemic control, are invited to participate in the program. After obtaining informed consent, patients have an intake assessment, participate in an educational curriculum, attend shared medical appointments and diabetes group meetings. Data is collected on quality process and outcome measures (hemoglobin A1C [HbA1c], low-density lipoprotein [LDL] cholesterol, blood pressure [BP], urine microalbumin, retinal exam, foot exam, pneumococcal vaccinations, thyroid panel, and serum creatinine) and behavioral outcomes (7 day assessment scale, psychosocial distress scale, depression screening, and patient satisfaction) at baseline and every 3 to 6 months thereafter. At baseline, the mean age is 50.9 +/- 12.4 years, is 51% African American and 49% Caucasian. Mean HbA1c and LDL values have decreased from 9.0 +/- 2.2% (p<0.0001) and the proportion of patients with HbA1c values less than 7% has increased from 20.3% to 36% (p<0.0001). The mean LDL value has decreased from 120 +/- 59 mg/dL to 104 +/- 37 mg/dL (p<0.0001), and proportion of patients with BP control (<130/80 mmHg) has improved from 16.2% to 55% (p<0.0001). Patients have shown improvements self-reported diet, exercise and foot care practices (p<0.05) and a reduction in the level of diabetes-related distress. Collaborative DSME programs in family medicine are an effective tool for managing diabetes.

Fellowship is supported by the Society of Teachers of Family Medicine, Chicago, IL, April 2007.

98E. A statewide competency-based pharmacotherapy curriculum for family medicine residents in South Carolina. Lori L. Dickerson, Pharm.D., FCCP, BCPS 1, Adrienne Ables, Pharm.D, 2, Sandra Counts, Pharm.D., BCPS 3, Kelly Jones, Pharm.D, BCPS 4, Sharrn Steadman, Pharm.D., BCPS, CDE 5, (1)Medical University of South Carolina, Charleston, SC; (2)Spartanburg Regional Health Care System, Spartanburg, SC; (3)Anderson Family Practice Center, Anderson, SC; (4)McLeod Family Medicine Center, Florence, SC; (5)USC Department of Family and Preventive Medicine, Columbia, SC.

In 2001, pharmacists in the family medicine residency programs in South Carolina collaborated to develop an on-line pharmacotherapy resource to accompany their current and rotations for family medicine residents. This curriculum was identified as a tool to evaluate the Accreditation Council for Graduate Medical Education medical knowledge core competency. Through initial funding (2001) and renewed support (2006) from the South Carolina Area Health Education Consortium, this curriculum has grown to include 46 modules and more than 400 enrolled residents and faculty. Each module contains suggested reading materials and a multiple choice quiz, and is housed in Web-CT. Topic areas were determined based on the American Board of Family Medicine in-training examination and American Academy of Family Physicians core curriculum. Pharmacists were assigned topic areas, identified reading materials and developed multiple choice questions with detailed feedback, which were peer reviewed by the group and by physicians using the in-training examination (ITE) and recommendations. The ITE curriculum has included 36 modules to date. Since 2003, the daily curriculum to include modules on evaluation and diagnosis. After testing and implementation of these modules, the question databank and reading materials will be merged into one curriculum for a more global evaluation of the curriculum to include modules on evaluation and diagnosis. After testing and implementation of these modules, the question databank and reading materials will be merged into one curriculum for a more global evaluation of medical knowledge.


98. Evaluation of a pharmacotherapy clinic’s impact on lipid management in diabetic patients. Dana G. Carroll, Pharm.D. 1, John Higginbotham, Ph.D., M.P.H. 1, Douglas N. Carroll, Pharm.D. 1, (1)Auburn University Harrison School of Pharmacy, Tuscaloosa, AL; (2)Rural Health Institute for Clinical and Translational Science, The University of Alabama, Tuscaloosa, AL.

PURPOSE: A pharmacist managed pharmacotherapy referral clinic (PC) was established in the Fall of 2001 at the University of Oklahoma (OU) -Tufts Family Medicine Clinic. The goal of this study was to assess the impact of the PC on managing diabetic patients’ lipids according to American Diabetes Association standards.

METHODS: This study was approved by the OU Health Science Center IRB and was conducted from January 2002 to December 2004 by retrospective chart review. Inclusion criteria included: OU–Tufts Family Medicine referred patients to the PC during the study period.

RESULTS: One hundred twelve patients met inclusion criteria. Eighty-five percent of patients in this study had at least one documented treatment compliance issue and 42% had multiple issues. The most common reason given for noncompliance with treatment plans was financial limitations (68% of patients).

In 2002, 34.2% of patients were below goal LDL levels (less than 100 mg/dL). In 2003, the percentage meeting goal increased to 49.3% and to 58.5% in 2004. The mean LDL levels decreased over time from 110 mg/dL in 2002 to 98 mg/dL in 2003 to 92 mg/dL in 2004. Triglycerides also decreased from a median of 227 mg/dL in 2002 to 181 mg/dL in 2004. Median was used for TG due to significant outliers. The HDL levels remained unchanged throughout the study period with a mean of 44 mg/dL. No variables were identified that significantly impacted the achievement of goal LDL levels. However, this may be due to the small sample size.

CONCLUSIONS: The number of diabetic patients seen in the PC achieving goal LDL levels increased over the three year study period. Mean LDL and TG levels decreased over the study period while HDL remained unchanged.
CONCLUSIONS: A pharmacist-managed DTI protocol resulted in more appropriately written orders for monitoring DTIs. In 2008, the Joint Commission will require a reduction in the likelihood of harm associated with anticoagulation therapy as one of its National Patient Safety Goals. This study demonstrated that a pharmacist-managed DTI protocol offers potential to improve the quality of patient care for known or suspected HIT.

Infectious Diseases

102. Review of a treatment algorithm for community-associated methicillin-resistant Staphylococcus aureus (CA-MRSA) skin infections. Mariel Segarra-Newnham, Pharm.D., M.P.H., FCCP, BCPS; Veterans Affairs Medical Center, West Palm Beach, FL.

BACKGROUND: After an increase in the number of patients presenting to our emergency room (ER) with CA-MRSA skin infections, a treatment algorithm was developed in 2004. A revision of the original algorithm was done in 2007 due to CA-MRSA epidemiology changes.

OBJECTIVE: To describe changes in CA-MRSA epidemiology that warranted a treatment algorithm change.

METHODS: Patients presenting to the ER with CA-MRSA skin infections within the last year were reviewed applying the original algorithm that included an MRSA risk assessment, emphasized ER presentation and did not include recommendations on incision and drainage (I&D).

RESULTS: More than 90% of 40 patients presented to the ER in the first eight months; however, an increasing number of cases were presenting to primary care clinics, particularly with recurrent episodes and treatment for CA-MRSA was sub-optimal in this setting. In addition, around 25% of CA-MRSA cases were not considered high risk based on the algorithm risk assessment. When the algorithm was implemented, the risk assessment classified only 5% of CA-MRSA cases as low risk. New data suggested that for small abscesses, I&D was sufficient. Therefore, a new algorithm that provided for treatment in all ambulatory settings, encouraged I&D for small abscesses and facilitated empiric treatment for CA-MRSA in all cases of suspected Staphylococcal infection, regardless of perceived risk, was developed. Initial feedback from providers has been positive. A one-year post implementation review is planned.

CONCLUSIONS: CA-MRSA infections are increasingly common in all ambulatory settings. A treatment algorithm that initially facilitated the care of these patients in the ER only needed to be revised after changes in the epidemiology of this disease were observed. The new algorithm provides for empiric treatment for MRSA in all cases of suspected Staphylococcal skin infection regardless of perceived risk or setting. The new algorithm has been well received.

103. Implementation and evaluation of a community acquired pneumonia pathway in hospitalized patients. Kathryn A. Taylor, Pharm.D., Dustin Dickerson, Pharm.D., Stephen T. Hanson, Pharm.D, Jason Hiett, Pharm.D., Judy Harrer, Ph.D.; VA Medical Center, Cincinnati, OH.

PURPOSE: Community acquired pneumonia (CAP) is the leading cause of death from infectious disease in the United States; however appropriate and timely therapy can greatly reduce complications. The implementation of clinical pathways has permit the practitioner through proper work-up and therapy have been shown to increase compliance with guidelines, reduce length of stay, and improve patient outcomes. The objective of this research was to evaluate the effectiveness of a treatment pathway for CAP at the Cincinnati VA medical center. The purpose of the order set was to help guide therapy and expedite the first dose of antibiotic for early administration in the emergency department (ED).

METHODS: In February 2005, a CAP treatment pathway was developed in the computerized patient record system (CPRS) based on the 2003 guidelines of the Infectious Disease Society of America. Pre and post-implementation were compared for mean time to first dose of an antibiotic and percent of patients receiving the initial dose within 4 hours of presentation to the hospital ED.

RESULTS: Significant improvements were seen in mean time from presentation to first dose of antibiotic (417 min pre-protocol, vs. 173 min post-protocol, p<0.001) and percent of patients receiving the first dose of antibiotic within 4 hours of presentation to the hospital (32% pre-protocol vs. 71% post-protocol, p<0.001). Results continued to improve and in fiscal year 2007, 94% of patients with CAP received their first dose of antibiotic within 4 hours of presentation to the ED.

CONCLUSIONS: Development and implementation of computerized order set significantly improved timing of first dose of antibiotic in patients with a diagnosis of community acquired pneumonia.

International Health

104. Development and implementation of a barcoding system to determine critical re-order medication levels in an international outpatient pharmacy. Matthew J. Brown, Pharm.D., candidate; Kathryn Clark, Pharm.D, candidate; Patricia V. Klein, Pharm.D., candidate; Patricia R. Wijga, Pharm.D.; BCPS; Jennifer P. Askew, B.S., Pharm.D.

METHODS: A Microsoft Access database was created to contain medication-related information. The medication-related information included a sample field clinic list which could automatically deduct items taken into the field, an add/delete function to maintain inventory as medications were brought into, or dispensed from, the pharmacy, and an easily accessible list of medications approaching critical threshold levels. A full inventory of the pharmacy was performed and these medications were entered into the database. Barcodes for the most commonly dispensed medications were generated and the barcoding device was connected to the clinic pharmacy computer. The staff was trained on the appropriate use of the database and the need to upload it regularly to a protected internet site, which is viewable by support staff in the U.S. This process was completed in 7 days.

RESULTS: An interdisciplinary team of pharmacists, physicians, and a nurse were trained on the appropriate use of the barcoding system. New medication categories have been added for database ease of use and the database has been uploaded to the internet without difficulty. Medications at threshold levels have been re-ordered and will arrive with the next medical brigades to the pharmacy.

CONCLUSION: A successful barcoding system for medication re-order was developed and implemented in an outpatient pharmacy in Honduras. This system allows for changes in prescribing habits, as well as the prompt re-order of medications, as medication threshold levels are approached.

Managed Care


PURPOSE: Diabetes has reached epidemic proportions nearing seven percent of the United States population; complications associated with this condition are serious and life-threatening, often leading to increased healthcare utilization. Humana understands the reduction of complications and improvement in quality of life for its members through effective diabetes management. With this focus, the pharmacy and case management have been dedicated to manage high risk members with diabetes via telephonic consultations. The overall primary outcome is adherence to current American Diabetes Association Standards of Care outcomes. Secondary outcomes include hospitalizations and emergency room / urgent care utilization.

METHODS: Members enrolled in Humana’s Senior Case Management program with a Medicare Risk Adjusted (MRA) score of 2.5 or above and ICD-9 codes indicating a diagnosis of diabetes are eligible for diabetes case management. Members are routed to pharmacy case management at the discretion of the nurse case manager, with suggested triggers including hypertension and cholesterol management, blood glucose testing, diabetes medication selection / review, cardiovascular disease and risk factors, tobacco use, acute care issues and medication adherence. The nurse and pharmacist document goals and interventions in the diabetes care plan.

RESULTS: Results pending include number of patients referred for pharmacy case management as well as number of patients who participated in a consultation, interventions addressed during the consultation and available outcomes of those interventions / consultation.

CONCLUSION: Humana has implemented an internal diabetes case management model using an interdisciplinary approach to improve member health and reduce member health care costs as a result of improving diabetes management. The model could guide open and closed managed care plans in managing high risk diabetes patients.

Medication Safety


PURPOSE: To avoid medication discrepancies, the Joint Commission mandates medication reconciliation upon hospital admission. The Veterans Affairs Healthcare System (VA) is the largest healthcare system in the United States; however the nature of medication discrepancies upon admission in the
VA is unknown. This study characterizes the frequency and nature of medication discrepancies between the patient's home regimen and admission orders in the VA.

METHODS: This study was approved by the Institutional Review Board. Patients admitted to medicine and surgical floors of our 150 bed, urban, academic veterans hospital are eligible. Clinical pharmacists obtained a comprehensive medication history within 24 hours of admission including reviewing the medication list and vials, Electronic Medical Record (EMR) review and contacting outpatient providers; a medication reconciliation note is then entered in the EMR. Patients without this note were excluded. Discrepancies are classified as unintentional (true errors) or intentional (induced changes) based on confirmation with the ordering provider. Unintentional discrepancies are characterized for frequency and type: omission (deletion of drug used before admission), commission (addition of drug not used before admission), dose, interval and other.

RESULTS: Among 139 patients, 39 patients were excluded from the study leaving 100 subjects for analysis. The total number of unintentional and intentional discrepancies for all 100 patients was 938. Sixty-two subjects (62%) had 112 unintentional discrepancies (Mean 1.8 unintentional discrepancies per admission/administration [24%]) had 9 or more unintentional discrepancies and 7 (11%) had 4 or more unintentional discrepancies. Types of unintentional discrepancies included: 76 omission (67%), 24 dose (21%), 8 interval (7%) and 4 commission (4%).

CONCLUSIONS: Medication discrepancies are common upon admission at a VA hospital. They are often unintentional and errors of omission are most common. Future analyses will determine reasons for these discrepancies and clinical impact.

107. Impact of safety interventions on inpatient colchicine use. Terry L. Seaton, Pharm.D.1, Nicholas J. Herrmann, (student)2, Richard M. Rechley, R.Ph.1,2, Thomas A. Bailey, M.D.1,3, St. Louis College of Pharmacy, St. Louis, MO; (2)BJC HealthCare, St. Louis, MO; (3)BJC HealthCare and Washington University School of Medicine, St. Louis, MO.

PURPOSE: This study evaluated the appropriateness of colchicine use and its associated toxicity in hospitalized patients before and after implementation of a series of safety interventions.

METHODS: Using a retrospective observational study design, we compared two cohorts of inpatients for whom colchicine was ordered at a large tertiary care teaching hospital. To achieve a power of 80%, each group of 75 patients consisted all who were prescribed intravenous colchicine plus a randomly selected sample who were prescribed oral colchicine during the first six months of either 2004 (pre-implementation) or 2005 (post-implementation). The safety interventions consisted of: 1) a policy restricting intravenous colchicine to the rheumatology service, 2) monitoring recommendations pertaining to the prescription/administration of colchicine, and 3) a set of defaults or prompts to promote safe colchicine use. We used explicit criteria to determine both the appropriateness of prescribing and the development of toxicity. Using a standardized form, we collected data either automatically, by querying a large clinical database, or manually, by viewing electronic health records. We used Chi square, students t-tests, and Pearson correlations for statistical analysis.

RESULTS: Patient characteristics did not differ between groups. Colchicine orders were deemed “appropriate” more often in the post-implementation period than in the pre-implementation period (67% vs. 47%, P<0.001). Colchicine toxicity was found more commonly in the pre-implementation group than the post-implementation group (28% vs. 8%, P=0.003) and less often when colchicine was used appropriately (2% vs. 38%, P<0.001). Toxicity frequency in both groups was directly proportional to the number of doses per treatment course (P=0.005).

CONCLUSIONS: These data suggest that interventions aimed at improving colchicine safety can increase the appropriateness of prescribing and decrease the frequency of colchicine toxicity in a hospital setting. Further measures are needed, however, to ensure that colchicine is appropriately used and toxicity is minimized in all patients.

Nephrology

108. Evaluation of clinical pharmacy service on dosage adjustment in patients with renal impairment. Chui Ping Lee, Pharm.D.1, Isaac YF Cheng, master, of, clinical, pharmacy2, Samuel CK Li, Master of Clinical Pharmacy3, (1)School of Pharmacy, The Chinese University of Hong Kong, Hong Kong; (2)Pharmacy Department, Tuen Mun Hospital, Hong Kong.

PURPOSE: Pharmacists are generally trained to make renal dosage adjustment based on tertiary literature. However, it is uncertain whether the recommended dosages would apply to most clinical cases and their acceptance by physicians. This study examined the percentage of renal dosage adjustment recommendations made by a clinical pharmacist service out of all potentially inappropriate prescriptions identified and the acceptance of these recommendations.

METHODS: A list of 40 targeted drugs in the hospital formulary that require renal dosage adjustment were identified through tertiary reference review. Patients admitted to two general medical wards between October 1st 2006 and January 31st 2007, with creatinine clearance <50% as assessed by Cockcroft-Gault equation and clinical indication, were included in the study. A detailed protocol to evaluate patients’ renal function and clinical data was developed to assist formation of final dosage recommendation.

RESULTS: A total of 338 drug orders prescribed for 489 patients that met the inclusion criteria were reviewed by the clinical pharmacists. Interventions were made for 129 out of the 539 prescriptions (24%) and 75 (58.1% of 339) interventions were accepted by physicians. For the remaining 409 drug orders, no pharmacist intervention was made because of the higher than recommended dosage possibly acceptable.

CONCLUSION: A relatively low percentage of potentially inappropriate orders were successfully intervened by clinical pharmacists in the current study. Consideration of individual patient factors and shortcomings of using estimation equation for renal dosage adjustments need to be considered when renal dosage adjustments are made clinically. References on renal dosage adjustments with clinical considerations taken into account are urgently needed to improve the quality and efficiency of renal dosage adjustment services provided by pharmacists.

Pediatrics

109. Daptomycin pharmacokinetics in a pediatric patient with methicillin-resistant Staphylococcus aureus endocarditis. Kim W. Benner, Pharm.D.1, Mary W. Worthington, Pharm.D.1, Leslie Hayes, M.D.2, Pamela J. Sims, Pharm.D., Ph.D.3, Heather Searcy, Pharm.D. candidate1, Michele Bryant, Pharm.D. candidate1, David Kumerlin, M.D.4,5,6,7, (1)Samford University McWhorter School of Pharmacy, Birmingham, AL; (2)University of Alabama at Birmingham, Division of Pediatric Critical Care, Birmingham, AL; (3)University of Alabama at Birmingham, Division of Pediatric Infectious Disease, Birmingham, AL.

PURPOSE: Daptomycin is a cyclic lipopeptide antibiotic with microbiological activity against gram-positive organisms including methicillin-resistant Staphylococcus aureus (MRSA). Due to limited information on daptomycin use in pediatric patients, we report a case of daptomycin use and pharmacokinetic analysis in a 17 month old patient with history of corrective heart surgery and subsequent MRSA endocarditis.

CASE REPORT: Daptomycin therapy was initiated in a 17-month-old male with endocarditis after the patient’s blood cultures remained positive for MRSA despite prolonged treatment with a combination of vancomycin, tobramycin, rifampin, and linezolid. Daptomycin 4 mg/kg was given as a one hour intravenous infusion every 24 hours; vancomycin and linezolid were discontinued. On day 7 of daptomycin therapy, blood samples were drawn immediately prior to administration of a dose, and 30 minutes, 2 hours, 5 hours, and 8 hours after the end of the infusion. These samples were analyzed utilizing a validated HPLC method at an outside institution; following receipt of the values, pharmacokinetic parameters were calculated using a noncompartmental model and the statistical moment theory. Measured concentrations ranged from 21.41 µg/ml drawn 30 minutes after the end of the infusion to 1.96 µg/ml just before the dose. The calculated area under the curve (AUC(0-24)) was 155.7 mg-hr/L and Cl was 0.225 L/hr (28.1 ml/hr/kg). The calculated mean residence time (MRT) was 6.6 hr and the Vss/V was 0.19L/kg. Blood cultures drawn on days 2 through 6 of daptomycin therapy were reported as no growth. Daptomycin was continued for a 42-day course of therapy, and all further cultures remained negative.

DISCUSSION: MRSA in our patient was successfully treated with daptomycin. Certain pharmacokinetic parameters determined for this pediatric patient substantially differ from reported adult values (AUC(0- 24) 4944 mg-hr/L, CI 8.3 ml/kg/hr) indicating the need for further pharmacokinetic studies in the pediatric population.

Pharmacoeconomics/Outcomes


PURPOSE: To consolidate the research-pharmacies at the VA-New York Harbor Healthcare System and to provide all pharmacy research-related services from one centralized location with at least one of the core campuses that make up the Harbor, without compromising patient safety and quality of care to the veterans. The goal was also to implement a fee schedule to cover research-related overhead expenses.

METHODS: A meeting was held with the principal investigators and study
Pharmaceutical Services: McKenzie C. 1
1. Jessica L. Purcell, Pharm.D., MPH 1

The research pharmacy services were centralized and the same standards were established for all three campuses, a fee schedule was established to reimburse the pharmacy for its overhead costs. The pharmacist intervention strategy was successful in reducing pharmacy costs. The pharmacy reimbursement program began to generate revenue to cover research pharmacy overhead expenses and buy necessary equipment. The consolidation also cleared up valuable space in the pharmacy department.

CONCLUSIONS: Consolidating the research pharmacies, centralizing the pharmacy-related research services and establishing a fee schedule resulted in significant cost savings, improved efficiency and generated revenue for the pharmacy department.

Presented at the Clinical Executive Board meeting at the Manhattan campus of the VA-New York Harbor Healthcare System in June 8, 2006.

112. Effect of pharmacy-based intervention on appropriate use of proton-pump inhibitors in an inpatient rehabilitation facility. McKenzie C. Ferguson, Pharm.D., Abigail Woodland, Pharm.D., BCPS, Brad Steimer, Pharm.D., SSM St. Mary's Health Center, St. Louis, MO.

The study population included inpatients admitted to a rehabilitation unit, including a 25-bed neurological rehabilitation unit. All patients were included if they were >65 years of age, had an acute hip fracture, or were receiving anticoagulation pre-operatively. The majority of patients (88.3%) received no pharmacologic anticoagulation.

RESULTS: Frequency of being prescribed PPIs increased significantly at discharge as compared to admission (22.5 vs. 27.2%). Whereas, vitamin D containing multivitamin use increased significantly at discharge as compared to admission (27.5% vs. 22.5%).

CONCLUSION: The planning of new studies and the administration of active studies has been simplified. The research-pharmacy reimbursement program began to generate revenue to cover research pharmacy overhead expenses and buy necessary equipment. The consolidation also cleared up valuable space in the pharmacy department.

113. Pharmacy preparation for a medical mission trip. Melody Ryan, Pharm.D. 1,2; (1)University of Kentucky College of Pharmacy, Lexington, KY; (2)Veterans Affairs Medical Center, Lexington, KY.

INTRODUCTION: Pharmacists frequently participate in medical mission trips to underserved countries. On these trips, the pharmacist may need to set up a pharmacy, give initial doses, and provide counseling under unusual circumstances such as in a very small, non-private space, outdoors, or in another language. Additionally, the pharmacist is often asked to procure medications for the trip through donations or with a very limited budget.

OBJECTIVE: Describe procedures that facilitate provision of pharmacy services in the context of a medical mission trip.

METHODS: Case studies for planning included types and quantities of medications, legal procedures, logistics for dispensing and counseling, non-medication supplies to enhance medication use, and reference materials. For example, an appropriate amount of antiparasitic medications in a dosing form is available, and sanitary drinking cups should be provided for one-time dosing in the pharmacy.

Women's Health


PURPOSE: Unintended pregnancy in the US continues to rise at an alarming rate such that increasing awareness and understanding of emergency contraception (EC) may help to decrease the number of unplanned pregnancies.

METHODS: Three groups of participants were enrolled in the study: (1) women who received an EC prescription for immediate use; (2) women who obtained an advance provision prescription for EC; and (3) women who present to purchase EC over-the-counter. Subjects 218 years of age and currently not smoking at the time of enrollment were recruited. A follow-up telephone survey was initiated within 3 to 6 months for subjects who receive EC for immediate use and within 3 to 6 months for those who received an advance provision prescription.

RESULTS: Sixteen immediate use patients and 8 patients given advance prescription prescriptions were recruited. Average time to presentation for a prescription was 17.8 hours. Thirteen of 24 patients who were contacted for phone follow-up, one advance provision and 12 immediate use patients.

Patients in the immediate use group were asked to recall information in the leaflet with 3 questions which included the mechanism of action of levonorgestrel, how long after intercourse one can take levonorgestrel and the proper administration of levonorgestrel. Five of the 12 patients in the immediate use group could not remember the mechanism of action. Eight of the 12 patients recalled that they could take levonorgestrel up to 72 hours following unprotected intercourse. Three of the 12 patients recalled that they can take levonorgestrel up to 120 hours following unprotected intercourse. Ten of the 12 patients could recall that they were told to take 2 pills simultaneously.

CONCLUSION: This study demonstrated the importance of pharmacists counseling patients regarding the proper use as many could not recall the duration after intercourse that they could use levonorgestrel.

115. Adherence to osteoporosis and anticoagulation treatment guidelines in acute hip fracture patients. Jessica L. Purell, Pharm.D., MPH, James D. Hossen, Pharm.D. 1,2; (1)Northeast Iowa Medical Education Foundation, Waterloo, IA; (2)University of Iowa College of Pharmacy/Northeast Iowa Family Practice Center, Waterloo, IA.

PURPOSE: Guidelines recommend short-term anticoagulation as well as osteoporosis treatment in patients who have suffered an acute hip fracture. This study documented anticoagulation and osteoporosis drug therapy administered to acute hip fracture patients in order to: (1) compare prescribed drug therapy to established medical guidelines and (2) evaluate potential areas for quality improvement.

METHODS: Medical charts of all patients admitted to one community hospital for hip fracture from January 2004 to December 2006 were reviewed. Patients were included if they were >65 years of age, had an acute hip fracture and underwent surgical repair. Data collected included demographics, medications, past medical history, length of surgery, time to anticoagulation.

RESULTS: Females comprised 74% of cases. Frequency of being prescribed osteoporosis drug therapy did not increase significantly during hospitalization (14.2% vs. 11% at discharge and admission, respectively). Females were centrally charged receiving calcium supplementation than upon admission (22.5% vs. 27.2%).

CONCLUSION: Osteoporosis drug therapy did not increase significantly during hospitalization (14.2% vs. 11% at discharge and admission, respectively). Females were centrally charged receiving calcium supplementation than upon admission (22.5% vs. 27.2%).

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CONCLUSION: This study demonstrated the importance of pharmacists counseling patients regarding the proper use as many could not recall the duration after intercourse that they could use levonorgestrel.
hospitalized more than 48 hours before surgery, 70% received no anticoagulation preoperatively. Patients who received preoperative anticoagulation had a longer delay from admission until surgery compared to those who did not receive preoperative anticoagulation (39.4 ± 27.8 hours, p≤0.001).

CONCLUSION: Osteoporosis drug therapy is very seldom started acutely after a hip fracture and remains greatly underutilized in this high-risk population. Most practitioners appear comfortable with anticoagulation; however greater emphasis on correct timing and duration of anticoagulation is needed.

116. Highlight on the women's health PRN. Jacintha S. Cauffield, Pharm.D., BCPS1, Patricia Wigle, Pharm.D., Jennifer McIntosh, Pharm.D.2, Shareen Y. El-Ihabi, Pharm.D., BCPS3, David L. Louroud, Pharm.D., BCPS, FCCM4, Laura Hansen, Pharm.D.4, (1)Southwest Washington Medical Center, Vancouver, WA; (2)University of Cincinnati, 304 Wherry Hall, Cincinnati, OH; (3)Northeastern University-Bovee College of Health Sc, 203 Mugar Life Science Bldg, Boston, MA; (4)University of California, San Francisco, School of Pharmacy, San Francisco, CA; (5)Poplar Bluff Reginal Med Ctr, Poplar Bluff, MO; (6)University of Colorado Health Sciences Center, Denver, CO.

PURPOSE: To increase the awareness and highlight the accomplishments of the Women's Health PRN.

METHODS: Pending.

RESULTS: The Women's Health PRN consists of 150 members whose interests range from pregnancy and prenatal care to the aging issues of osteoporosis and heart disease to gender-related pharmacokinetics. Its purpose is to provide ACCP members with an interest in Women's Health a smaller community for exchange of practice ideas and opportunities for collaborative research. Several members list clerkships and/or postgraduate experiences that emphasize women's health at the ACCP website. The history, purposes, demographics, and future direction of PRN will be discussed. Past, present, and future PRN activities will be highlighted with an emphasis on accomplishments. Recent accomplishments include: the development of a women's health curriculum for pharmacist schools through a partnership with AACP; and an ACCP White Paper on Research in Women and Special Populations. Four of 26 of projects awarded support from the Frontier Fund address issues related to women's health. The roles of the various committees (Programming, Communications, Research and Scholarship, Nominations and Membership) will be presented. An example of the PRN newsletter will be available. Future goals of the PRN will also be presented. Among these is the development of two textbooks, one of which will cover Women's Health Issues, and the other which will emphasize the treatment of chronic medical conditions during pregnancy.

CONCLUSIONS: Women's Health is a broad field encompassing multiple dimensions of health across the life span, and the Women's Health PRN seeks to address multiple aspects of women's health. It is a dynamic, accomplished group of diverse members who enjoy collaborating with one another as well as specialists from other disciplines. We welcome new members.

RESIDENTS AND FELLOWS RESEARCH IN PROGRESS

ADR/Drug Interactions

117. The frequency of clopidogrel plus CYP3A4 inhibitors and substrates in residents of a long-term care facility. Marielle O. Montecogolo, Pharm.D., Catherine A. Millares, Pharm.D., CGP, Bishop Luka, Pharm.D., Henry Cohen, M.S., Pharm.D., FCCM, BCPP, CGP, Kingsbrook Jewish Medical Center, Brooklyn, NY.

OVERVIEW: Clopidogrel is an adenosine diphosphate receptor antagonist prodrug. Upon ingestion clopidogrel is absorbed systemically and converted into an active moiety by hepatic CYP450 3A4 enzymes. Clopidogrel and statins are standard therapy in the management of atherosclerotic disease and are 3A4 substrates. Statins may inhibit the metabolism of clopidogrel and thus prevent its conversion to its active metabolite via competitive antagonism, plausibly yielding clopidogrel inactive. Furthermore, 3A4 inhibitors such as erythromycin and troleandomycin have been shown to inhibit clopidogrel metabolism, thus blocking its antiplatelet effects. Ostensibly, similar interactions may occur with other 3A4 substrates and inhibitors (azole antifungals, amiodarone, calcium channel blockers, fibrate antilipemics).

PURPOSE: We hypothesize that there may be a high incidence of clopidogrel use with 3A4 substrates and inhibitors. This study was conducted to assess the frequency of clopidogrel coadministration with 3A4 substrate and inhibitor medications.

METHOD: An electronic chart was reviewed to include all residents at the Rutland Nursing Home who were receiving clopidogrel between October 1 and October 31, 2007. The medication profiles for all identified residents were screened for possible substrates and inhibitors of the 3A4 enzyme system. The Fleckhart's Cytochrome P450 Drug-Interaction Table was used to identify and stratify 3A4 inhibitors and classify them as, weak, moderate, or strong inhibitors. An analysis was performed to assess the frequency of clopidogrel use with 3A4 inhibitors vs. non-3A4 inhibiting agents.

RESULTS: Pending.

CONCLUSION: Pending

Adult Medicine

118. Evaluation of continuation of stress-ulcer prophylaxis at hospital discharge. William R. Judd, Pharm.D., P. Shane Winstead, Pharm.D., George A. Davis, Pharm.D., BCPS, Timothy M. Cliford, Pharm.D., BCPS, Tracy E. Macanally, Pharm.D., BCPS; University of Kentucky HealthCare, Lexington, KY.

PURPOSE: The use of stress ulcer prophylaxis (SUP) for the prevention of stress-related mucosal disease is a common practice in hospitalized patients. However, only a subset of patients are at an increased risk of clinically important bleeding. The primary objectives are to determine the percentage of hospitalized patients who receive SUP during their admission and at hospital discharge without an approved indication. Secondary objectives are to determine the cost impact of inappropriate prescribing and to evaluate if transition of care medication reconciliation from ICU to floor facilitates discontinuation of inappropriate drug therapy.

METHODS: We conducted a retrospective chart review of ~10% of adult cardiology, family medicine, and internal medicine patients who received SUP during their hospitalization and at hospital discharge without an approved indication. Secondary objectives are to determine the cost impact of inappropriate prescribing and to evaluate if transition of care medication reconciliation from ICU to floor facilitates discontinuation of inappropriate drug therapy.

RESULTS: Pending.

CONCLUSION: Pending.

Ambulatory Care


PURPOSE: To assess outpatient response in achieving LDL-C goals with ezetimibe when added to concurrent statin therapy at the Veterans Affairs San Diego Healthcare System (VASDHS).

BACKGROUND: There is currently a gap between evidence-based guideline recommendations and achievement of LDL-C goals with statin monotherapy. Combination statin and ezetimibe therapy is an option for reaching LDL-C goals set forth by NCEP/ATP III. Access to ezetimibe at the VASDHS is restricted to non-formulary approval through a clinical pharmacy specialist. However, the VASDHS currently has no systematic process to evaluate whether patients approved for ezetimibe respond to this medication and achieve target LDL-C goal.

METHODS: Retrospective review of electronic medical records of outpatients approved for ezetimibe between January 1st, 2005 and August 31st, 2007. Primary outcome was to determine whether patients identified as non-responders to ezetimibe had their medication regimen subsequently modified. Primary outcome was determined if associations existed between patient covariates and response to ezetimibe. Statistical analysis was performed using χ² (or Fischer's exact) on categorical data and the student t-test (or Mann-Whitney U) on continuous data where appropriate. Matched data was analyzed using the paired t-test (or Wilcoxon signed-rank) where appropriate.

RESULTS: Preliminary descriptive statistics showed no significant difference at baseline between responders and non-responders, while interestingly, the
only covariate significantly different post-intervention was serum triglycerides. Pairwise pre-post comparisons showed statistically significant differences in LDL-C and total cholesterol in responders but no difference in any covariates in non-responders.

CONCLUSIONS: This research is ongoing and will continue with a focus on institution-specific statistical analyses, conclusions, and clinical recommendations are pending. Anticipated date of completion is February 2008.

Cardiovascular

120. Impact of the timing of initial activated partial thromboplastin time on duration to achieve stable anticoagulation with unfractionated heparin. Joseph R. Rinka, Pharm.D., D., Toby C. Trujillo, Pharm., D.; Boston Medical Center, Boston, MA.

PURPOSE: Intravenous unfractionated heparin (UFH) has been a foundation in antithrombotic therapy for over 50 years. It has proven effectiveness for a variety of indications. However, the utility of UFH is complicated by its unreliable pharmacokinetic profile, associated adverse events, and reliance on the non-standardized activated partial thromboplastin time (aPTT) for estimation of therapeutic efficacy. Failure to achieve a therapeutic aPTT early in the treatment may be associated with worse outcomes. The objective of this analysis is to study the impact of timing of the initial aPTT on the time to therapeutic anticoagulation with UFH.

METHODS: This is a retrospective analysis of patients with an order for a weight-based UFH infusion protocol. Patients will be categorized according to the timing of the first aPTT after initiation of therapy (<6 hours, 6-7 hours, >7 hours). The primary outcome will be the duration of time to reach stable therapeutic anticoagulation, as defined by the institution specific therapeutic aPTT range. Secondary outcomes include mean time of the initial aPTT drawn, mean first aPTT value, the number of dosage adjustments needed to achieve therapeutic anticoagulation, as well as the percentage of aPTTs within the therapeutic range. ANOVA and $\chi^2$ analysis will be used to evaluate differences between the groups as appropriate. A sample size of 40 patients in each group will have an 80% power to detect a difference of 12 hours in time to achieve therapeutic anticoagulation with a significance level of 0.05.

RESULTS: Interim results (n=34) demonstrate that patients with an initial aPTT drawn < 6 hours, 6-7 hours, > 7 hours after initiation achieved stable therapeutic anticoagulation at 36.1, 13.8, and 38.4 hours, respectively (p=0.035).

CONCLUSION: Full results for all defined outcomes will be presented. Current interim results indicate a need to improve UFH monitoring practices within our institution.

121. Pinacidil Reduces Interventricular Heterogeneities and Arrhythmia Inducibility During Loss of Inward Rectifier Potassium Channel Function. Przemyslaw Radwonski, Pharm.D.; Rengasayee Veeraraghavan, B.Tech.; John J. Liddle, Pharm.D., M.B.; Pickworth, Pharm.D., Danielle Blais, Pharm.D.; The Ohio State University Medical Center, Columbus, OH.

PURPOSE: ATG is the primary agent at our institution for the treatment of heart transplant rejection and induction. Conventional dosing of ATG is 1 mg/kg for six days and 0.75 mg/kg for 4 days. Another method of ATG dosing is based on CD3 counts; however, limited data exists regarding ATG in transplant recipients. The objective of this study is to determine the CD3 count response to ATG, total ATG dosing, cost, long-term complications, and the dosing scheme of other immunosuppressive agents.

METHODS: A retrospective chart review is being conducted in patients treated with ATG for induction or rejection of heart transplant between July 1, 2003 and June 30, 2007. Data collected included demographics, ATG dose, concurrent immunosuppression, laboratory findings, readmissions, and cost.

RESULTS: During the time period, 60 transplants were performed and six patients were treated with ATG for rejection and nine for induction. At this time, data is available for the six patients suffering rejection (33% humoral rejection and 66% cellular rejection). The average initial dose of ATG was 1.1 mg/kg with an average reduction in CD3 count of 794 cells/mm$^3$ was found after the first ATG dose. Patients received a mean total dose of 183 mg based on CD3 counts versus a potential dose of 808 mg if a conventional strategy was utilized. p=0.0029. This resulted in a total decrease in cost of $41,679. Two patients expired and two of the remaining four were readmitted for readmissions possibly related to ATG. We did not observe any recurrent infections. All patients received IV steroids, 66% continued their calcineurin inhibitor and 83% continued their mycophenolate mofetil.

CONCLUSIONS: Thus far, the total dose of ATG was reduced using CD3 counts monitoring resulting in a decrease in overall drug cost. Long-term complications of ATG are still being evaluated.


PURPOSE: Nicotine replacement therapy (NRT) has recently been associated with mortality in medical intensive care unit patients. NRT is frequently utilized in cardiac surgery patients; however, no safety data exists for use in this population. The primary outcome of this evaluation was the impact of NRT on in-hospital mortality following coronary artery bypass graft (CABG) surgery.

METHODS: This retrospective cohort study evaluated patients undergoing CABG between August 2004 and August 2007. Patients were consecutively screened and identified using electronic medical records and were stratified into three groups by smoking status and NRT usage—smokers who received NRT, smokers who received no NRT, and non-smokers. Blood concentration monitoring was used for patient selection and patients were matched by APACHE II score.

RESULTS: A total of 2057 patients undergoing CABG were evaluated and 35.8% (n = 736) underwent cardiopulmonary bypass. Of the total population, 27.3% (n = 567) were smokers and NRT was subsequently administered to non-smokers (12.8% (n = 107, NRT group). Mortality was non-significantly higher in the NRT group compared to the non-NRT smoker group (n = 716), 3.3% versus 1%, respectively (p=0.083). Smokers not receiving NRT were not at increased risk of death compared to non-smokers (HR 0.92, 95% CI 0.42–2.04). APACHE II scores were similar between NRT and non-NRT groups, 25.6±3.3 versus 26.4±4.8, respectively (p=0.4). A non-significant increase in mortality was noted for NRT use following either on-pump CABG (HR 2.51, 95% CI 0.25–23.1) or off-pump CABG (HR 4.72, 95% CI 0.65–34.5). APACHE II scores were similar between NRT and non-NRT groups, 25.6±3.3 versus 26.4±4.8, respectively (p=0.4). A non-significant increase in mortality was noted for NRT use following either on-pump CABG (HR 2.51, 95% CI 0.25–23.1) or off-pump CABG (HR 4.72, 95% CI 0.65–34.5).

CONCLUSIONS: These results demonstrate a non-significant increase in mortality as a result of NRT administration. Heterogeneity within groups and low patient deaths impact these findings and contribute to wide confidence intervals. Additional evaluation in large patient cohorts with prospective controls is warranted to further assess trends in mortality with NRT use following CABG.

124. Ischemic and hemorrhagic outcomes following percutaneous coronary intervention with antithrombotic therapy plus glycoprotein IIb/IIIa inhibition—enoxaparin versus bivalirudin. Terri J. Saffoletta, Pharm.D., Heath R. Jennings, Pharm.D., BCPS; Saint Joseph HealthCare, Lexington, KY.

PURPOSE: ACC/AHA guidelines for management of patients experiencing unstable angina (UA) or non-ST elevation myocardial infarction (NSTEMI) include recommendations for the use of antiplatelet and antithrombotic therapy in combination with percutaneous coronary intervention (PCI). This study evaluated two pharmacologic regimens used adjunctively with PCI in this patient population. Treatment groups consisted of glycoprotein IIb/IIIa inhibitor (GP IIb/IIIa) in combination with either enoxaparin (ENOX) or bivalirudin (BIV). The purpose of this evaluation was comparison of ischemic and hemorrhagic outcomes following PCI with these therapies.

METHODS: This retrospective cohort evaluation reviewed the medical
Clinical Administration

125. Assessment of erythropoiesis stimulating agent (ESA) use and the impact of pharmacist intervention on inappropriate prescribing. Lauren Czownowski, Pharm.D.; Joanna Q. Hudson, Pharm.D.; Bob L. Lobo, Pharm.D.; Jennifer Robertson, Pharm.D.; Carli Nesheiwat, Pharm.D.; (1)Methodist Healthcare University Hospital, Memphis, TN; (2)University of Tennessee, Memphis, TN; (3)Methodist University Hospital, Memphis, TN.

PURPOSE: The FDA has recently added new safety warnings regarding the use of erythropoietin stimulating agents (ESA). For this reason, we developed and implemented a program consisting of an ESA dispensing form that must be completed by the pharmacist prior to dispensing the first ESA dose. The form consists of a checklist of appropriate indications and contraindications, and requires the pharmacist to contact the prescriber for inappropriate orders. In addition, we implemented a computerized clinical rule that notifies the pharmacist electronically whenever the hemoglobin value exceeds 12 g/dl during ESA therapy.

METHODS: ESA dispensing forms will be collected from October, 2007 through March, 2008 and reviewed for correct indication, contraindications, pharmacist interventions and ESA order discontinuations or dosage modifications. ESA utilization prior to October, 2007 will be compared to utilization during the intervention. Cost savings as a result of the program will be calculated.

RESULTS: In the first four weeks there were 67 new ESA orders and three clinical rule notifications. The most common indications for ESA were end-stage renal disease, followed by chronic kidney disease and cancer. Use of the ESA dispensing form led to two interventions (for a normal hemoglobin and a contraindication). In addition, the clinical rule led to three interventions for elevated hemoglobin. Thus, 7% of ESA orders required an intervention (5/70). Assuming that each intervention averted two doses from being dispensed, the program reduced ESA utilization by 10 doses.

CONCLUSIONS: A program consisting of routine evaluation of each ESA order by a pharmacist using a standardized dispensing form and the implementation of a computerized clinical rule reduced ESA doses dispensed in the first month of implementation. Data will be collected for at least five additional months.

Critical Care

126. Evaluation of bleeding events in patients receiving recombinant human activated protein C (rhAPC) for the treatment of severe sepsis was based on the PROWESS study. Alyson W. Gibson, Pharm.D.; Jeffrey S. Guy, M.D.; Sloan B. Fleming, Pharm.D.; Cathy M. Oles, D.Ph.; (1)Vanderbilt University Medical Center, Nashville, TN; (2)Vanderbilt Regional Burn Center, Nashville, TN.

PURPOSE: Managing hyperglycemia in the intensive care unit (ICU) setting is of great importance, as uncontrolled blood glucose results in increased morbidity and mortality. The Vanderbilt University Medical Center Burn ICU has taken a nontraditional approach to managing hyperglycemia, utilizing subcutaneous insulin glargine in addition to insulin infusions and sliding-scale insulin. This practice is not widely accepted, as subcutaneous administration is believed to produce a depot in burn patients while result in erratic absorption. The purpose of this study is to determine the effectiveness of subcutaneous administration of insulin glargine in decreasing intravenous (IV) insulin requirements and further quantify the mathematical relationship between insulin glargine and IV insulin.

METHODS: This study is a retrospective analysis of adult burn patients (age ≥ 18) admitted to the Burn ICU at Vanderbilt University Medical Center from June 2005 to June 2007. Patients who received both insulin glargine and an insulin infusion were included. Patient demographics, total body surface area (TBSA) burn, insulin type and requirements, glucose measures, concurrent nutrition, and specified co-morbidities were collected. The primary objective is to determine the time spent within target glucose range (80–110mg/dL) for patients while on IV insulin only, sub-Q glargine only, and combination therapy. Secondary endpoints include the number of hypo- (<70mg/dL) and hyperglycemic (>200mg/dL) events on each insulin therapy and the correlation between total daily IV insulin received to amount of sub-Q glargine required on transition.

RESULTS: Data collection ongoing. Results to be presented.

Drug Information

129. Impact of a meta-analysis indicating potential safety risks of rosiglizotone on physician prescribing decisions. Christopher S. Wisniewski, Pharm.D.; Shelby L. Corman, Pharm.D.; BCPS; University of Pittsburgh
CONCLUSION: Full results of this study will be used to determine how well published information has influenced their decision. The responses will be analyzed using descriptive statistics.

RESULTS: In a preliminary evaluation of 68 survey responses, most physicians consider themselves either very familiar (31%) or somewhat familiar (62%) with this issue. Eighty percent of these physicians indicated that this information affected their prescribing. Of those respondents, 50% indicated that they completely stopped writing new rosiglitazone prescriptions and 50% specified that they stopped prescribing rosiglitazone only in certain patient populations. In patients previously prescribed rosiglitazone, 75% of physicians stopped the medication in specific populations, while 14% stopped rosiglitazone in all patients and 11% did not discontinue the drug. The majority of respondents rated the influence of the meta-analysis, recommendations from physician leadership, and other published information as 4 out of 5, with 5 meaning very influential on their decision.

CONCLUSION: Full results of this study will be used to determine how well new information permeates the medical community, and identify effective methods of influencing prescribing practice.

Education/Training

130. Student perception of wiki in an elective course. Scan M. Mirk, Pharm.D., Jill S. Burkiwicz, Pharm.D., BCPS, Kathy E. Fit, Pharm.D., BCPS, Midwestern University Chicago College of Pharmacy, Downers Grove, IL.

PURPOSE: This study surveyed third professional year pharmacy students enrolled in a pharmacy elective course in order to (1) describe student experiences and overall satisfaction with using wiki and (2) evaluate whether level of involvement in a wiki is associated with student performance or satisfaction. Faculty experience with using wiki was also assessed.

METHODS: A pre- and post-survey was used to evaluate previous experiences and satisfaction with wiki use as a viability tool for participation points. Level of student involvement will be compared to student reported course performance and wiki satisfaction. Faculty feedback and experiences both in the classroom and with using wiki will be gathered.

RESULTS: Based on responses from the pre-survey 30% (14/42) of the students have used a wiki; none reported collaborating or participating in a wiki prior to the course. Of those who have used a wiki, 79% (11/14) have a very positive or positive attitude toward wikis, 86% (12/14) find wikis very useful or useful and 100% (14/14) said they use wikis to search for information. Information from the post-survey and faculty feedback is pending.

CONCLUSION: Students who are aware of wikis have a favorable attitude towards them. Wikis may provide a tool to actively involve students and to foster the idea of student-directed learning.

131. Student consumerism and educational attitudes: a comparison of a 4-year public institution versus a 3-year private institution. Korey Kennelly, Pharm.D., Candidate, Aaron Katz, Pharm.D. Candidate, Dawn Knudsen, Pharm.D., Mary Gurney, Ph.D., R.Ph.; Midwestern University Chicago College of Pharmacy, Downers Grove, IL.

PURPOSE: The purpose of this study is to determine and compare the level of consumerism and educational attitudes between pharmacy students at a 4-year public institution and a 3-year private institution. A potential consequence of competitive admissions standards, an arduous curriculum, differences in tuition and years of tuition paid, is an increase in student involvement in activities outside the classroom.

METHODS: Students at a 3-year private institution ("Private") were recruited after attendance of a required class during October 2007. Inclusion criteria included students in the first or the last year of the pharmacy program. Second-year students were excluded because they were off campus at this time. Comparison data is from a 4-year public institution ("Public") that had previously used the same survey. A 19-item survey was given to students. Four questions were used to obtain demographics. Fifteen of the questions were designed to assess student attitudes regarding their education. The students were asked to rate their responses from "strongly disagree" to "strongly agree" on a 5-point Likert scale using a ParSCORE scantron card. The "Private" results were compared to the "Public" results. Pearson correlations, Student t-tests and χ2 tests were applied to the data as determined to be appropriate.

RESULTS: 288 "Public" and 163 "Private" students provided complete data from the survey. Preliminary results of this survey show that respondents from both institutions, trends in the mean were identified. For 11 of the 14 items, pharmacy students attending the “Public” institution had higher means than students attending the “Private” institution. Final results will be completed by February 2008.

CONCLUSIONS: This information may be helpful in understanding the degree of students' consumerism and educational attitudes and applying that knowledge to teaching activities in and out of the classroom.

132. Comparing the impact of interventions made by doctor of pharmacy students to those of pharmacy residents. Evangelia Davanos, Pharm.D., Tamara Goldberg, Pharm.D., Robert DiGregorio, Pharm.D., Boris Nagel, Pharm.D., Evangelina Berrios-Colon, Pharm.D.; (1)The Brooklyn Hospital Center, Brooklyn, NY; (2)Arnold and Marie Schwartz College of Pharmacy, Long Island University, Brooklyn, NY.

OBJECTIVE: ???

PURPOSE: Pharmacy schools introduce students to patient care activities early in their curriculum; however it is during their 6th year experiences and overall satisfaction with using wiki and (2) evaluate whether level of involvement in a wiki is associated with student performance or satisfaction. Faculty experience with using wiki was also assessed.

METHODS: A pre- and post-survey was used to evaluate previous experiences and satisfaction with wiki use as a viability tool for participation points. Level of student involvement will be compared to student reported course performance and wiki satisfaction. Faculty feedback and experiences both in the classroom and with using wiki will be gathered.

RESULTS: Based on responses from the pre-survey 30% (14/42) of the students have used a wiki; none reported collaborating or participating in a wiki prior to the course. Of those who have used a wiki, 79% (11/14) have a very positive or positive attitude toward wikis, 86% (12/14) find wikis very useful or useful and 100% (14/14) said they use wikis to search for information. Information from the post-survey and faculty feedback is pending.

CONCLUSION: Students who are aware of wikis have a favorable attitude towards them. Wikis may provide a tool to actively involve students and to foster the idea of student-directed learning.

133. The rate of primary prevention for osteoporosis in long-term glucocorticoid use: A cluster analysis. Madeline Close, Pharm.D., Jill Burkiwicz, Pharm.D., BCPS, Carrie Simcak, Pharm.D., BCPS, Midwestern University Chicago College of Pharmacy, Downers Grove, IL.

PURPOSE: This study is designed to assess the rate at which bisphosphonates are prescribed for osteoporosis prophylaxis and treatment in patients receiving concurrent long-term glucocorticoid therapy. There is significant literature published demonstrating that there is a decreased risk for osteoporosis if bisphosphonates are prescribed as primary prevention in the long-term glucocorticoid therapy population. Despite these published benefits, gaps remain in physician prescribing patterns for these agents. Secondly, this study hopes to investigate which predictors positively and negatively influence the rate of primary prevention prescribing.

METHODS: Electronic medical records of 250 randomly-selected patients receiving long-term glucocorticoid therapy at a prednisone-equivalent dose of 5 mg or more with treatment duration of at least 3 months at 1 academic center in the United States will be reviewed. The rates of bisphosphonate use as primary osteoporosis prevention will be assessed. Patient's medical history, indications for steroid use, dose of steroid, length of steroid treatment, prescribed bisphosphonate agent, and the patient's lab values will be documented. Glucocorticoid dose ≥ 7.5 mg/day, specialty care, postmenopausal status and history of GERD/PUD, will be collected and assessed as possible predictors of bisphosphonate use or non-use.

RESULTS: Nine hundred patients have been identified as meeting the inclusion criteria. Electronic medical records for 250 randomly selected patients will be reviewed. Data collection and analysis is currently underway.

CONCLUSIONS: This study will determine the rate of primary osteoporosis prevention prescribing in long-term glucocorticoid patients.
predictors of bisphosphonate use may be potential barriers to use. As such, this study hopes to discover a potential role for pharmacists to alleviate these barriers and ensure that all long-term glucocorticoid therapy patients receive appropriate bisphosphonate prophylaxis.

Health Services Research

134. Implementing observer methodology to determine the impact of bar-code medication administration and infusion pump technologies on medication administration errors. Peter J. Helmons, Pharm.D., Lindsay N. Waddell, Pharm.D., Charles E. Daniels, Ph.D., UCSD Medical Center, Department of Pharmacy, San Diego, CA.

PURPOSE: Administration errors are the most dangerous type of medication errors, as they are abundant and unlikely to be intercepted. Bar-code medication administration (BCMA) and intelligent infusion pump technologies (“smart-pumps”) complement each other in decreasing medication administration errors. The additive effects of specific implementation of these technologies on medication administration errors are unknown. The goals of this study are to implement observer methodology to determine medication administration errors and the additive effects of BCMA and smart-pump technologies on the incidence of these errors.

METHODS: This study is conducted on two medical-surgical units and two Intensive Care Units (ICU). A validated observation methodology is used to perform the medication administration error rates. After training the observers and assessing adequate inter-rater reliability, observations are conducted before and after implementation of each technology. Medication errors are determined by matching the observed medication administered to the patients with the scheduled medication in the electronic medication record.

RESULTS: The results of the pre bar-coding observations on the two medical surgical units are described here. Pre bar-coding observations on the ICU’s are scheduled in November 2007 and post bar-coding observations on both units are finalized by March 2008. Observations pre and post smart-pump implementation are scheduled in May and September 2008. We observed 888 medication administrations (509 and 379 medication administrations on each medical surgical ward). We found an average pre bar-coding error rate of 10.4% (7.7% if time errors are excluded). Omissions (37% of all errors), drug unavailable (34%) and time errors (26%) were the most prevalent errors.

CONCLUSION: We successfully implemented the observer methodology in our hospital. On the medical-surgical units, we found error rates that are in line with other studies using similar methodology. We expect that bar-coding implementation will decrease the errors of omission and time errors identified by this method.

135. Increasing employee influenza vaccination rates utilizing immunization certified pharmacists. Jamie L. Greve, Pharm.D., Kerri S. Parks, Pharm.D., David Kuhl, Pharm.D., Marilyn Lee, Pharm.D., BCPS, Regional Medical Center at Memphis, Memphis, TN.

PURPOSE: Documentation of employee influenza vaccination status is now required to comply with state law and recommended to improve patient safety by the Centers for Medicare and Medicaid Services (CMS). Our institution’s employee influenza vaccination rate in the 2006 season was 39%. The purpose of this study is to demonstrate the effect of utilizing immunization certified pharmacists in collaboration with nurses as part of an interdisciplinary focused influenza vaccination initiative to increase employee influenza vaccination rates.

METHODS: This is a prospective, single center study conducted in a tertiary care teaching hospital from October 1 to November 30, 2007. During the month of September 2007, there was an organized educational initiative to educate employees about the influenza vaccination and dispel common surrounding myths. Beginning in October, all employees were required to fill out a hospital approved form which screened for contraindications, allowed for documentation of annual vaccination, and provided the employee the option to decline as well as provide rationale for declination. Decentralized, vaccination certified pharmacists and nurses with mobile vaccination carts were available to assist with screening and vaccination of employees (healthcare professionals and non-professional staff). Vaccination rates were compared to historic vaccination rates from 2006 using chi square analysis. Additionally, reasons for decline were evaluated.

RESULTS: As of November 14, 2007, 1297 of 3041 (42.7%) employees have been vaccinated (p=0.001 vs. 2006), and 550 (18%) employees have declined vaccination. The most common reasons for decline were “I have been sick from the flu shot in the past” (n=107, 19%) and “don’t need it” (n=53, 9%).

CONCLUSION: Immunization certified pharmacists involved in an employee vaccination program improved compliance with patient safety recommendations and state law. Innovative immunization initiatives incorporating pharmacists should be incorporated into health-systems' employee vaccination programs.
140. Evaluation and clinical impact of concomitant administration of vancomycin in a medical intensive care unit. Hung M. Le, Pharm.D., Linda W. Kam, Pharm.D., BCPS; James A. Haley Veterans’ Hospital, Tampa, FL.

BACKGROUND: Healthy People 2010 initiative recognizes the importance of reducing vancomycin use among intensive care unit patients due to significant increase in the prevalence of bacterial resistance to vancomycin. The target is to achieve a 20 percent reduction from the baseline vancomycin use. The objective of the study is to determine the amount of intravenous vancomycin used in the medical intensive care unit (MICU) at the James A. Haley Veterans’ Hospital and assess compliance with the target set by Healthy People 2010.

STUDY METHODS: This study will be submitted to the Institutional Review Board for approval. This is a retrospective chart review study. The primary outcome is to determine average vancomycin doses per 1,000 patient-days used in the MICU at the James A. Haley Veterans’ Hospital in compliance with the Healthy People 2010. The secondary outcomes are to compare 2004 national benchmark of vancomycin use in MICU, to assess compliance with CDC guidelines in regards to indication and duration of therapy, to measure incidence of intravenous vancomycin for empiric versus definitive therapy defined by documented microbiological culture positivity; to evaluate culture results.

RESULTS: methicillin-resistant Staphylococcus aureus, methicillin-sensitive Staphylococcus aureus, methicillin-resistant Staphylococcus epidermidis, vancomycin-resistant enterococci. The study setting is the 15-bed MICU at the James A. Haley Veterans Hospital. All MICU patients received intravenous vancomycin therapy during the study period of October 1, 2007 and March 31, 2008 will be included in the study. A list of MICU patients who received vancomycin will be identified each day through the pharmacy computer database. A chart review using the computerized patient record system (CPRS) will be initiated to gather pertinent patient information. Data will be collected including dose and duration of vancomycin therapy, indication for vancomycin, culture and sensitivities.

140. Evaluation and clinical impact of concomitant administration of polyvalent cations with oral fluoroquinolones. Michael A. DeCesare, Pharm.D., Nicole M. Bohm, Pharm.D.; Medical University of South Carolina, Charleston, SC.

PURPOSE: The in vitro interaction between fluoroquinolones (FQ) and concomitant polyvalent cations (PVC) resulting in decreased FQ bioavailability has been extensively characterized. However, there is a paucity of information regarding its clinical significance or the extent of inappropriate scheduling. The goal of this study is to characterize scheduling errors and identify resultant treatment failures.

METHODS: A retrospective review of adult patients who were prescribed oral FQ for at least 2 days between January 1 and August 31, 2007 was performed. Appropriateness of PVC scheduling was assessed based on recommendations by the manufacturers and common clinical practice. Chart review and microbiology surveillance of the PVC administration. Concomitant administration of PVC was scheduled for administration at least 2 hours apart from the FQ as suggested by our hospital, but did not report concomitant administration. Twenty-two were scheduled within 2 hours of FQ administration.

RESULTS: A preliminary analysis of the first 41 patients concurrently receiving FQ and PVC reveals that 100% were scheduled inappropriately according to the recommendations by the manufacturers. Of 48 PVC doses concurrently administered, 38% were scheduled for administration at least 2 hours apart from the FQ as suggested by our hospital but did not meet recommendations by the manufacturers, while the remaining 62% were scheduled within 2 hours of FQ administration. Twelve patients were determined to have clinical failures due to alterations in antibiotic regimen, which included switching from oral to intravenous FQ while medications continued to be given orally (6%) or changing to a different antibiotic in the absence of new microbiologic data (17%). One isolate of Escherichia Coli that had previously demonstrated sensitivity became resistant. Overall, 23% of patients met criteria for treatment failure.

CONCLUSIONS: Concomitant administration of FQ and PVC appears to be associated with treatment failure. Healthcare practitioners must maintain vigilance to avoid inappropriate scheduling, which occurred commonly in this study, to prevent potentially significant drug interactions.

141. Impact of a pharmacist-managed standing orders program on pneumococcal vaccination rates of hospitalized patients. Kerri S. Parks, Pharm.D., Jamie Glore, Pharm.D., David Kuhl, Pharm.D., Marilyn Lee, Pharm.D.; Regional Medical Center at Memphis, Memphis, TN.

PURPOSE: Pneumococcal vaccination improves outcomes in at risk populations. Accordingly, the 2008 Centers for Medicare and Medicaid Services (CMS) Core Measures require hospitals to provide documentation of pneumococcal vaccine administration to patients who meet criteria established by the Centers for Disease Control (CDC). This study evaluates the impact of a pharmacist-managed standing orders program on pneumococcal vaccination rates among hospitalized adults.

METHODS: This is a prospective, single center study conducted in a tertiary care teaching hospital from October 15, 2007 to January 15, 2008. All patients 30 years of age or older receiving antibiotics were screened. A standing order form with screening criteria and administration recommendations was used to determine vaccination status and to provide documentation for the medical record. Vaccination history was obtained from each patient’s chart, previous discharge summaries, and through patient interviews. Patients meeting CDC criteria were vaccinated. Pneumovax® was ordered by the pharmacist using the standing orders form and administered by either the nurse or pharmacist. Vaccination rates for the project were compared to a retrospective group of 95 patients admitted from September 24 through October 12, 2007.

RESULTS: A total of 102 patients were screened in the intervention period through November 2, 2007. The number of patients receiving prior vaccination or not meeting criteria for vaccination were not different between the baseline 53 (53.7%) and intervention 61 (59.8%) groups (p=0.4). Patients not vaccinated, but meeting criteria for immunization, decreased from 29 (30.5%) to 10 (9.8%), p<0.001. Vaccination rates increased from 13.8% (n=15) to 30.4% (n=31), p=0.016.

CONCLUSION: A proactive approach to patient pneumococcal vaccination dramatically decreases missed vaccination opportunities and increases compliance with CMS measures. Pharmacist should be integrated into health system immunization initiatives.

142. Evaluation of antimicrobial selection for healthcare-associated pneumonia before and after the implementation of a guideline-supported emergency department protocol. Lisa Keller, Pharm.D.1, Douglas Sloan, Pharm.D.2, Mandy Plovanich, Pharm.D.2, Susan Spodick, Pharm.D.2, (1)West Virginia University Hospitals/West Virginia University School of Pharmacy, Morgantown, WV; (2)West Virginia University School of Pharmacy, Morgantown, WV; (3)West Virginia University Hospitals, Morgantown, WV; (4)South University School of Pharmacy, Savannah, GA.

PURPOSE: Healthcare-associated pneumonia (HCAP), which includes patients admitted from nursing homes and long-term care facilities, is a relatively new entity now included with the hospital-acquired (HAP) and ventilator-associated pneumonia (VAP) guidelines. The 2005 American Thoracic Society (ATS) and The Infectious Diseases Society of America (IDSA) guidelines for the management of HAP, HCAP and VAP state that these conditions should be treated initially with broad-spectrum antimicrobials targeting multidrug-resistant pathogens. Following the guideline publication, our institution employed a guideline-based emergency department (ED) protocol for the treatment of HCAP. The objectives of this study are to evaluate antimicrobial selection before and after the ED protocol implementation and determine the rate of compliance to this protocol and the national guidelines.

METHODS: A retrospective analysis was performed of patients admitted to the ED from a nursing home, long-term care facility, or a local inpatient rehabilitation center that received antimicrobials for pneumonia. Age, sex, admission source (facility), length of stay, patient expiration, initial antibiotic selection, culture site and positive culture results were collected. Patients included in this study. The average age was 72 years. Fifty-one patients were admitted prior to and 14 patients were admitted following protocol implementation. Compliance rate increased from 6% to 79% following ED-protocol implementation. Of the overall non-compliant regimens, 6% did not have methicillin-resistant Staphylococcus
auric coverage, 6% did not have combination therapy for targeted gram-negative organisms, and 66% received neither. More data will be presented on the post-ED protocol population at a later date.

CONCLUSIONS: The percentage of patients receiving ATS/IDSA-recommended HCAP treatment increased following implementation of the emergency department protocol.

143. Ertapenem as empiric substitution for ampicillin/sulbactam in complicated intra-abdominal infections. Lisa Rene, Pharm.D., Debra Goff, Pharm.D., FCCP, Jay M. Mirtallo, M.S., RPh, BCNSP, FASHP, Julie Manning, M.D., (1)The Ohio State University Medical Center, 410 West 10th Avenue, Columbus, OH; (2)The Ohio State University Medical Center, Columbus, OH; (3)The Ohio State University Medical Center, Columbus, OH.

PURPOSE: Complicated intra-abdominal infections (cIAI) are most frequently caused by Escherichia coli. The 2006 hospital-wide antibiogram reported E. coli susceptibility to ampicillin/sulbactam (A/S), ertapenem, and piperacillin/tazobactam (P/T) as 52%, 100%, and 92%, respectively. This is a retrospective review of empiric use of A/S, ertapenem, and P/T for postoperative cIAI during a 3-month period. The proportion of patients without risk factors for Pseudomonas aeruginosa who received P/T is also reported.

METHODS: In May 2007, ertapenem became the recommended agent by the Antibiotic Subcommittee for non-ICU patients with postoperative cIAI. Staff was notified through the Pharmacy and Therapeutics bulletin. When A/S was prescribed, a pharmacist was to contact the physician for an ertapenem switch. If P/T was prescribed, the case was reviewed for P. aeruginosa risk, and physician was contacted. Patients were identified through daily reports of A/S, ertapenem, and P/T use by the general surgical service. Data collected included patient demographics, operative procedure, antibiotic indication, days of postoperative antibiotics, and microbiology results (including Clostridium difficile) until discontinuation of antibiotics or hospital discharge. Appropriateness and timing of preoperative antibiotic prophylaxis were reviewed. Study results will be used to identify additional education and interventions.

RESULTS: Results for 60/110 patients are reported. Thirty-five patients met inclusion criteria. Prescribing of A/S, ertapenem, and P/T was 14%, 23%, and 66%, respectively. In 46% of cases, guidelines for appropriate antibiotic selection were followed. P/T was used in 46% of patients without P. aeruginosa risk. Pharmacist interventions were poorly documented and infrequent.

CONCLUSIONS: Compliance with the guideline was poor. In the antibiotic resistance era, patients without P. aeruginosa risk factors should not receive P/T. Additional, formal re-education of physicians with consistent pharmacist interventions is necessary. The complete analysis of 110 patients including 65 cIAI patients will be presented at the 2008 ACCP Spring Practice and Research Forum.

144. Analysis of vancomycin minimum inhibitory concentrations, plasma levels, and treatment outcomes for methicillin-resistant Staphylococcus aureus bloodstream infections. Natalie Boyd, Pharm.D., M.S.1, Jon D. Herrington, Pharm.D.2, Robert Fader, Ph.D.3, (1)University of Texas at Austin College of Pharmacy, Temple, TX; (2)Scott & White Memorial Hospital, Temple, TX.

PURPOSE: Clinical failures with vancomycin treatment for methicillin-resistant Staphylococcus aureus (MRSA) bloodstream infections and evaluate outcomes in relation to pharmacokinetic monitoring and dosage adjustment of vancomycin.

METHODS: Patients hospitalized at Scott & White > 18 years and with positive MRSA blood cultures will be included in the study. Patients with presumed or confirmed central nervous system infections will be excluded. MICs will be determined via epilometer test strips (E-test). Vancomycin serum levels will be monitored and pharmacokinetics will be calculated. Outcomes will be assessed as either clinical success, defined as resolution of fever, leukocytosis, and local signs of infection or failure, defined as lack of improvement, worsening of signs and symptoms of infection, requiring a different antibiotic, or relapse. Outcomes will be correlated with response rate of vancomycin for MRSA bloodstream infections with MICs of ≤ 1 µg/mL, 1.5–4 µg/mL, and > 4 µg/mL. RESULTS: Preliminary data shows that during a 12 month period, 135 bloodstream isolates were positive for S. aureus and 56% (76/135) of these isolates were MRSA. Vancomycin MICs were measured for 43 of the 76 MRSA isolates. The percent of isolates with MICs of 2, 1.5, 1, and < 1 µg/mL were 16%, 19%, 39%, and 26%, respectively. CONCLUSION: The pilot data suggest that the median vancomycin MIC for MRSA bloodstream isolates is 1 µg/mL. Studies are currently ongoing to delineate the relationship between vancomycin MICs and response rates for MRSA bloodstream infections.

Nephrology

145. Home medication regimen changes over time in daily nocturnal hemodialysis patients. Katie E. Pallotta, Pharm.D.1, Darren W. Grabe, Pharm.D.1, Harold J. Manley, Pharm.D.2, BCPS1, Shari Meola, R.N.3,1, Christopher D. Hoy, M.D.2, George R. Bailie, Pharm.D., Ph.D., MSc2, (1)Albany College of Pharmacy, Albany, NY; (2)VillageHealth Disease Management, Glenmont, NY; (3)Hortense and Louis Rubin Dialysis Center, Inc., Clifton Park, NY.

PURPOSE: Simplification of medication regimens may improve medication adherence, which is poor in end stage kidney disease patients. Daily nocturnal home hemodialysis (DNHD) has proven benefits, however its effect on medication burden is unknown. We examined medication regimen changes in patients who changed from another form of kidney replacement to DNHD.

METHODS: A retrospective analysis of 41 DNHD patients over a 2-year period was conducted. Demographic and medication regimen information was collected at baseline (prior to DNHD training), on day 1 of DNHD (following training), and at 3, 6, 12, 18, and 24 months of DNHD. Medication regimen changes, including number of medications, daily pill burden (PB), and number of total administration times per day were determined at each time point for each patient. Home medications used to treat anemia, renal osteodystrophy (ROD), and cardiovascular (CV) disease were analyzed for number of medications and PB.

RESULTS: The mean age at the start of DNHD therapy was 53.5 ± 11.3 years. Thirty-two percent of patients were female and 86% Caucasian. Patients were prescribed 10.4 ± 4.4 home medications at baseline and 12.6 ± 4.8 at study end (p = 0.067). Number of home anemia medications significantly increased (p = 0.001), number of ROD medications decreased (p = 0.027), and number of CV medications did not change significantly (p = 0.087). Total PB did not change significantly over the 24 months (p = 0.884), nor did number of ROD or CV PB decreased (p = 0.105). Number of medication administration times per day decreased from 5.0 ± 1.5 at baseline to 3.8 ± 1.5 at 24 months on DNHD (p = 0.003).

CONCLUSIONS: Medication burden changes over time in end stage kidney disease patients after changing to DNHD. Although total number of medications did not change significantly by 24 months, other changes in the regimen occurred.

146. Comparison of phosphate binder exposure and all-cause mortality among veterans on hemodialysis.-April S. Atherton, Pharm.D.1, Ravintra Pathak, Pharm.D., Ph.D., M.B.A.2, (1)University of Utah Pharmacotherapy Outcomes Research Center, Salt Lake City, UT; (2)Salt Lake City Veterans Affairs Medical Center, Salt Lake City, UT.

INTRODUCTION: The incidence and prevalence of stage-5 chronic kidney disease (end stage renal disease) in the US is estimated to be 107,000 and 485,000, respectively. Management of hyperphosphatemia is difficult in these patients and is the leading cause of morbidity and mortality. Calcium acetate, sevelamer and lanthanum carbonate are the three FDA approved dietary phosphate-binders. The aim of this study is to assess the all-cause mortality and clinical effectiveness of these medications in veterans with end-stage renal disease (ESRD) undergoing hemodialysis.

METHODS: Retrospective data will be obtained from 2005–2007 using the VA information Systems and Technology Architecture (VISTA) system. Patients with ESRD will be identified using ICD 9 codes (585.5 and 585.6), hemodialysis procedural codes(V56.31)and the code for hemodialysis (39.95). ESRD patients not undergoing hemodialysis, those receiving chemotherapy or those requiring more than one oral phosphate binder will be excluded. Patient exposure days to phosphate binders and all-cause mortality will be assessed using ANOVA (null hypothesis will be rejected if the study finds a statistically significant difference in mortality among the three dietary phosphate binders) and evaluated using Kaplan Meier survival curves and Cox regression analysis. Secondary outcomes, including serum chemistries and hospitalizations will be compared using ANOVA among the 3 different phosphate binders.

RESULTS: 184 veterans with ESRD and receiving hemodialysis were identified. Utilization days of sevelamer, calcium acetate and lanthanum carbonate were 4290, 691 and 290, respectively. Data is currently being analyzed to assess all causes of mortality and clinical effectiveness of these dietary phosphate binders.

CONCLUSION: Details will be presented at the meeting. However, a preliminary analysis indicates that lanthanum was very poorly tolerated by the veterans. It also had the highest discontinuation rates, and its effectiveness in lowering serum phosphate appeared to be inferior to other dietary phosphate binders.

Oncology

147. Evaluation of oxaliplatin versus irinotecan based first-line chemotherapy for advanced colorectal cancer. Rebecca L. Owens, Pharm.D.1,
**CONCLUSION:** Weight loss greater than 5% from baseline during initial therapy (p=0.9). By multi-variate regression with performance status as a potential confounder associated with weight loss > 5% between treatment groups when evaluated therapy (p=0.045). However, there was no difference in overall survival (p>0.05 for all comparisons). Performance status was significantly worse at therapy (p=0.7). Baseline characteristics of age, gender, and body mass index last follow-up were 55% for oxaliplatin therapy and 53% for irinotecan and irinotecan regimens (26% vs 21%, respectively; p=0.3). Survival rates at weight loss (> 5% from baseline) during initial therapy between oxaliplatin and irinotecan versus irinotecan-based regimens. Baseline and cycles of first-line regimen were significantly different between the groups. Patients on oxaliplatin regimen had a lower initial performance status compared to irinotecan (p=0.035). Patients on oxaliplatin regimens received fewer cycles of therapy than did patients on oxaliplatin regimens (median 5 versus 7, p<0.004). In a multivariate model controlling for performance status and cycles received, survival rates between the groups remained similar (p=0.73). The number of cycles of the first-line regimen received was the only factor that was independently predictive of survival in the multivariate model.

**CONCLUSION:** This retrospective review of patients with MCRC suggests that there is no difference in survival between patients who initially receive oxaliplatin versus irinotecan-based regimens.

148. A retrospective analysis of the impact of weight loss on overall survival in advanced colorectal cancer patients initially treated with oxaliplatin- or irinotecan-based regimens in community oncology practice. Rebecca D. Boudreaux, Pharm.D.1, Rebecca L. Owens, Pharm.D.1, Trevor McKibbon, Pharm.D.2, Greg McKibbin, Pharm.D.3, (1)University of Texas at Austin and University of Texas Health Science Center at San Antonio, San Antonio, TX; (2)University of Tennessee Health Science Center, Memphis, TN; (3)University of Texas at Austin and University of Texas Health Science Center San Antonio, San Antonio, TX.

**PURPOSE:** Both irinotecan- and oxaliplatin-based regimens are utilized in the treatment of metastatic colorectal cancer (MCRC). However, these regimens have significant toxicity differences. Weight loss and performance status (PS) are indicators of functional status and are related to the toxicity seen with these regimens. We investigated the association between overall survival and both performance status and percent weight loss after initial therapy with oxaliplatin- or irinotecan-based regimens. Baseline characteristics of age, gender, and body mass index at treatment initiation were similar for both groups on univariate analysis (p>0.05 for all comparisons). Performance status was significantly worse at baseline for patients treated with irinotecan therapy compared to oxaliplatin therapy (p=0.045). However, there was no difference in overall survival associated with weight loss > 5% between treatment groups when evaluated by multi-variate regression with performance status as a potential confounder term.

**CONCLUSION:** Weight loss greater than 5% from baseline during initial treatment was not statistically different among MCRC patients treated with oxaliplatin- or irinotecan-based regimens and was not associated with a decrease in overall survival when adjusted for performance status.

**Pain Management/Analgesia**

149. Efficacy of continuous peripheral nerve blockade in the management of total knee arthroplasty pain. Does preoperative education improve patient outcomes related to pain control. Molly E. Adams, Pharm.D.1, Troy Hogeman, Pharm.D.2, BCPS3, FPGCO4, Jill Moscati, R.N.5, APN5; (1)Midwestern University Chicago College of Pharmacy, Downers Grove, IL; (2)Northwest Community Hospital, Arlington Heights, IL.

**PURPOSE:** Narcotics work well as analgesics after total knee arthroplasty (TKA), but are associated with many adverse effects. Our purpose is to evaluate if continuous peripheral nerve blockade with ropivacaine and education during and after TKA decreases narcotic use and decreases side effects associated with narcotic analgesia.

**METHODS:** A chart review was conducted of TKA patients at Northwest Community Hospital. Patients included if they had a unilateral TKA during the months of June and November 2007. Patients were separated into three groups: no continuous nerve block, continuous nerve block without or with preoperative pain pump and medication education. Standardized education was initiated in August 2007. Data collected included: amount of narcotic equivalents used (PACU and 48h postop), highest pain score in PACU, LOS in PACU and hospital, use of anti-emetics (PACU and 48h postop), and adverse events noted.

**RESULTS:** Data has been collected on 45 patients (5 no block; 26 block without education; 14 block with education). These preliminary results show an average PACU highest pain score of 5 (10=10) (3.8 no block, 2.92 block without, 3.82 with education). PACU LOS for most patients was > 90 minutes. Five patients required the use of anti-emetic in the PACU (1 no block; 4 block without education) and 14 required an anti-emetic on the floor (2 no block, 8 block without, 4 with education). The most common adverse event was breakthrough pain. Average LOS for the hospital is 3.5 days (3 no block, 3.77 block without, 3.36 with education). Further analysis is pending.

**CONCLUSION:** Our preliminary results suggest that average high pain score is lower for the groups receiving continuous nerve block. Treatment with continuous nerve block does not appear to affect PACU or hospital LOS. Anti-emetic use is slightly lower for the groups with continuous nerve blocks.

**Pediaiatrics**

151. Evaluation of medication dosing in overweight children. Jamie L. Miller, Pharm.D., Peter N. Johnson, Pharm.D., Donald Harrison, Ph.D., Tracy M. Hagemann, Pharm.D.; University of Oklahoma College of Pharmacy, Oklahoma City, OK.

**PURPOSE:** The incidence of overweight children in the U.S. has significantly increased over the last three decades. Baseline data for the number of overweight children admitted to institutional settings has not been established. Weight-based dosing in pediatric patients (mg/kg/dose or mg/kg/day) is the most common empirical strategy for dosing medications in children. Overweight children, this dosing strategy could result in under- or over-dosing leading to a lack of efficacy or toxicity from medications. The objective of this study is to document the number of overweight pediatric patients to 1.) determine the percentage of patients admitted to our institution with a BMI > 85th percentile and 2.) identify the number of occurrences of over/under dosing of analgesics and antimicrobials.

**METHODS:** This is a retrospective, pilot study of patients 5–12 years of age with a BMI > 85th percentile admitted between January 1–June 30, 2007. Data collection includes baseline demographics and the dosing regimen of analgesics and antimicrobials for patients with a BMI > 85th percentile. A potential under-dose is defined as: (1) < 90% of the minimum recommended pediatric dose (mg/kg/day) and below the minimum adult recommended dose (mg/kg/day); (2) doses/day less than recommended according patient age. A potential overdose is defined as: (1) > 110% of the maximum recommended pediatric dose; (2) dose exceeding maximum recommended adult dose. χ² analyses will be performed to assess potential association between BMI percentile and presence of under/dosing. Data will be analyzed using SPSS for Windows (v14.0) with the priori level of significance set at p<0.05.

**RESULTS:** Preliminary data analysis indicates that 37% (312/843) of pediatric patients admitted to our institution during this timeframe have a BMI > 85th percentile.

**CONCLUSIONS:** Data analysis in progress. Final results to be presented.
medical record system will be used to identify patients who, since March 1, 2007 to August 31, 2007, received antiepileptics to prevent CINV. Patient not receiving chemotherapy, those receiving oral chemotherapy, or those treated on an outpatient basis will be excluded. The following data will be collected: date and time of chemotherapy, dose of chemotherapy, emetogenic risk potential for chemotherapy, date and time of antiemetic therapy, dose and route of antiemetic therapy, number of vomiting episodes, number of as-needed antiepileptics required, patient age, sex, allergies, type of cancer, and length of hospital stay. All the data will be recorded without patient identifiers and maintained confidentially.

Pharmacoeconomics/Outcomes


BACKGROUND: The financial burden of erythropoiesis stimulating agents (ESAs) is a major budgetary concern for most pharmacy departments, and exemplifies one therapeutic class of agents which has shown medical benefit but has encountered scrutiny for its cost. In the retail setting, patients would be expected to pay over $2000 a month for this therapy alone. Drug costs for these agents exceed 1.4 million dollars at National Naval Medical Center (NNMC) annually. In addition to fiscal concerns, the Food and Drug Administration (FDA) required a black box warning in March 2007, alerting providers of increased mortality, cardiovascular and thromboembolic events, and tumor progression.

PURPOSE: The primary objective of this study is to determine cost-effectiveness of ESAs at NNMC. Secondary objectives include evaluating adherence to national standards of care and preventing drug-related adverse events.

METHODS: Data collection includes patient demographics and comorbidities, laboratory data (change in hemoglobin, renal function, iron studies), indications for use, dose and frequency, adverse drug events, and medication costs. Financial and laboratory data over a one-year course will be reviewed with patient chart information to assess appropriateness.

RESULTS: Between 12 December 2006 and 12 December 2007, 250 prescriptions were written for ESAs in the inpatient setting and an additional 1,140 prescriptions for ESAs were dispensed or refilled in the outpatient setting. Calculated average cost per dose for darbepoetin alfa (Aranesp®) and epoetin alfa (Procrit®, Epogen®) were $696.66 and $187.78, respectively. Complete results are pending additional chart review and anticipated completion of project will be March 2008.

CONCLUSIONS: By evaluating the indicators, use, side effect profile, costs, and clinical effects, our goal is to improve prescribing behaviors and implement a protocol that supports national standards. A prescribing protocol will ensure medication appropriateness and promote fiscal responsibility.

154. Comparison of pharmacist-mediated versus physician-directed interventions initiated by clinical pharmacists reviewing Utah Medicaid patients’ medication profiles. Abril S. Atherton, Pharm.D., Joanne LaFleur, Pharm.D., MSPH, Gary Oderda, Pharm.D., MPH, University of Utah Pharmacotherapy Outcomes Research Center, Salt Lake City, UT.

PURPOSE: Drug-related problems (DRPs) are assessed by clinical pharmacists reviewing the drug regimens of Utah Medicaid patients and mailed interventions are generated to address identified problems. The purpose of this analysis was to compare the change in DRPs 90 days after the intervention letter for patients whose review letters were sent directly to the physician versus those that were sent care of the clinical pharmacist. We hypothesized that pharmacist-mediated letters were more likely to be associated with a decrease in the number of DRPs compared to physician-directed letters.

METHODS: Patients for whom review letters were sent between January-December 2006 to clinicians care-of pharmacists or directly to prescribers in University of Utah clinics were identified. Baseline characteristics were compared using Student’s t-test for continuous variables and chi² for categorical variables. The odds of having a decrease in DRPs was compared between groups using logistic regression, adjusting for patient-specific characteristics such as initial number of drug-related problems and initial number of pharmacies.

RESULTS: A total of 440 patients in University clinics were reviewed in 2006 including 187 whose letters were sent to pharmacists and 253 directly to a physician. The mean number of DRPs identified at baseline was 3.39, 3.21 for pharmacist-mediated and 3.52 for physician-only practice models (p=0.076). The mean decrease in DRPs was 48% (47% for pharmacist-mediated and 52% for physician-directed, p>NS). Adjusted odds ratio comparing the decrease in DRPs between the pharmacist-mediated and physician-directed model will be reported.

CONCLUSION: All patients had nearly a 50% reduction in number of DRPs 90 days after intervention letters were mailed, regardless whether intervention letters were mailed to the physician or a clinical pharmacist. Additional results will be reported.

Pharmacoeconomics/Outcomes


PURPOSE: To determine if antidepressant use during pregnancy has changed over time. The goal of this study was to examine Medicaid claims data to characterize antidepressant utilization among pregnant women in a state Medicaid population.

METHODS: This retrospective, observational study reviewed Medicaid claims among pregnant women between January 1, 1995 and October 20, 2007. The prescription claims database was queried to identify pregnancies associated with one or more claims for antidepressant medication. The data were analyzed to identify the most widely prescribed antidepressants. Prescription claims were screened monthly during pregnancy by agent and class to evaluate if antidepressant treatment was continued, substituted, or discontinued. Antidepressant prescription trends were evaluated yearly as well as by first, second, and third trimesters.

RESULTS: Preliminary results indicated that 2.6% of the 108,862 pregnancies 8,030 (7.4%) were exposed to an antidepressant. Pregnancies exposed to selective serotonin reuptake inhibitors were 4.6%. Pregnancies exposed to bupropion, SNRIs, TCAs, and trazodone were 1.0%, 0.5%, 0.3%, and 0.3% respectively. The number of pregnancies exposed to antidepressants significantly increased from 2.2% in 1995 to a high of 11.0% in 2004. Overall, 2.2% of pregnancies were linked with an antidepressant drug in the first trimester, 3.3% in the second trimester, and 4.1% in the third trimester.

CONCLUSIONS: These data indicate SSRIs as the most prescribed antidepressants during pregnancy and the use of antidepressants have increased since 1995. Complete analysis of the data will be available at the time of presentation.

156. Use of ACE-inhibitors, angiotensin II receptor blockers, and statins in women of childbearing potential. Christine D. Lee, Pharm.D., Rex W. Force, Pharm.D., Brooke A. Pugmire, Pharm.D., Christopher T. Owens, Pharm.D.; Idaho State University, Pocatello, ID.

PURPOSE: The epidemics of metabolic syndrome and type 2 diabetes combined with adherence to treatment guidelines has led to increased prescribing of ACEI, ARB, and statins. The fact that younger patients are receiving these medications and that they are pregnancy category D and X raises concerns in women of childbearing potential. To characterize this problem, we analyzed longitudinal paid pharmacy and medical claims in this at-risk population.

METHODS: In this research in progress, women aged 14–45 were identified from January 1, 1994 to October 2007. The at-risk women who received one or more prescriptions for an ACEI, ARB, or statin were identified and univariate trend analyses were performed. Additionally, all pregnancies over the study period were identified by ICD-9 delivery codes. Pharmacy claims for the drugs of interest during the 280 days prior to delivery were quantified. An analysis of indications for drug use and the presence of concurrent pharmacologic contraindication in the at-risk population will be performed and available at the time of presentation.

RESULTS: Of 27,753 at-risk women in 1994, 359 (0.93%) had at least one claim for an ACEI, ARB or statin. At-risk women peaked in 2005 when 1460 (4.3%) were exposed to an antidepressant. Overall, 2.2% of pregnancies exposed in 1994 was 0.027% (2 women) and in 2007 was 0.15% (11 women).

CONCLUSION: The use of ACEIs, ARBs, and statins in women of childbearing potential has increased 3-fold from 1994 to 2007. Additionally, increased use of these medications appears to be occurring concurrently with pregnancy. Additional data will be available at the time of presentation.

Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery


PURPOSE: HIV protease inhibitor (PI)-treated patients have increased T,
Transplant/Immunology


PURPOSE: Elevated blood concentrations of tacrolimus have been documented with concurrent treatment doses of fluconazole. The purpose of this study is to determine if there is a clinically significant drug interaction between oral low-dose fluconazole (50 mg/day) and tacrolimus and to evaluate this regimen’s efficacy in primary renal transplant patients.

METHODS: All adult recipients from January 2005 to December 2006 have been reviewed. Patients who received maintenance immunosuppression with tacrolimus, mycophenolate mofetil and a rapid seven day steroid withdrawal, in addition to 30 days of fluconazole prophylaxis, are eligible for inclusion. Patients are excluded if another interacting medication was used or if tacrolimus doses and troughs were unavailable. Two tacrolimus troughs are then compared, one while on fluconazole and another at least seven days after fluconazole discontinuation.

RESULTS: Of the patients screened, 54 are eligible for this study. Demographics: male 61% (33/54), deceased donor 24% (26/54), living related 37% (20/54) and living unrelated 15% (8/54). After fluconazole discontinuation, the average tacrolimus trough decreased by 15%, but the average tacrolimus dose also decreased by 6%. On average, serum creatinine decreased 19%. In 31 patients with a stable dose both on and off fluconazole, the average tacrolimus trough decreased. There was one documented oral thrush infection. Additional patients are being evaluated for inclusion to reach 80% power.

CONCLUSION: Preliminary data suggests that although low-dose fluconazole appears to be an effective antifungal prophylactic agent, there may be a drug interaction with tacrolimus. Interpretation of this data is limited by intrapatient variability of tacrolimus troughs and change in fluconazole dose. Additional patients are being evaluated for inclusion.

On fluconazole

<table>
<thead>
<tr>
<th>Tacrolimus trough (ng/mL)</th>
<th>12.6±3.5</th>
<th>10.9±3.7</th>
<th>p=0.016</th>
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<tr>
<td>Tacrolimus trough (with stable dose, ng/mL)*</td>
<td>12.2±2.9</td>
<td>10.8±3.9</td>
<td>p=0.05</td>
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<tr>
<td>Tacrolimus dose (mg/kg/day)</td>
<td>0.4±0.1</td>
<td>0.3±0.1</td>
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<td>Serum creatinine (mg/dL)</td>
<td>1.5±0.5</td>
<td>1.2±0.4</td>
<td>p=0.001</td>
</tr>
</tbody>
</table>

Ambulatory Care

160. Evaluating the stability of chronic anticoagulation when switching vitamin K formulations. Elim Ijo, Pharm.D., candidate; Wingate University School of Pharmacy, Wingate, NC.

PURPOSE: Low-dose vitamin K supplementation has been used to decrease variability of international normalized ratios (INR) in patients on warfarin therapy. Patients followed in our anticoagulation clinic were discontinuing use of ADEK (vitamin K 150 µg) supplement. Our purpose is to determine the effect of changing vitamin K formulations on the INR in patients taking warfarin.

METHODS: This prospective study evaluated ten patients (four men, six women), ages 48–88 years old, on warfarin therapy and supplemental low-dose vitamin K. Inclusion criteria were as follows: stable anticoagulation with individualized warfarin dosing, low-dose vitamin K with ADEK, and reasonably consistent lifestyle (e.g., diet, medication compliance). Patients were switched from a full tablet of ADEK to either two Viactiv® chewable tablets (40 µg vitamin K/tablet) or one GNC vitamin K tablets (100 µg vitamin K/tablet). INR measurements were taken using a point-of-care testing device. Total weekly warfarin and vitamin K doses, time in range and range of INR values in the therapeutic range were compared three months before and after changing vitamin K formulation.

RESULTS: To date six participants have completed three months follow-up with the remaining four pending completion. Although successfully changing to a lower daily vitamin K dose required minimal change in the weekly warfarin dose (+ 0.4 %, range -6.6% to 9%), the daily vitamin K dose was carefully titrated to a lower range of 25–100 µg to maintain INR stability. The average daily vitamin K dose before was 150 µg compared to 71 µg afterwards.

CONCLUSION: Our preliminary data suggests that when changing ADEK to another formulation of vitamin K supplement the INR should be closely monitored. In most cases a supplement with lower vitamin K content may be adequate to maintain INR stability. Final data collection will be completed by February 2008.

161. Impact of collection methods on lipid results obtained using the Cholestech LDX Portable Lipid Analyzer. Cory Holland, Pharm.D., Candidate; Kristal L. Williams, Pharm.D.; (1)Butler University College of Pharmacy and Health Sciences, 1520 N. Senate Ave, Indianapolis, IN;}

STUDENT SUBMISSIONS

ADR/Drug Interactions

159. Adverse effects of dapsone when used as pneumocystis prophylaxis in pediatric oncology patients. Zhiyu Chen, B.S.; (1)Skaggs School of Pharmacy and Pharmaceutical Sciences, University of California, San Diego, La Jolla, CA; (2)School of Medicine, University of California, San Diego, San Diego, CA; (3)Pediatric Oncology, Rady Children’s Hospital-San Diego, San Diego, CA.

PURPOSE: Dapsone (DDS)-associated adverse effects (AE) include hemolysis and methemoglobinemia. DDS metabolism involves N-hydroxylation to toxic DDS-NHY and acetylation to nontoxic MADDs. Our study’s purpose was to 2-fold: 1) to determine the frequency of hemolysis and methemoglobinemia in pediatric oncology patients on DDS for PCP prophylaxis, and 2) to develop an assay to measure DDS and its metabolites for using in a prospective study of DDS-associated toxicity in pediatric oncology patients.

METHODS: We performed a retrospective study of pediatric oncology patients with DDS-related AE treated at RCHSD from 3/2006 to 3/2007. Patients with DDS-associated AE were identified by treating physicians and their medical records were screened. To help identify patients at risk for DDS-associated AE, we also attempted to develop a novel assay to simultaneously measure DDS, DDS-NHY and MADDs in human plasma using HPLC method. RESULTS: From 3/2006 to 3/2007, 7 patients (ages 4–13 yrs) experienced a DDS-associated AE. Mean duration of DDS therapy prior to AE was 12.6 months. For 4 patients, AE involved hemolysis and methemoglobinemia; 2 patients, methemoglobinemia only; and 1 pt, hemolysis only. MethHb level for patients with methemoglobinemia was 6.5 ± 2.0%. Two patients had cyanosis. Six had decreased O2-saturation by pulse oxymeter. The highly unstable DDS-NHY in plasma at room temperature was the major challenge for assay development. Reproteination was optimized with 100% methanol. The addition of 10 µl of 200 mg/ml ascorbic solution into every 1ml of plasma stabilized DDS-NHY. The degradation was reduced from 30.7% to 5.1% over 48 hours. The resulting assay range was 0.097 µg/ml–9µg/ml for all three compounds.

CONCLUSIONS: DDS-associated AE occur commonly. We recommend close monitoring of pediatric oncology patients on DDS PCP prophylaxis for signs/symptoms of hemolysis and methemoglobinemia. We plan to perform a prospective study to determine the incidence of AE in patients and correlate AE with DDS-metabolite levels.
164. Interferon gamma and IL-10 gene polymorphisms and immune responses to influenza vaccine in patients with heart failure. Jonathan C. Budge, B.S., Pharmacy, Student1, Michelle A. Detry, B.S.1, John JM Moran, B.S.1, Nancy K. Sweitzer, M.D.1, Orly Vardeny, Pharm.D.1 (1)University of Wisconsin School of Pharmacy, Madison, WI; (2)University of Wisconsin, Madison, WI; (3)Division of Cardiovascular Medicine, Dept of Medicine, University of Wisconsin, Madison, WI.

PURPOSE: Heart failure (HF) patients (pts) are at high risk for influenza illness and mount less vigorous immune responses to influenza vaccine. Vaccine-induced T cell responses through production of the cytokines interferon gamma (IFNγ) and IL-10, are necessary for protection from influenza illness. We hypothesized that genetic variants in the IFNγ and IL-10 genes affecting their production are associated with influenza vaccine immune responses.

METHODS: We studied 32 HF pts optimized on guideline based therapy and 19 healthy controls (HC). Participants received the inactivated influenza vaccine intramuscularly, and underwent phlebitomy before and 2-4 weeks after vaccination. Cytokine production were measured in cultured peripheral blood mononuclear cells (PBMCs) using ELISA. IFNγ and IL-10 genotypes were determined by PCR, and linear regression models were created to explore associations between genotypes and IFNγ and IL-10 concentrations.

RESULTS: There were no statistically significant differences between HF and HC in IFNγ production from influenza vaccination (table; p=NS). HF pts had higher levels of IL-10 compared to HC (p<0.001). IFNγ genotype was not associated with IFNγ concentrations. Associations with the IL-10 variant will be presented.

CONCLUSIONS: In this exploratory study, IFNγ genotype was not associated with vaccine-mediated cytokine production. Further investigation of genetic variants with vaccine response is warranted in a larger sample.

Cardiovascular

163. Outcomes of patients requiring dual or triple antithrombotic therapy: Clopidogrel and warfarin with or without aspirin. Gladys H. Mitani, Pharm.D.1, Dwight Song, BS, Pharm., D., Candidate2, May Mak, Pharm.D.1, Enrique Ostrenga, M.D.1, Sandra Yoo, Pharm.D., D.1 (1)USC School of Pharmacy, Los Angeles, CA; (2)USC School of Medicine, Los Angeles, CA.

PURPOSE: To determine the incidence of bleeding rates, stent reocclusion and cardiovascular events (CV) for patients on dual antithrombotic therapy (DT) with clopidogrel plus warfarin and triple therapy (TT) with clopidogrel, aspirin plus warfarin who received close anticoagulation monitoring by the Outpatient Anticoagulation Clinic (OAC) at the LAC-USC Medical Center. METHODS: 23 Post-PCI/stent patients (pts) and 1 pt with a PTCA discharged from the LAC-USC Cardiology Ward were retrospectively followed from December 10, 2001 to October 12, 2007. Inclusion requirements for this study include pts who were followed up at the OAC, who received DT or TT for >1 month.

RESULTS: Twenty-two out of 24 pts were on TT and 2 were on DT. The primary end points were bleeding defined by the Thrombosis In Myocardial Infarction scale (TIMI) and stent reocclusion. There were a total of 26 bleeding events in 11 pts in the TT group; 23 were minimal, 3 were minor and none were major. Forty percent were associated with underlying causes. One pt on DT experienced 1 minor episode of bleeding; another had 5 minimal episodes. Gum bleeding was the most common (36%), followed by rectal bleeding or occult positive stools (24%). Most bleeding events resolved spontaneously and only 4 events required minor interusions in therapy. Fifty-eight percent of the bleeding events were associated with an INR within range (INR 1.95–3.1). 35% were below (INR < 1) and 10% were above (INR>3.1). During the study period, none of the pts in either group experienced stent reocclusion, second CV event, or death from complications. CONCLUSION: TT patients who were carefully managed by an anticoagulation clinic did not appear to experience levels of adverse bleeding episodes that would warrant discouraging the use of this regimen when indicated. Further studies are needed to further evaluate the risk/benefit of TT.

165. Incidence of adverse cardiac events among patients on a QT-prolonging drug with concomitant cardiac risk factors: results from the MATRIX study. Kyle J. Ellis, B.S., Naomi V. Dahl, Pharm.D.1, (1)Wilkes University, Wilkes-Barre, PA; (2)Watson Laboratories, Morristown, NJ.

PURPOSE: Drugs that prolong the QT interval have been associated with an increased risk of adverse cardiac outcomes. The Multicenter Assessment of Transdermal Therapy in Overactive Bladder with Oxybutynin (MATRIX) study assessed safety and effectiveness of transdermal oxybutynin treatment (OXY-TDS) for overactive bladder (OAB). We conducted a post-hoc analysis to examine whether concomitant use of QT-prolonging drugs affected the incidence of cardiac adverse events among study participants.

METHODS: This was a multicenter, open-label, prospective study in community-dwelling adults with OAB. All participants were treated with OXY-TDS 3.9 mg/day (2 patches/day) for 56 months. The incidence of cardiac adverse events was compared between patients taking QT-prolonging drugs vs those not taking them by means of a Fisher’s exact test.

RESULTS: Among 2878 participants (mean age 62±3.4±8.1), 50 (1.7%) took a
21. drug known to cause QT-prolongation during the study. These patients (39 female) also had numerous other cardiac risk factors: history of cardiac disease 29 (38%), a hypertension 36 (72%), diabetes 10 (18), obesity 23 (46%). Overall, 23 (0.9%) participants experienced any cardiac event during the study. The incidence of cardiac events was significantly greater (P=0.001) among patients taking QT-prolonging drugs at the time of the event (4 participants, 8%; sotalol (Birmingham, Bournemouth) than among others patients (21, 0.7%).

CONCLUSIONS: QT-prolonging drugs appear to increase the risk of cardiac adverse events 10-fold over a 6-month period. Further analyses will be conducted to control for other factors which may contribute to the risk.

Critical Care

167. Treatment of recurrent Stenotrophomonas maltophilia ventilator-associated pneumonia with IV doxycycline and aerosolized colistin: a case report. Elizabeth L. Underwood, Pharm.D., Candidate, Kristal L. Williams, Pharm.D.1, Tynesh Dodd, High School Student1; (1)Butler University College of Pharmacy and Health Sciences, Indianapolis, IN; (2)Butler University College of Pharmacy and Health Sciences / IU Methodist Family Practice Center, Indianapolis, IN; (3)Crispus Attucks Medical Magnet High School, Indianapolis, IN.

BACKGROUND: The elimination of health disparities is a major key goal of Healthy People 2010. Currently, significant disparities between white and minorities continue to exist. As the U.S. Hispanic population increases, it is imperative that health care systems and providers adequately respond to the needs of the community, the individual, and various cultures. Pharmacists, the most accessible health care providers, are positioned to positively impact individuals through providing essential medication counseling and assisting patients achieve the best use of medications. For the growing non-English speaking Hispanic population it will be necessary to provide such information in Spanish. There are very few studies evaluating pharmacy-related services available to non–English speaking patients.

OBJECTIVES: The objectives of this multi-centered, descriptive study are to evaluate available resources at retail pharmacies for the non-English speaking Hispanic population to report survey Hispanic residents regarding their pharmacy experiences and perceptions, and to determine ways to potentially decrease medication errors among Hispanics.

METHODS: This study will be conducted utilizing multiple survey tools (phase 1) and a secret shopper (phase 2). Two surveys will be distributed as part of this study. The first survey will be distributed via facsimile to pharmacy managers and pharmacists of major retail pharmacies. Pharmacist and pharmacy managers will be asked to complete a 14-item survey on available resources for the Hispanic individual. The second survey will be randomly administered to adults, non-English speaking Hispanic patients of the various study sites at their physician appointments. The 10-item patient survey will focus on the patient's experiences at the pharmacy and the desirable characteristics at their community pharmacy. Pharmacists obtaining valid prescriptions will be randomly asked to participate in phase two. Volunteering patients will be instructed on the study-designated criteria for evaluating the medication counseling experience and resources available.

RESULTS: To be presented.

Education/Training

168. Disease and medicine management programme for patients with Chronic Obstructive Pulmonary Disease (COPD). Maher Al-Abed, Ph.D., Student1, James McElney, BSc. Ph.D. FPSN1 FRPharmS FACCPC. Joseph C. Kidney, Respiratory, Consultant1, Bronagh McCourt, BSc. Clinical Pharmacist1; (1)School of Pharmacy, Queen's University of Belfast (QUB), Belfast, United Kingdom; (2)Queen's University of Belfast (QUB), Belfast, United Kingdom; (3)Department of Respiratory Medicine, Mater Hospital, N Ireland, Belfast, United Kingdom; (4)Mater Hospital, N Ireland, Belfast, United Kingdom.

PURPOSE: The aim of this study is to examine the impact of a pharmacy led disease and medicine management programme on clinical and humanistic outcomes in patients with COPD.

METHODS AND SETTING: The programme was delivered by well trained clinical pharmacists. It included patient education on disease state and medications (including inhaler technique), discussion on simple home exercises, breathing and relaxation techniques. Patients were given printed information booklets and a customised action plan for acute exacerbations (including advice on GPs to provide prescription for an antibiotic and an oral corticosteroid to be initiated promptly by patients for exacerbations). Patients were followed up at three months by telephone and at six months during a scheduled visit.

RESULTS: MEASUREMENTS: Hospital admissions, emergency department (ED) visits and health related quality of life.

RESULTS: At the six month follow up patients in the intervention group had a significant reduction in both hospital admissions [34 (43%) vs 15 (19%); p<0.01, OR=0.43, CI 0.21-0.86] and emergency department visits [43 (53%) vs 21 (25%); p<0.01, OR=0.33, CI 0.13-0.80].

Using the disease specific St George Respiratory Questionnaire (SGRQ), differences reached statistical significance at the 5% level on the symptom scores (-7.9; p<0.01), impact scores (-7.6 p<0.02) and total scores (-5.6; p<0.05). However, the physical activity subscale did not reach the clinically relevant improvement of 4 points.

CONCLUSION: The clinical pharmacy led self-management plan significantly reduced hospital admissions and improved the quality of life in COPD patients. Physical activity was resistant to the intervention at the six month measurement point.

169. Academic dishonesty among pharmacy students: does technology have a role? Meghan E. Morgan, BS, BA1, Heather P. Whiley, Pharm.D, BCPS, CDE1, (1)Auburn University Harrison School of Pharmacy, Tuscaloosa, AL; (2)Auburn University, Harrison School of Pharmacy, Tuscaloosa, AL.

BACKGROUND: Academic dishonesty is a concern among universities and colleges across the country. Schools of pharmacy are no exception; however, few studies have determined the pervasiveness of academic dishonesty in this population of professional students. Academic dishonesty while in school may lead to unprepared pharmacists or unethical behavior in future practice. If academic dishonesty becomes a problem in our schools of pharmacy, the future of the profession may be in jeopardy. Additionally, in this age of ever expanding technology, students have new opportunities for academic dishonesty.

PURPOSE: This study will evaluate the use of technology for academic dishonesty and prevalence among doctor of pharmacy candidates.

METHODS: A link to a brief online survey, posted at www.surveymonkey.com, will be e-mailed to all pharmacy students attending Auburn University, Samford University, Mercer University, and University of Mississippi following IRB approval. The survey questions will address academic dishonesty committed or witnessed while enrolled in pharmacy school. The questions will evaluate the prevalence of academic dishonesty as well as the use of technology for such purpose.

RESULTS & CONCLUSION: pending.

170. What practice area do pharmacy graduates prefer, retail or academia. Michelle Picrey, Pharm.D, candidate, Fungasi Mugwaga, Pharm.D.,...
candid, Yvette Collins, Pharm.D., candidate, Abbigail Williams, Pharm.D., candidate; Hampton University, Hampton, VA.

PURPOSE: The profession of pharmacy practice has evolved greatly over the recent years. Many opportunities are available for pharmacists such as working in retail, clinical settings or teaching at pharmacy schools. This study was conducted to determine if factors such as scheduling, benefits and financial earnings, location and the ability to advance have influenced pharmacists to choose retail over academia.

METHODS: The researchers conducted surveys targeted towards retail pharmacists in Virginia and pharmacy practice professors teaching at Hampton University, Virginia Commonwealth University, Shenandoah University and the University of Appalachia. The website www.SurveyMonkey.com was used to access the survey. Participants were asked demographic information, job satisfaction, geographic, job advancement and gender influenced them to choose academia or retail pharmacy as their first career choice after graduating pharmacy school.

RESULTS: All of the pharmacists in academia completed a residency, whereas the average number of retail pharmacists who completed a residency was only 21%. The factors affecting career choices in academia was consistent with an average between 60 to 70% and these factors included job advancement, diversity and job title. An average of 89% of retail pharmacists agreed that the salary was the greatest factor influencing their decisions of working in retail. Pharmacists in both academia and retail agreed that they were adding value to their institution.

CONCLUSIONS: Pharmacy graduates preferred retail pharmacy compared to academia pharmacy based on certain factors.

Endocrinology

171. Retrospective study evaluating impact of race and gender on Hba1c following pioglitazone therapy. Ligy T. John, Pharm.D. Candidate, 1 Jacqueline Milton-Brown, Pharm. D., 2 LinCY S. Lau, Pharm. D., 3 Ph.D., 4 (1)Texas Southern University, College of Pharmacy and Health Sciences, Houston, TX; (2)Harris County Hospital District (HCHD) Drug Information Center, Houston, TX; (3)JUT MD Anderson Cancer Center, Houston, TX.

OBJECTIVE: Following a drug utilization review at a county hospital district, it was found that majority of patient population were Hispanic and females. This study was carried out to determine gender and racial specific response to pioglitazone therapy.

METHODS: This is a retrospective analysis of patients prescribed pioglitazone over a period of 6 months. Patient specific information ascertained from reviewing patient medical records included: demographics, pre and post Hba1c, FBG, LFT, lipid profiles, and adverse events. Descriptive statistics, unpaired t-test and chi-square for nominal data were used to determine the impact of race and gender on laboratory outcomes.

RESULTS: A total of 199 patients were included in the final analysis, this group consisted of 72 (36.2%) males, and 127 (63.8%) females. Among them, 105 (52.8%) were Hispanics and 94 (47.2%) were Non-Hispanics. There was no significant age difference between these groups. The results showed that 16 subjects achieved A1c < 7% after therapy vs. 3 prior to therapy (P=0.004). Of the 16 subjects, eleven (8.66 %) women reached the treatment goal of < 7.0 mg/dL Hba1c, while only five (9.44 %) men reached the goal, p=0.005 (women) vs. p=0.441 (men). There is a significant difference in the number of study Hispanic patients who attained treatment goal of A1c < 7% (0 vs. 7 post therapy, p=0.014) compared to Non-Hispanics (3 pre vs. 8 post therapy, p=0.1330). Other treatment monitoring parameters, such as CFT, lipid profile, and FBG, and change in A1c values, there were no significant difference between male vs. female or Hispanic vs. non-Hispanic groups.

CONCLUSIONS: After pioglitazone therapy, significantly higher number of women and Hispanics achieved A1c values < 7%. Role of concurrent therapy or compliance rate in achieving the goals was not taken into consideration. Further studies are needed to determine gender or racial specific outcome responses to pioglitazone.

172. Diabetes risk, perceptions of risk, and physical activity patterns in an active older adult community. Mark A. Farmenter, MS, Pharm. D., Candidate; Gina C. Guazzetti, Pharm. D., Candidate, Erin RaneY, Pharm. D., BCPS, Midwestern University, Glendale, AZ.

PURPOSE: Older adults are at increased risk for developing Type 2 diabetes (DM). Little data is available regarding whether perceived risk for DM influences risk reduction behaviors. The purpose of this study was to: 1) assess whether older adults with access to healthcare and health education accurately perceive DM risk, 2) determine the relationship between perception of DM risk and physical activity, and 3) provide an educational intervention to help decrease DM risk.

METHODS: Residents of an active older adult community in the Phoenix metropolitan area were eligible. Mean ages included the American Diabetes Association (ADA) Risk Test, the Risk Perception Survey – Developing Diabetes, and the Stanford Brief Activity Survey, as well as physical measurements of body mass index, blood pressure, and fasting plasma glucose. A live program on diabetes risk reduction was offered to all participants.

RESULTS: Sixty adults (age=66±8 years) were classified as moderate risk (MR; n = 22) or high risk (HR; n = 38) for developing DM. There was no significant difference in risk perception scores between the MR (1.96 ± 0.25) and HR (2.12±0.34) groups (p=0.07). There was a negative correlation between risk perception and physical activity (r = -0.35, p=0.006). Perception of “personal control” was positively correlated with physical activity levels (r = 0.28, p=0.03). Approximately 40 participants attended the live program.

CONCLUSION: As evidenced by a lack of difference between risk perception of MR and HR participants, older adults in this study setting were not able to accurately perceive their personal diabetes risk. Perception of higher diabetes risk was associated with lower physical activity levels, but perception of control over developing diabetes was associated with higher physical activity levels. These data suggest that risk reduction efforts should emphasize personal empowerment in order to maximize risk-reducing behaviors.

HIV/AIDS


PURPOSE: Polymorphisms exist in the CYP3A5 gene resulting in decreased protein expression and metabolism of CYP3A5 substrates. LPV and RTV are CYP3A substrates; however, few studies have evaluated concentrations based on CYP3A5 genotype. We sought to determine if certain patients receiving LPV/RTV therapy differed between genetically-determined CYP3A5 expressors versus non-expressors.

METHODS: HIV+ adults receiving LPV/RTV capsules 400/100mg twice daily plus tenofovir disoproxil fumarate (TDF) and þ1 nucleoside reverse transcriptase inhibitor for ≥ 4 weeks underwent an intensive PK study following a standardized meal. PK parameters were determined by non-compartmental analysis. Subjects were genotyped for the CYP3A5*3, *6, and *7 polymorphisms by PCR-pyrosequencing. Subjects who were *3, *6, or *7 homozygotes were classified as non-expressors; heterozygotes or wild-type homozygotes were classified as expressors. Log-transformed PK parameters were compared between expressors versus non-expressors (t-tests).

RESULTS: Thirty-three subjects (4 male/9 female, 3 black/10 non-black, 3 expressors/10 non-expressors) completed the study. Results are shown as mean (±SD).

LPV CL/F (ml/kg) AUC (ng*h/mL) Cmin (ng/mL) Cmax (ng/mL)
Non-expressors 73.9 (33.7) 71293 (21338) 7714 (2407) 4052 (1594)
Expressors 174.0 (9720) 95720 (31310) 76503 (2300) 2300 (1200)
p-value 0.002 0.07 0.3 0.04

LPV CL/F was faster and Cmin was lower in CYP3A5 expressors versus non-expressors. Additionally, in the setting of TDF, LPV concentrations were decreased in all subjects compared to historical data [mean (±SD) LPV AUC – 92600 (36700) ng*h/mL and Cmin – 5500 (2700) ng/mL]]. No statistically significant differences in RTV PK were found.

CONCLUSION: This study revealed faster LPV CL/F and lower Cmin in CYP3A5 expressors versus non-expressors. LPV concentrations were also significantly lower in these subjects on TDF compared to historical values, particularly in the CYP3A5 expressors. Future research is necessary to determine if certain patients receiving LPV/RTV plus TDF who are CYP3A5 expressors may be at risk for virologic failure.

Infectious Diseases

174. In vitro activity of trimethoprim vs. various antimicrobial agents against clinical isolates of MRSA from colonized patients. Elyn Choa Tan, Pharm. D., Candidate; Mercer University, Atlanta, GA.

BACKGROUND: Eradication of methicillin-resistant Staphylococcus aureus (MRSA) carriage via trimethoprim oral therapy may be a feasible decolonization option that can reduce the risk of MRSA infection and prevent transmission of the organism to other patients. This study compared the in vitro activity of trimethoprim vs. various antimicrobial agents against clinical isolates obtained from patients colonized with MRSA.

METHODS: Broth microdilution MIC susceptibility testing and time-kill methods were used to test the activities of vancomycin, clindamycin, rifampin, trimethoprim, and trimethoprim-sulfamethoxazole against clinical isolates of MRSA obtained from colonized patients who accessed services through the Piedmont Hospital in Atlanta, Georgia from December 2006–July 2007. Susceptibility profiles of a total of 82 clinical isolates were obtained and time-kill studies were performed on three selected isolates at two times their
175. The relationship between vancomycin susceptibility in Staphylococcus aureus and resistance to other antibiotics. Steven Chen, B.S.1, Scott Johns, Pharm.D.2; Janice Kaping, M.S.1; Pamela Mosse, Pharm.D.3; (1)University of California at San Diego, School of Pharmacy, La Jolla, CA; (2)Veteran Affairs Healthcare System, San Diego, CA.

Our goal is to attempt to identify if susceptibility trends exist among current active anti-microbial agents commonly used against methicillin-resistant Staphylococcus aureus (MRSA) in the VA hospital. E-test is used to measure the minimum inhibitory concentration values (MICs) for vancomycin, ticarcillin, linezolid, daptomycin, co-trimoxazole, and minocycline using 30 MRSA isolates collected from 30 unique patients at the VA San Diego Healthcare System. MIC values were compared using Spearman rank correlation analysis. We also investigated the relationship between Vitek II and E-test MIC values of MRSA. Spearman correlation analysis was employed to analyze the data. We found a significant correlation only between MIC values of vancomycin and those of minocycline (r = 0.81, p<0.0001). This correlation is difficult to explain since vancomycin inhibits bacterial cell wall synthesis, while minocycline inhibits bacterial protein synthesis without affecting cell wall synthesis. No other statistically significant relationship was found to correlate with the MIC values of vancomycin. linezolid (r = 0.28, p=0.1310); co-trimoxazole (r = 0.12, p=0.5286); ticarcillin (r = 0.28, p=0.1310); daptomycin (r = 0.08, p=0.496). Of the 27 isolates tested for the comparison between Vitek II and E-test, only nine show 100% agreement, 12 show 33% disagreement, and six show 50% disagreement. Vancomycin E-test MIC values were typically higher than Vitek II MIC values. In conclusion, the reliability of Vitek II to assess the variability in MIC values of MRSA to vancomycin necessitates further evaluation.

176. Antimicrobial consumption as a potential driver of microbial resistance in a surgical intensive care unit (SICU) comparing two different utilization methodologies.Deline Daily Dose (DDD) and Days of Therapy (DOT). To compare these usage tools to microbial resistance rates over time.

BACKGROUND: Excessive antimicrobial use is a key driver of microbial resistance development in the hospital settings that can lead to negative patient outcomes and increased healthcare cost.

METHOD: This retrospective investigation obtained abx usage data from pharmacy database and abx sensitivity patterns obtained from micro lab data from January 1, 2003 to December 31, 2006. Data were collected: IV abx received, patient identifer, dose, frequency, and start and end dates, census data which determined DDD and DOT. Susceptibility patterns included P. aeruginosa, Acinetobacter spp, E. coli, K. pneumoniae, E. cloacae, and S. aureus (both MSSA and MRSA). Abx classes examined: B-lactams (pip/tazo (p/t), ampicillin, cefaloridine (cefl), cefclarid (cecl)), carbapenems (meropenem (M) and imipenem (I)), aminoglycoside (genta (G), tobra and amik (A)), fluoroquinolones (cipro (C) and moxi), and vancomycin (V).

RESULT: Abx agent trended against organism resistance rates over time. Agents and org examined: cecl, V, G to S. aureus; p/t, C to P. aeruginosa; cfl to E. coli, K. pneumoniae; I, M, amik to E. cloacae; cdl, I, M, amik to Acinetobacter spp. Linear regression analysis performed for each combination above for both DDD and DOT. The only statistically significant correlation found was for cecl (DDD p=0.1, DOT p=0.015).

CONCLUSION: SICU abx consumption, as determined by DDD and DOT, matched to commonly isolated organism resistance rates over time did not correlate as a driver of resistance for the majority of SICU organisms' encounter.

177. Utilization of culture and susceptibility testing in patients with candidemia at UNC Hospitals. Bridgette L. Thoens, B.S.1, Todd A. Correll, Pharm.D., BCPS2; Ralph H. Raasch, Pharm.D., FCCP, BCPS3; (1)University of North Carolina School of Pharmacy, Chapel Hill, NC; (2)University of North Carolina Hospitals, 101 Manning Drive, Chapel Hill, NC.

PURPOSE: Because data-driven interpretive breakpoints for fluconazole, iraconazole and fluocytosine rely on methodological consistency anddeliverable dose, and clinically meaningful data is lacking for flucytosine. The extended-spectrum triazoles and echinocandins, routineantifungal susceptibility testing is not recommended as a standard of care for candida infections by the Infectious Diseases Society of America. The objectives of this study are to retrospectively investigate if culture and susceptibility (C/S) data obtained for patients with candidemia at UNC Hospitals is utilized appropriately to de-escalate therapy and to collect patient outcomes of that chosen therapy.

METHODS: Approval for this study has been obtained from the Institutional Review Board, all information has been maintained confidentially. Patients were identified from positive Candida bloodstream infections from July 1, 2006 to June 30, 2007 utilizing the microbiology laboratory database at UNC Hospitals. Patient outcomes collected include evidence of dissemination, length of hospitalization and survival of hospital admission. Data analysis will be complete by March 2008.

RESULTS: C/S data was obtained for twenty-six of the seventy-three Candida bloodstream isolates identified. C/S data was not obtained for forty-six isolates. DDD and two isolates were found to correlate with the MIC values of vancomycin: linezolid (r = 0.28, p=0.01), ciprofloxacin (r = 0.34, p=0.015). Time-kill analyses revealed that trimethoprim exhibited better killing activity vs clindamycin or rifampin. It showed significantly greater killing activity when comparing trimethoprim vs co-trimoxazole. Trimethoprim/sulfamethoxazole. Time kill analyses of three selected isolates and two isolates were excluded due to outpatient status. Outcomes were evaluated in three groups: (1) appropriate use of C/S data to guide therapy (2) disregard or untimely availability of C/S data, and (3) C/S not obtained. Frequency of disseminated disease within each group was 23%, 54% and 13%, respectively; the median length of hospitalization was 22, 27 and 29 days, respectively; and the percentage of patients surviving hospital admission was 77%, 83% and 63%, respectively.

CONCLUSIONS: Appropriate utilization of C/S data to guide therapy appears to reduce the length of hospitalization and improve survival rates in patients with candidemia. Further analysis is necessary to determine the statistical, clinical and economic significance of these findings.

178. Therapeutic impact of statin therapy in patients with chronic hepatitis C. Brandon Bookstaver, Pharm.D.1; LeAnn Norris, Pharm.D.2, Rebecca L. Tombleson, Pharm.D.3, Linsey Hocker, Pharm.D.4; (1)South Carolina College of Pharmacy- USC Campus, Columbia, SC; (2)South Carolina College of Pharmacy, Columbia, SC; (3)Wake Forest University Baptist Medical Center, Winston-Salem, NC.

PURPOSE: Optimal therapy for the treatment of HCV includes pegylated interferon plus ribavirin which is shown to produce a sustained virologic response that only approaches 55% in addition to an undesirable side effect profile. In vitro studies have demonstrated the beneficial effects of lovastatin on HCV RNA replication. While including chronic use of statins has its potential contraindication to statin use, several studies have demonstrated an acceptable rate of hepatotoxicity in patients with HCV on concurrent statin therapy. The objective of this study is to evaluate the safety of statin therapy and impact on viral load in patients with chronic HCV in order to determine if a favorable risk-benefit profile exists.

METHODS: This study was conducted in a population of HCV positive patients at a Veterans Administration Hospital. Patients with a diagnosis of HCV were screened through a computerized record system. The following data were collected on each study subject: severity of disease, viral load, time of contraction, liver function tests, lipid profile, HCV related hospitalizations, treatment of HCV, length of HCV treatment, reasons for cessation in HCV treatment, and use of statin therapy. Data collected on patients with HCV currently receiving statins will be compared to those HCV positive patients not receiving statin therapy. The primary outcome of safety will be evaluated by determining if significant elevations of liver function tests, occurred secondary to statin therapy. Data will be analyzed to determine if significant reductions in viral load occurred on statin therapy of if the receipt of statins contraindication to statin use, several studies have demonstrated an acceptable rate of hepatotoxicity in patients with HCV on concurrent statin therapy. The objective of this study is to evaluate the safety of statin therapy and impact on viral load in patients with chronic HCV in order to determine if a favorable risk-benefit profile exists.

CONCLUSIONS: The C/S data was matched to the most recently obtained DDD and DOT. The frequency of disseminated disease within each group was 23%, 54% and 13%, respectively; the median length of hospitalization was 22, 27 and 29 days, respectively; and the percentage of patients surviving hospital admission was 77%, 83% and 63%, respectively. The objective of this study is to evaluate the safety of statin therapy and impact on viral load in patients with chronic HCV in order to determine if a favorable risk-benefit profile exists.

METHODS: This study was conducted in a population of HCV positive patients at a Veterans Administration Hospital. Patients with a diagnosis of HCV were screened through a computerized record system. The following data were collected on each study subject: severity of disease, viral load, time of contraction, liver function tests, lipid profile, HCV related hospitalizations, treatment of HCV, length of HCV treatment, reasons for cessation in HCV treatment, and use of statin therapy. Data collected on patients with HCV currently receiving statins will be compared to those HCV positive patients not receiving statin therapy. The primary outcome of safety will be evaluated by determining if significant elevations of liver function tests, occurred secondary to statin therapy. Data will be analyzed to determine if significant reductions in viral load occurred on statin therapy of if the receipt of statins correlated with an increase in sustained virologic response. Appropriate statistical analysis will be applied to the data set.

Managed Care

179. STEP I A – Initial assessment of pharmacologic concerns identified by clinical pharmacists in workers’ compensation. Elizabeth J. Kuschner, R.Ph., Pharm.D.1, Brandon Bookstaver, Pharm.D.1, LeAnn Norris, Pharm.D.2, Rebecca L. Tombleson, Pharm.D.3, Linsey Hocker, Pharm.D.4; (1)Progressive Medical Inc, Westerville, OH; (2)Ohio State University, Columbus, OH.

PURPOSE: Pharmacists play an important role in improving clinical outcomes and reducing costs associated with the management of chronic conditions. Pharmacists are well suited to identify chronic conditions and problems associated with treatment.
and nurse case managers for early detection of drug related problems (STEP II). METHODS: Comprehensive drug utilization reviews (n = 285) conducted by the clinical pharmacy staff over the past calendar year (n = 7 pharmacists) were reviewed, patient information was removed and data was entered into an electronic spreadsheet for analysis. RESULTS: Opportunities for clinical interventions were identified that could impact both patient safety and clinical outcomes. Eight percent of injured workers were seen by multiple physicians within the same specialty practice. Approximately 13% of injured workers received overlapping drug therapies. Opioids (22%), sedative hypnotics (14%), anticonvulsants (13%), muscle relaxants (13%), and antidepressants such as tricyclic antidepressants (8%), serotonin and norepinephrine reuptake inhibitors (11%), and selective serotonin reuptake inhibitors (9%) constituted a majority of these duplications in therapy. Narcotic analgesics (24%) and antidepressants (34%) were the two classes most often involved in the drug-drug interactions. Inappropriate use of muscle relaxants (11%) and NSAIDs (10%) as well as inappropriate and potentially subtherapeutic doses of anticonvulsants (40%), often led to additional pharmacologic therapy which may have resulted in safety concerns and increased costs. Opioids (47%), muscle relaxants (9%), hypnotics (17%), and miscellaneous NSAIDs (5%) represented the majority of missed generic opportunities for insurance providers. Lastly, compensation for medications that may not be related to the accepted medical condition(s) such as sedative hypnotics (18%), proton pump inhibitors and H2 antagonists (14%), and antidepresants (17%) often resulted in unnecessary cost to the insurance providers.

CONCLUSIONS: Opioids, antidepressants, and sedative hypnotics should be targeted for “real-time alerts” adjustors and nurse case managers for early detection of drug related problems (STEP II).

Oncology

181. Impact of first-line chemotherapy regimen (oxaliplatin- or irinotecan-based) on exposure to fluoropyrimidine, oxaliplatin, and irinotecan, with or without targeted therapy in the community oncology setting (COS). Russell Attridge, Pharm.D.; Rebecca L. Owens, Pharm.D.; Trevor McNabb, Pharm.D., M.S.; BCPS1; Kim Koeller, M.S.1; (1)The University of Texas at Austin College of Pharmacy, The University of Texas Health Science Center at San Antonio, San Antonio, TX; (2)University of Tennessee Health Science Center, Memphis, TN.

PURPOSE: Data suggests improved survival for patients with metastatic colorectal cancer (MCRC) who are able to receive all active agents (fluoropyrimidine, oxaliplatin, irinotecan) and a monoclonal antibody. This analysis was performed to determine if the starting regimen (oxaliplatin- vs. irinotecan-based) makes a difference in achieving the above goal in the COS.

METHODS: A national, multi-centered, retrospective chart review of patients with MCRC starting chemotherapy treatment after January 2003 was conducted at 10 community oncology practices across the US (TX, CA, FL, MA, ME, MT, OH, NV). Data was collected on baseline demographics, performance status (PS), medications administered, toxicity-related events (hospitalization, extra clinic visits, dose reduction, drug change/delay), non-drug related events (patient, physician, disease) and mortality.

RESULTS: A total of 307 patients received initial regimens with oxaliplatin (n = 237) or irinotecan (n = 40). Baseline characteristics were similar among the two groups (p>0.05). There was not a significant difference among oxaliplatin- and irinotecan-based initial regimens for either exposure to fluoropyrimidine, oxaliplatin, and irinotecan (37.7% vs. 30%, p=0.21, respectively) or exposure to the 3 cytotoxic drugs and bevacizumab (27.2% vs. 20%, p=0.16). 36%, 27%, 11%, and 4% of patients were able to progress to second, third, fourth, and fifth-line therapy in the group initiated on oxaliplatin, compared to 58%, 33%, 28%, and 8% of patients in the irinotecan-initiated group. No significant difference was found in cycles per patient subsequent to first-line therapy between the oxaliplatin- and irinotecan-based group (median, interquartile range): 6 (3–11) vs. 11 (5–18), p=0.07.

CONCLUSION: This retrospective analysis indicates that exposure to fluoropyrimidine, oxaliplatin, and irinotecan with or without bevacizumab in patients with MCRC is independent of whether the initial regimen is oxaliplatin- or irinotecan-based. Although cycles per patient given after first-line treatment are not statistically significant, the differences may be clinically relevant.

Pharmacoeconomics/Outcomes

182. Sweet success or lost in translation? A Comparison of Branded and Private-labeled Glucose Meters. Alison Keillor, Pharm.D. Candidate; Butler University College of Pharmacy and Health Sciences, 1520 N. Senate Ave, Indianapolis, IN.

BACKGROUND: Self-monitoring of blood glucose (SMBG) is a highly important component of diabetes care for both patients and health care practitioners. Recent marketing trends for glucose meters focuses on creating meters that require a minimal amount of blood, are painless, and provide results quickly. With the rising cost of branded meters, private-label meters have become a popular, cost-effective alternative. Apart from being more cost-effective, concerns regarding the accuracy of these generic meters compared to branded meters exist. The ADA recommends that home glucose meters not deviate from the laboratory value by more than ± 5%. Several studies have evaluated deviations of branded meters, but currently studies evaluating private-label meters are lacking.

STUDY OBJECTIVE: The objective of this study is to determine the differences, if any, in accuracy and variation between two study–designated private-label study meters, the TrueTrack Smart System® (Home Diagnostics) and the BD Logic® (Sanvita) and two study–designated control meters, the Ascensa Contour® and the Freestyle Flash®.

METHODS: Consenting, English-speaking students or faculty/staff (> 18 years) of an Indiana College of Pharmacy will be eligible for the study. Four capillary blood samples will be collected via fingerssticks from each participant to obtain glucose readings from each of the study meters. Blood glucose results from the two study meters and the two control meters will be compared to the two control meters via appropriate statistical analysis. The variation threshold for this study is 3%. A variation in glucose results greater than 3% will be considered inaccurate reading. Readings within 3% of the controls will be considered accurate.

RESULTS: An IRB application for this study has been submitted. Approval is pending. It is anticipated that data collection and analysis will be completed February 2008. There are approximately 535 students enrolled within and approximately 63 faculty and staff affiliated with the College of Pharmacy.

Pharmacogenomics/Pharmacogenetics

183. Does genotype predict the number of medications needed to control blood pressure?. Joseph P. Stalder, BS; UCSD Skaggs School of Pharmacy and Pharmaceutical Sciences, La Jolla, CA.

PURPOSE: To determine the association between known genetic polymorphisms affecting hypertension and the number of antihypertensive medications required to establish or maintain blood pressure control.

METHODS: This was a cross-sectional study of 20 single nucleotide polymorphisms (SNP) in hypertensive candidate genes measured by pyrosequencing and maldi-tof. Associations between SNPs and the number of antihypertensive medications prescribed to the patient (as abstracted from pharmacy fill records) were examined using Kruskal-Wallis tests.

RESULTS: In 2003–04, the VA San Diego Healthcare System cared for 5810 hypertensive patients in primary care VA clinics. Of these, 1352 diagnosed with primary hypertension consented to enroll in this study and were subsequently genotyped. Male patients with the GG variant of the α2- adrenergic SNP arg16gly required more medications than those with GA or AA variants (p=0.038). None of the other 19 gene polymorphisms demonstrated a statistically significant relationship with the number of antihypertensives used.

CONCLUSIONS: Of the 20 genes studied, one showed a statistically significant association with the number of medications required to control male patients’ blood pressure. However, this is likely a result of chance rather than clinical importance. Thus, this study suggests that these SNPs are not independently pharmacogenetically useful in predicting which patients will require more antihypertensive agents in order to establish or maintain proper blood pressure control.

184. Interethnic comparison of SLCO1B1 haplotypes: relevance to clinical pharmacokinetic-pharmacogenetic studies. Charles J. Foster, B.S.; Shannon D. Knussen, B.A.; Christina L. Aguilate, Pharm.D.; University of Colorado Denver School of Pharmacy, Denver, CO.

PURPOSE: The SLCO1B1 gene encodes a transporter that is responsible for uptake of drugs from the plasma into the liver. The effects of variant SLCO1B1 haplotypes (i.e., *1B, *5, *15, *16, and *17) on drug pharmacokinetics are frequently studied in Caucasian subjects. However, in African Americans, characterization of common variant SLCO1B1 haplotypes and the subsequent impact of these haplotypes on drug disposition have largely been ignored. The purpose of this investigation was to compare the frequencies of commonly studied SLCO1B1 haplotypes in African Americans versus Caucasians.

METHODS: The study population consisted of 100 African Americans (DNA obtained from the Coriell Institute), and 143 Caucasians (DNA obtained during University of Colorado studies). Samples were genotyped for the following SLCO1B1 polymorphisms: -1182G/A, -1049A/C, 388A/G, and...
RESULTS: SLC10B1 genotype frequencies were in Hardy-Weinberg equilibrium. SLC10B1 variant allele frequencies differed between African Americans and Caucasians. In African Americans, the -11187A, -10499C, 388A and 521T/C. SLC10B1 haplotypes were computationally assigned as follows: *1A (-11187G/-10499A/388A/521T); *1B (GAGT); *5 (GAAC); *15 (GAGC); *16 (GGGC); *17 (AAGC); and *21 (AAGT). χ² tests were used to test for Hardy-Weinberg equilibrium.

RESULTS: SLC10B1 genotype frequencies were in Hardy-Weinberg equilibrium. SLC10B1 variant allele frequencies differed between African Americans and Caucasians. In African Americans, the -11187A, -10499C, 388A and 521T/C. SLC10B1 haplotypes were computationally assigned as follows: *1A (-11187G/-10499A/388A/521T); *1B (GAGT); *5 (GAAC); *15 (GAGC); *16 (GGGC); *17 (AAGC); and *21 (AAGT). χ² tests were used to test for Hardy-Weinberg equilibrium.

SCL01B1 genotype frequencies

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| in | in African Americans Ethnicity:
| CA Ethnicity: | Caucasians |
| *1A (wild-type) | 21% | 39.8% |
| *1B | 75.9% | 21.3% |
| *5 | 1.5% | 2.1% |
| *15 | 1% | 8.7% |
| *16 | 0% | 3.2% |
| *17 | 0.5% | 1.9% |
| *21 | 0.5% | 2.1% |

CONCLUSIONS: The SLC01B1 *5, *15, *16, and *17 haplotypes, which have been associated with decreased transporter function, are rare in African American individuals. As such, future research that elucidates common functional SLC01B1 haplotypes in African American individuals, and their impact on drug disposition in clinical pharmacokinetic studies, are warranted.

Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

185. Comparison of aminoglycoside pharmacokinetics in average weight, overweight, and obese pediatric populations. Megan A. McKe, Pharm.D., Candidate, Laura E. Marran Wicks, Pharm.D, Candidate, Melanie McLeod, Pharm.D, Candidate. John E. Murphy, Pharm.D.; University of Arizona College of Pharmacy, Tucson, AZ.

PURPOSE: This retrospective collection of data will 1) provide standards for dosing aminoglycosides in obese pediatrics, 2) increase awareness of drug monitoring in obese populations, and 3) reduce medication errors and adverse drug reactions in obese children.

METHODS: This study is a retrospective chart review from past and current patients at University Medical Center Hospital in Tucson, Arizona. Patients between the ages of three and seventeen that have/are being treated with aminoglycoside concentrations will be included in this study. Subjects will be divided into three groups based on weight and height percentiles as defined by the Center for Disease Control (CDC) growth charts. Collecting retrospective data from electronic and hard copy charts will provide measured concentrations of aminoglycosides in order to evaluate pharmacokinetics. Data specific to the antibiotic will include: dose and frequency; time dose was given; length of infusions; number of doses for each treatment; and time concentration was measured. Aminoglycoside clearance, volume of distribution, and half-life are the primary outcomes that will be compared using ANOVA. Specifically, t-tests will also be used to compare the volume of distribution between the three groups. A p-value of <0.05 will be considered statistically significant.

RESULTS: Charts are in the process of being reviewed and data is currently being analyzed. This will conclude December 2007 and researchers will analyze potential differences between the pharmacokinetics of aminoglycosides in obese pediatrics as compared to average weight pediatrics.

186. Characterization of antidepressant binding sites on the nicotinic acetylcholine receptor. Carl L. Sullivan, Master's, student, Matt Crunden, undergraduate student, Hugo R. Arias, Ph.D.; Department of Pharmaceutical Sciences, Midwestern University, Glendale, CA.

PURPOSE: Characterization of the antidepressant (AD) binding sites on the nicotinic acetylcholine receptor (AChR) in the resting and desensitized states. METHODS: [3H]acetylcholine binding using a Scatchard-plot using Torpedo AChR membranes, competition binding experiments using well known noncompetitive antagonists (i.e., [3H]TCP, [3H]dizocilpine, and [14]carnitabiolactone and agonist (i.e., [3H]cytisine) radioisotopes, Schild-type analysis, and molecular modeling of the Torpedo AChR ion channel and molecular docking of imipramine.

RESULTS: (1) There is one (0.99 ± 0.19 binding sites/AChR) binding site of modest affinity (Kd = 1.6 ± 0.3 µM) for [3H]diazepam; (2) the antidepressant affinity for the [3H]TCP and [3H]dizocilpine loci in the desensitized state follows the sequence: imipramine (D) > amitriptyline (A) > fluoxetine (F) > bupropion (B), whereas in the resting state the sequence is F > A + I > D > B; (3) Schild-type analysis suggests that antidepressants may sterically interact with both TCP and dizocilpine sites in the desensitized state; (4) antidepressants inhibit [14]carnitabiolactone binding in the resting state. However, the observed Ki values were higher than that for [3H]TCP inhibition; (5) [3H]cytisine binding was enhanced by antidepressants when the AChR is in the resting but not the desensitized state, but not when the AChR is desensitized state; and (6) imipramine interacts with a domain formed between valine (position 13') and serine (position 6') rings.

CONCLUSIONS: Using scavenge samples to determine ampicillin pharmacokinetics in infants. Lina Meng, B.S.; Keary Zhou, Pharm.D.; Steven S. Rossi, Ph.D.; Rowena Espina, B.S.; Neil Finner, M.D.; Edmund V. Capparelli, Pharm.D.; Brooke Best, Pharm.D., M.A.S.; (1) University of California San Diego School of Pharmacy and Pharmaceutical Sciences, La Jolla, CA; (2) University of California, San Diego Medical Center, San Diego, CA; (3) School of Medicine, University of California, San Diego, San Diego, CA.

PURPOSE: The objectives of this study were to determine if scavenged samples can be used to determine ampicillin pharmacokinetics (PK) in infants, and to develop a high-pressure liquid chromatography (HPLC) assay to monitor ampicillin in human plasma.

METHODS: This study prospectively examined scavenged blood samples of 44 neonates in the Neonatal Intensive Care Unit at UCSF Hilkrest Medical Center. 'Scavenged samples' refer to any residual samples left over in the NICU laboratory after standard-of-care clinical evaluations. Inclusion criteria included infants of any estimated gestational age (EGA) receiving IV ampicillin and post-natal age younger than 120 days. After obtaining informed consent, samples were scavenged approximately once daily along with demographic information and complete ampicillin dosing. An HPLC assay with isocratic elution was developed based on previously published methods using as little as 13 µL of human plasma with a range of sensitivity of 0.244 to 125 µg/mL. A naive pool analysis was performed with a reproducibility of log of concentrations versus time.

RESULTS: Twenty-one infants with the EGA of > 32 weeks and 23 infants with the EGA of 32 weeks were enrolled. In the first 23 patients enrolled, 103 scavenged blood samples were collected. In these samples, 95% appear evaluable based on sample volume. Time after dose vs. concentration is consistent with previously published data. Neonates ≤ 32 weeks EGA had higher ampicillin concentrations and slower elimination as expected based on their less mature renal function. Half-life values from pooled data were 3.4 hours (± 12 weeks EGA) and 4.6 hours (± 32 weeks EGA), r² = 0.58 and 0.73, respectively.

CONCLUSIONS: Assays can be developed to accurately measure ampicillin concentrations from very small sample volumes. With small volume assays, neonates ≤ 32 weeks EGA had higher ampicillin concentrations and slower elimination as expected based on their less mature renal function. Half-life values from pooled data were 3.4 hours (± 12 weeks EGA) and 4.6 hours (± 32 weeks EGA), r² = 0.58 and 0.73, respectively.


Prostaglandins are the downstream products of the action of cyclooxygenase (COX) enzymes on arachidonic acid. Through their interaction with G-protein coupled receptors, these compounds stimulate intracellular signaling cascades that regulate cell physiology in virtually all tissues of the body. Prostaglandin-E2 (PGE2) is one of the prostaglandins produced by the actions of COX and is important in pain, inflammation, fever, bone metabolism and is becoming appreciated for its potential role in cancer. Two of the PGE2 receptor subtypes, EP2 and EP4, are similar in their activation of adenyly cyclase (AC) and subsequent up regulation of cAMP production. The EP2 receptors treated cells responding with intracellular production of cAMP, with the EP2 receptor responding more efficiently than the EP4 receptor in the future we will demonstrate that we can detect a PK steady state expressing the FLAG-tagged EP2, or EP4 receptors. These cell lines will be characterized using with selective agonists in assays for radioligand binding and cAMP productions. Additionally, we will use antagonists and inhibitors to examine the signaling properties of these receptors. We intend for these cells to be used as a novel assay system for the development of future selective EP2 and EP4 agonists. This research could potentially benefit in
selectively targeting EP1 or EP2 pathways linked to prevalent ailments such as pain, fever, inflammation, possibly cancer or bone growth.

Pharmacy Residency

194. Mandating residencies for all pharmacy graduates by the year 2020: a study of existing programs' plans for expansion. Helen B. Kim, MS, Pharm.D., Candidate, Hien Tran, Pharm.D. Candidate, Quang Bui, Pharm.D. Candidate, Faria Nusrat, Pharm.D. Candidate, Olivia Ng, Pharm.D. Candidate, Christina Thanawatvit, Pharm.D. Candidate, Danielle Richardson, Pharm.D. Candidate, Diane Nguyen, Pharm.D. Candidate, Quan Tran, Pharm.D. Candidate, Julia Nguyen, Pharm.D. Candidate; Touro College of Pharmacy, Vallejo, CA.

PURPOSE: As the role of pharmacists evolves from primarily dispensing activities, pharmacy residencies play an important role. As a result, in 2006, the American College of Clinical Pharmacy (ACCP) made the bold recommendation of mandating residency training for all pharmacy graduates by the year 2020 before entry into pharmacy practice involving direct patient care. Our aim was to assess the current number and distribution of residencies and estimate the residency growth required if all Doctor of Pharmacy (Pharm.D.) graduates participate in PGY1 residency training by the year 2020.

METHODS: A 4-question email survey was sent to the designated contact person for the American Society of Health-System Pharmacists (ASHP) accredited PGY1 programs inquiring about the number of past, current, and future residency positions. If no response was received within 7-10 business days, we followed up with up to 2 telephone calls.

RESULTS: ASHP listed 553 accredited PGY1 residency programs and 23 non-accredited programs in the U.S. The 2007 survey response rate was 57%. Current number of accredited residency positions increased 50% from 5 years ago and 133% from 10 years ago. Within the “next few years” (estimated at 3 years), residency positions are predicted to increase by 32% overall or 6.8% per year. Fulfillment of the ACCP mandate will require approximately 17% annual PGY1 residency growth rate while respondents collectively projected a 6.8% annual growth rate for all types of residencies.

CONCLUSIONS: While PGY1 residency programs have shown substantial growth over the past 10 years, PGY1 positions will need to increase approximately 8-fold or 17% per year over the next 13 years to meet the mandate that by 2020 all Pharm.D. graduates complete a PGY1 residency. The needed growth will vary depending on the percent of pharmacists involved with providing direct patient care.

Substance Abuse/Toxicology

193. Interaction of ibogaine congeners with the nictinic acetylcholine receptor. Mary E. Ghafoori, undergraduate, student1, Krzysztof Jozwik, Ph.D., Irving W. Wainer, Ph.D.2; (1)Department of Pharmaceutical Sciences, Midwestern University, Glendale, AZ; (2)Gerontology Research Center, NIA-NIH, Baltimore, MD.

PURPOSE: Characterization of the binding sites for ibogaine congeners on the nictinic acetylcholine receptor (AChR) in the resting and desensitized states. METHODS: [3H]18-methylnicotine coronaridine (1.3 ± 0.2 × 10^-5 M) and linezolid. Limited data exists on the safety and efficacy of these agents in the treatment of vancomycin resistant enterococcus (VRE) after orthotopic liver transplantation. Shannon L. Holt, B.S., Matthew T. Harris, Pharm.D., BCPS; (1)University of North Carolina at Chapel Hill, School of Pharmacy, Chapel Hill, NC; (2)Duke University Hospitals, Durham, NC.

PURPOSE: Current treatment options for VRE infections include dicloxacillin and linezolid. Limited data exists on the safety and efficacy of these agents in

Transplant/Immunology

193. Evaluating the safety and efficacy of dapptomycin and linezolid in the treatment of vancomycin resistant enterococcus (VRE) after orthotopic liver transplantation. Shannon L. Holt, B.S., Matthew T. Harris, Pharm.D., BCPS; (1)University of North Carolina at Chapel Hill, School of Pharmacy, Chapel Hill, NC; (2)Duke University Hospitals, Durham, NC.
liver transplant recipients. This study will be evaluating the efficacy and safety of either daptomycin or linezolid in the treatment of VRE for this defined population.

METHODS: This study has been approved by the Institutional Review Board. This is a single site retrospective cohort analysis that includes 20 liver transplant recipients with documented VRE treated with either daptomycin or linezolid. The primary endpoints include resolution of infection and rate of VRE reoccurrence. Secondary endpoints assess the safety/tolerability of daptomycin and linezolid. Liver transplant recipients will be screened for a history of VRE infections between the dates of 1/04–1/07 by looking at past microbiological results. Inclusion criteria for the study include: liver transplant recipient, age > 18-years-old, and a documented VRE infection between the above dates treated with either daptomycin/linezolid. Patients were excluded if they were < 18-years-old, received daptomycin/linezolid for another indication, and patients on daptomycin/linezolid for <3 doses. The safety and efficacy will be evaluated by looking at survival, resolution and reoccurrence of infection, and adverse events. Other data collected includes: demographics, site of infection, time to infection, dose/duration of treatment, prior vancomycin use, co-infections, statin use with daptomycin, SSRI use with linezolid, and labs. A descriptive analysis will be performed on all data.

RESULTS: Twenty liver transplant recipients were treated with either daptomycin or linezolid for VRE infections. The average age was 44-years-old (18–64), 60% were male, 90% were primary transplant recipients, and 80% had prior vancomycin exposure. Eight of 20 patients received daptomycin, 5/20 received linezolid, and 7/20 were treated with both. Overall patient survival was 80%. Of those who died, the average survival time was 30 mos. Final results and conclusions will be completed prior to presentation.