American College of Clinical Pharmacy
2004 Annual Meeting
October 24–27 • 2004
Dallas • Texas
ADRs/Drug Interactions


PURPOSE: To study the effect of a single dose of eszopiclone on the pharmacokinetics of digoxin at steady state.

METHODS: In this single-center, open-label, placebo-controlled study in healthy adults, a loading dose of digoxin on Day 1 (0.5 mg BID, doses separated by 12 hours), was followed by once-daily dosing of digoxin 0.25 mg on Days 2–7. A single dose of eszopiclone 3 mg was administered with digoxin on Day 7. To evaluate digoxin pharmacokinetics, blood was drawn predose on Days 4–7 and at 1, 2, 4, 6, 8, 12 hours on Days 6 and 7, and 24 hours postdose, on day 8. Primary endpoints were comparisons of AU(C0–t) and Cmax of steady state digoxin administered alone (Day 6) to the combined treatment with eszopiclone (Day 7).

RESULTS: Twelve subjects (7 male) aged 24–64 years (mean 40.7) completed the study. Steady state digoxin levels were achieved by Day 4. On Day 6, with digoxin (alone), mean Cmax was 2.3 ng/mL, median tmax was 1.0 hr, and mean AU(C0–t) was 21.2 ng•hr/mL. On Day 7 (concomitant eszopiclone administration), the digoxin mean Cmax was 2.1 ng/mL, median tmax was 1.0 hr, and mean AU(C0–t) was 21.0 ng•hr/mL (90% CI for Cmax and AU(C0–t) within reference range). There were no serious adverse events and no trend to discontinuation.

CONCLUSIONS: In this study, a single dose of eszopiclone 3 mg did not affect the steady state pharmacokinetics of digoxin in healthy volunteers. Eszopiclone in combination with digoxin was well-tolerated.

2. Hepatic panel abnormalities associated with medications in the medical intensive care unit. Anastasia M. Rivkin, Pharm.D., BCPP, Ellina Dan, Pharm.D.; Long Island University, Arnold and Marie Schwartz College of Pharmacy and Health Sciences, Brooklyn, NY.

PURPOSE: This study documented hepatic panel changes in 107 intensive care unit admissions over three months in order to evaluate incidence of hepatic panel abnormalities associated with medications amongst adult inpatients.

METHODS: This prospective observational 12 week study conducted in a medical intensive care unit from January through April 2004 included 107 men and women aged 16–96 years. Patient's charts were reviewed to identify medication-related hepatic panel abnormalities during the admission, and characterize common medications implicated.

RESULTS: Thirty-six episodes of phosphate replacement in 27 patients were assessed. Mean admission and discharge phosphorus concentrations were 3.1 mg/dL and 3.4 mg/dL. Seventy-five percent of replacement episodes involved single doses of intravenous potassium phosphate (mean 13.1 mmol). Forty-one percent of intravenous use was for mild cases of hypophosphatemia (2.1–2.4 mg/dL), and 44% for moderate (1.2–2.4 mg/dL). Normalization of phosphorus upon initial repeat lab assessment was 61%. Thirty-three percent of mild cases receiving intravenous replacement were eligible for oral therapy, and 85% were eligible for alternate use of phosphate based on average potassium and sodium values of 4.1 mEq/L and 139 mmol/L. No hyperphosphatemia was documented.

CONCLUSIONS: Intravenous potassium phosphate use predominated despite numerous cases of mild hypophosphatemia with normokalemia. Many patients were eligible for oral therapy or intravenous sodium phosphate. Identification of patients eligible for these alternate therapies may lead to reductions in medication errors, adverse effects, and medication administration time by avoiding intravenous potassium-containing products.

5. Characterization and economic impact of drug-related hospital admissions to a general medicine service in Singapore. Grant E. Sklar, Pharm.D., Josephine Y. Lee, B.Sc.(Pharm); Vernon M.S. Oh, M.D.; (1)Department of Pharmacy, National University of Singapore, Singapore; (2)National University Hospital, Singapore.

PURPOSE: This study reviewed drug-related hospital admissions to a general medicine service in a tertiary-care hospital in order to characterize the drug-related hospital admissions, and determine the economic impact of such admissions.

METHODS: Medical records of 397 admissions to the general medicine service from 4 randomly selected months in 2001–02 were reviewed.
6. Adverse effects associated with extra doses of bupropion. Greene Shepherd, Pharm.D.; University of Georgia, College of Pharmacy, Augusta, GA.

PURPOSE: Bupropion is a widely used drug with a risk of adverse effects at therapeutic doses, including seizures in 0.4% of patients. Unintentional extra doses were studied to describe frequency of adverse effects and examine possible dose response relationships.

METHODS: A retrospective review was conducted to describe cases of dosing errors with bupropion reported to the American Association of Poison Control Centers (AAPCC). Errors leading to extra bupropion due to unintentional extra doses were included. AAPCC coding for dose, treatment site, symptoms and clinical outcome was evaluated.

RESULTS: During a 4-year period 476 cases were reported meeting our inclusion and exclusion criteria. Women (n=354, 74.4%) were more commonly involved than men. Doses ranged between 75 mg and 1500 mg with a median and mode of 300 mg. Most cases (n=349, 82.7%) were managed outside of hospitals. Seizures were reported in 4 cases (8.4%) and one of the developing status epilepticus. Other prominent effects included agitation (8.2%), dizziness (7.4%), drowsiness (6.1%), nausea/vomiting (6.6%), hallucination (0.4%), tremor (7.1%) and tachycardia (3.5%). Clinical outcomes were: no effect (n=293, 61.6%), minor effect (n=132, 27.7%), moderate effect (n=49, 10.3%) and major effect (n=0, 0%). Doses were higher (P>0.05) in cases with adverse effects vs. no effect. Doses were slightly higher in moderate and major outcomes but not significantly (P>0.083).

CONCLUSIONS: In this series, significant adverse effects were present in >10% of patients following extra doses of bupropion. Seizures were present twice as often as one would expect with usual dosing. Extra doses of bupropion appear to increase risk of adverse effect.


PURPOSE: To investigate the drug interactions of nateglinide with various agents including calcium channel blockers and lipid lowering agents.

METHODS: A dose of 30 mg/kg of nateglinide was administered alone orally to each of rabbits or 30 min after the administration of diltiazem (10 mg/kg), verapamil (20 mg/kg), nifedipine (5 mg/kg), gemfibrozil (150 mg/kg), lovastatin (3 mg/kg) or fluvastatin (3 mg/kg). Serum samples (0.15 ml) were collected from the femoral artery cannula at predetermined time intervals and analyzed by HPLC.

RESULTS: In combination with nifedipine, AUC∞ and AUC0-∞ were 201.8% (P>0.05) and 180.7% (P>0.05) of the respective control value. The Cmax and half-life of nateglinide increased from 21.7 to 39.4 µg/ml (P<0.01) and to 7.1 to 11.3 hours (P<0.05) by nifedipine, respectively. Diltiazem also increased Cmax and AUC0-∞ of nateglinide from 21.7 to 39.0 µg/ml (P>0.05) and 68.7 to 91.8 µg•hr/ml (P>0.05), respectively. Among lipid-lowering agents, gemfibrozil decreased the AUC0-∞, AUC∞ and Cmax of nateglinide from 96.2 to 43.1 µg•hr/ml (P<0.05), 68.7 to 30.8 µg•hr/ml (P<0.005) and 21.7 to 10.3 µg/ml (P<0.0001).

CONCLUSIONS: Concomitant use of nifedipine or diltiazem with nateglinide may increase the risk of hypoglycemia while co-administration of gemfibrozil with nateglinide may reduce the blood glucose-lowering effect of nateglinide.


PURPOSE: To study pharmacokinetic and pharmacodynamic interactions of single oral doses of eszopiclone 3 mg and lorazepam 2 mg.

METHODS: Single-center, randomized, four-arm, parallel, daytime administration, inpatient, single-dose, single-blind study in 36 healthy volunteers (15 male), 20–64 years old who received eszopiclone 3 mg alone, lorazepam 2 mg alone, eszopiclone 3 mg and lorazepam co-administered, or placebo. Blood drawn at 8 a.m. was analyzed at various time points up to 24 hours postdose. Digit Symbol Substitution Test (DSST) was conducted to evaluate pharmacodynamic effects.

RESULTS: Coadministration of eszopiclone with lorazepam decreased the eszopiclone mean Cmax by 22.69% and the lorazepam mean Cmax by 21.1%. After combined treatment, the eszopiclone mean AUClast decreased by 7% and the lorazepam mean AUClast decreased by 9.5%. Analysis of the interaction effects on DSST for the combination treatment showed no decremental effect on Emx (P=0.8322) or AUClast (P=0.3651). There was no clinically relevant difference in the number of subjects who reported adverse events or in severity or discontinuation rates between those administered the combination of eszopiclone and lorazepam and those administered each drug alone.

CONCLUSIONS: In this study of healthy volunteers, combined treatment with eszopiclone and lorazepam reveal a minor (21–25%) mutual reduction in Cmax, but little change (7–9 %) in AUClast. The pharmacodynamic evaluation of the combination of eszopiclone and lorazepam showed no effect on DSST by Emx and AUClast.

9. Safety and tolerability of double-dose esmolprazole (40 mg twice daily). Joel Richter, M.D.1, Michael Vacek, M.D., Ph.D.1, C. Richard Stansey, M.D.2, Reza Shakar, M.D.1, Clara Wang, MAppStat1, David R. Rutledge, Pharm.D., FCCP1, Mark Sostek, M.D.4,1 (1)Cleveland Clinic, Cleveland, OH; (2)St. Luke’s Hospital, Milwaukee, WI; (4)Sepracor Inc., Marlborough, MA.

PURPOSE: To evaluate the safety and tolerability of a double-dose (40 mg twice daily) of esmolprazole in patients with heartburn and/or regurgitation.

METHODS: A double-blind, placebo-controlled, two-way crossover, 12-week, multicenter study was conducted to evaluate the safety and tolerability of double-dose esmolprazole in patients with heartburn and/or regurgitation. Patients were randomized to receive double-dose esmolprazole 40 mg twice daily or placebo for 12 weeks. The primary objective was to assess the safety and tolerability of double-dose esmolprazole compared with placebo.

RESULTS: A total of 256 patients were randomly assigned to double-dose esmolprazole 40 mg twice daily (Placebo: n=127, Esmolprazole: n=129). The most common adverse effects were: nausea (34.8% vs. 31.8%), headache (22.3% vs. 21.6%), and upper respiratory tract infection (16.4% vs. 16.3%). No clinically significant differences were observed in the incidence of adverse effects between the two groups.

CONCLUSIONS: Double-dose esmolprazole 40 mg twice daily is safe and well tolerated in patients with heartburn and/or regurgitation.

10. Pattern of medications usage and potentially inappropriate medication usage among Korean ambulatory elderly patients based on explicit criteria. Jin Sun Nam, M.S.; Jung Mo Oh, Pharm.D.; Graduate School of Clinical Pharmacy, SooMyung Women’s University, Seoul, South Korea.

PURPOSE: To determine the extent and rate of prescription drug therapy, especially polypharmacy and the prevalence of potentially inappropriate medication use in Korean elderly ambulatory patients based on explicit criteria.

METHODS: Performed a retrospective study of 65 years or older ambulatory patients visiting a university hospital based clinic from January 2002 to April 2004. Study determined the patterns of drug prescribing using the Anatomical Therapeutic Chemical Classification and the potentially inappropriate medication usage based on explicit Beers criteria.

RESULTS: Of the 4042 elderly patients the mean number of prescription was 2.2±2.0, which was similar between genders and all age groups within the elderly. 10.7% of patients were prescribed with more than 5 medications concurrently. The most frequently prescribed medication was the drugs used for treating nervous system diseases (44.3%), followed by alimentary and musculoskeletal diseases (3.2%). A total of 511 elderly (13%) was prescribed with medication that met the criteria for potentially inappropriate drug prescribing for the elderly. This proportion was similar between genders and all age groups within the elderly. Among these 511 elderly patients the mean number of potentially inappropriate drugs prescribed was 5.3±3.3 drugs. Potentially inappropriately prescribed drugs were amitriptyline (7.6%), diazepam (69.9%), ketorolac (57.6%), short acting nifedipine (44.4%), triazolam (38.3%), and hydroxyzine (38.3%).

CONCLUSIONS: Potentially inappropriate drug prescribing in Korean ambulatory elderly patients is common. Education programs and interventions aimed at optimizing the prescribing and dispensing of the most appropriate drugs are needed.

11. Is occurrence of an antiepileptic drug related adverse drug reaction related to an active or prior history of neoplasm? Sunita Dergalust, M.D.; University of Georgia, College of Pharmacy, Augusta, GA.

PURPOSE: To determine the occurrence of antiepileptic drug (AED) related adverse drug reactions (ADRs) related to an active or prior history of neoplasm.

METHODS: Patients were identified through direct patient interaction by the pharmacy service and through the Pharmacy database of ADRs. Key characteristics used included a recent or past history of neoplasm and exposure to an AED. RESULTS: 100 patient records were identified. Patients ranged in age from 38 to 82 years (average: 62 years). Seventy-four (74%) met inclusion criteria. Of
the 74 patients, 15 (20%) were found to have key criteria of a selected AED related ADR with an underlying neoplasm. Of these 15 patients, 4 (27%) had a history of radiotherapy (XRT) and 11 (73%) had no history of XRT. The most commonly reported ADR was rash in 10/15 patients (67%). The most commonly noted “offending” AED was phenytoin: 9/15 patients (60%).

CONCLUSIONS: XRT therapy has been reported to be an important risk factor for the development of AED-related ADRs. In our sample a majority of patients with an AED-related ADR did not receive XRT. Our findings suggest that neoplasm itself (active or by history) may be an underappreciated risk factor for an ADR. Further studies are underway.


PURPOSE: To study pharmacokinetic and pharmacodynamic interactions of single oral doses of escopoline 3 mg and paroxetine 20 mg.

METHODS: Single-center, four-arm, parallel, daytime administration, inpatient, single-dose, single-blind study in 40 healthy volunteers (27 male, 21–55 years, randomized to receive one of four oral treatments: escopoline 3 mg alone, paroxetine 20 mg alone, coadministered escopoline 3 mg and paroxetine 20 mg, or placebo. Blood was drawn predose and at various time points up to 24 hours postdose. Digit Symbol Substitution Test (DSST) was conducted to evaluate pharmacodynamic effects.

RESULTS: When given in combination, little mean change in paroxetine points up to 24 hours postdose. Digit Symbol Substitution Test (DSST) was showed no decremental effect on Emax (p=0.1229), and no decrement in paroxetine 20 mg, or placebo. Blood was drawn predose and at various time points up to 24 hours postdose. Digit Symbol Substitution Test (DSST) was conducted to evaluate pharmacodynamic effects.

CONCLUSIONS: The results of this study suggest that coadministration of escopoline 3 mg and paroxetine 20 mg had no clinically significant pharmacokinetic or pharmacodynamic interactions.


PURPOSE: Intravenous immunoglobulin (IGIV) therapy has been utilized for various labeled and off labeled conditions, since 1981. The primary objective of the study was to perform a drug utilization evaluation of IGIV. The study also evaluated the incidence of ARF and thrombosis, and attempted to identify a subgroup of patients at higher risk for developing ARF.

METHODS: A retrospective chart review was performed on all patients who received IGIV therapy from May 1, 1998 to June 30, 2003. Patients were identified through a query performed on the VA computerized database system. Data was collected pertaining to patient demographics and comorbidities, concomitant medications, and IGIV therapy. ARF was defined as an increase in Scr levels > 0.5 mg/dL.

RESULTS: The three main indications for IGIV were hypogammaglobulinemia, immune thrombocytopenic purpura, and chronic inflammatory demyelinating polyradiculoneuropathy. Age incidence rate of ARF was found to be 1.2% (4/464 patients) and occurred with the first cycle of sucrose containing IGIV therapy. Age > 65, chronic renal insufficiency, diabetes mellitus, IGIV dose > 400 mg/kg/day showed a trend towards significant risk factor for ARF (p=0.078, 0.079, 0.079, and 0.074, respectively). The study did not find any new occurrence of thromboembolic event.

CONCLUSIONS: This is the first study evaluating the incidence of ARF in all patients with various indications receiving IGIV therapy. The study has given more support to the increasing documentation suggesting association between the sucrose content of the IGIV and the development of ARF.

14. Thiazolidinedione use, weight gain, edema, and congestive heart failure. Sabrina W Cole, Pharm D., Courtney L. Bickford, Pharm.D., Sarah J. Schiwesow, Pharm D., Andrea M. Wessell, Pharm.D., BCPS, CDE, Namniet M. Berensen, Pharm.D., BCPS; Medical University of South Carolina, Charleston, SC.

PURPOSE: To evaluate weight gain, edema, and congestive heart failure (CHF) in patients receiving thiazolidinediones (TZD).

METHODS: Patients were identified by reviewing daily appointment schedules from November 2003 through February 2004, in a family medicine clinic. In addition to patient demographics and TZD regimens, the following data were obtained pre- and post-TZD initiation: weight, A1C, CHF diagnosis, loop diuretic regimen, and other antidiabetic agents. If patients gained at least 10 pounds, had a loop diuretic started or dose increased, or received a diagnosis of CHF; then recommendations for additional monitoring or TZD discontinuation were made.

RESULTS: Nineteen patients were assessed. Eighty-one patients had pre- and post-TZD weights documented. Of these, 32 (40%) patients had a greater than 10-pound weight gain. Of the 73 patients who had pre- and post-TZD A1Cs, the average reduction was 1%. Six patients (7%) received a new diagnosis of CHF. Twenty-eight (31%) patients required treatment with a loop diuretic after TZD initiation and 12 (13%) patients required an increased diuretic dosage. Seventy-nine patients (87%) were receiving other antidiabetic agents. Recommendations for additional monitoring were made for 17 (18%) patients. A recommendation to discontinue TZD treatment was made for 12 (13%) patients. Recommendations to discontinue TZD therapy were accepted in 5 patients, not accepted in 4 patients, and unknown in 3 patients.

CONCLUSIONS: These results underscore the importance of increasing awareness of and adherence to the suggested monitoring parameters for patients receiving TZD therapy set forth by the American Heart Association and American Diabetes Association.

Analgesia

13E. Testosterone patch therapy increases sex hormone levels with associated improvements in sexual function, mood and hematocrit in men with opioid induced androgen deficiency (OPIAD). Harry W Daniel, M.D., FACOP, Robin Lentz, CCRA, Norman A. Mazer, M.D., Ph.D.; (1)University of California Davis Medical School, Redding, CA; (2)Mercy Medical Center, Redding, CA; (3)Watson Laboratories, Inc., Salt Lake City, UT.


16. Low-dose botulinum toxin type A in the treatment of pifrimys syndrome unresponsive to the conventional therapy. Jin Ho, B.S., Se Jin Yoon, M.D., Sang Ho Lee, M.D.; Yoon, M.D. 1, Robin Lentz, CCRA2, Norman A. Mazer, M.D., Ph.D.3; (1)University of California Davis Medical School, Redding, CA; (2)Department of Pharmacy, Woordul Spine Hospital, Seoul, South Korea; (2)Department of Rehabilitation Medicine, Woordul Spine Hospital, Seoul, South Korea; (3)Department of Radiology, Woordul Spine Hospital, Seoul, South Korea; (4)Department of Neurosurgery, Woordul Spine Hospital, Seoul, South Korea; (5)Graduate School of Clinical Pharmacy, Sookmyung Women's University, Seoul, South Korea.

PURPOSE: Investigated the effectiveness of single, low dose of botulinum toxin type A (BTX-A) in improving the pain and quality of life (QOL) for patients with conventional therapy resistant pifrimys syndrome (PS). METHODS: Total of 30 patients with chronic PS were enrolled in an open label, prospective and single blind trial from January 2004 to February 2004. 150 units of BTX-A (DysportA) were injected into the affected unilateral piriformis muscle under the CT guidance. Patients' pain ratings using visual analog scale (VAS) or numeric rating scale (NRS) were obtained at baseline, 4, 8 and 12 weeks of treatment. Health-related QOL was assessed using Medical Outcome Study 36-item Short Form Health Survey (SF-36) at baseline and 4 weeks of treatment on visit to clinic. SF-36 was also collected from 82 healthy normal Korean volunteers.

RESULTS: The pain intensity scores at 4, 8 and 12 weeks of post BTX-A treatment measured by VAS or NRS were all significantly lower (p<0.001) than baseline. The baseline score of SF-36 subscales in patients with PS was significantly lower than the score of the age and sex matched 82 healthy normal subjects. After 4 weeks BTX-A treatment, patients significantly improved in physical functioning (p=0.003), role physical (p=0.021), bodily pain (p=0.016), general health (p=0.013), vitality (p=0.031) and social functioning (p=0.035). However, no significant improvement was seen with role emotional (p=0.13) and mental health (p=0.170) scales.

CONCLUSIONS: Relative low dose of BTX-A has significant impact on improving the pain and the QOL in patients with refractory piriformis syndrome.


PURPOSE: Serotonin (5-HT) and noradrenergic (NE) are involved in pain modulation via descending inhibitory pathways in the brain and spinal cord. This study assessed the efficacy of duloxetine, a potent and balanced inhibitor of 5-HT and NE, in the treatment of diabetic neuropathic pain in patients with DNP.

METHODS: Patients with DNP (without comorbid depression) were randomized to treatment with duloxetine 60 mg QD, 60 mg BID, or placebo for 12 weeks. The primary outcome measure was the weekly mean score of 24-hour average pain severity on the 11-point Likert scale. Secondary measures included night and 24-hour worst pain severity, Brief Pain Inventory (BPI), Clinical Global Impression of Severity (CGI-S), Patient Global Impression of Improvement (PGI-Improvement), Short-form McGill Pain Questionnaire, Dynamic Allodynia, and Average Daily Intake of Acetaminophen.

RESULTS: Duloxetine 60 mg QD and 60 mg BID demonstrated significant improvement in the treatment of DNP with rapid onset of action and separation from placebo at Week one on the 24-hour average pain severity score. For all secondary measures for pain (except allodynia), mean changes showed superiority of duloxetine over placebo, with no significant difference between 60 mg QD and 60 mg BID. CGI and PGI evaluation also demonstrated greater improvement on duloxetine- versus placebo-treated
patients. Doloxetine showed no notable interference on diabetic control and both doses were safely administered and well tolerated.

CONCLUSIONS: This study confirms previous findings that doloxetine at 60 mg QD and 60 mg BID is safe and effective in treating DNP.

18E. Opioid induced andrenogen deficiency in men (OPIDAN): An estimate of the potential patient population in the U.S. and Canada. Norman A. Macer, M.D., Ph.D.; C. Richard Chapman, Ph.D. 1; Harry W. Daniell, M.D., FACCP 1; Ernest Volinn, Ph.D. 1; (1)Watson Laboratories Inc., Salt Lake City, UT; (2)Pain Research Center, University of Utah School of Medicine, Salt Lake City, UT; (3)University of California Davis Medical School, Redding, CA.

American and Canadian Pain Societies, Vancouver, BC, May 6–9, 2004

19E. Naloxone utilization in determining appropriate opioid use, avoiding adverse effects, and minimizing medication errors. Rob W. Hutchinson, Pharm.D., Omar Gonzalez, Pharm.D., Presbyterian Hospital Dallas, Dallas, TX.


Cardiovascular

20. Use of venous thromboembolism prophylaxis on medical at-risk patients. Hsuehjien Yin, M.S. 1; Leo Lichtig, Ph.D. 1; Paul J. O’Connor, RPh, M.B.A. 2; F Randy Vogenberg, RPh, Ph.D. 1; (1)University of Illinois at Chicago, Chicago, IL; (2)Aon Consulting Life Sciences Practice, Wellesley, MA.

PURPOSE: Patients having prolonged immobility are at high risk of developing venous thromboembolism (VTE). Use of thromboprophylaxis (TP) for preventing VTE was recommended by the 2001 American College of Chest Physicians guidelines. Consequently, patients with inpatient stays longer than 5 days should be given TP. TP utilization, however, varies widely across hospitals. This study focused on heart failure and shock patients to show utilization rate of TP and factors associated with its use.

METHODS: An administrative database from 15 hospitals across the United States was used to identify and analyze the cohort. Descriptive statistical analysis was done to identify TP utilization rates. Logistic regression was performed to identify factors associated with TP as well as the relationship between length of stay (LOS) and VTE risk. VTEs identified within 90 days after the index admission were assumed to be associated with that admission. The analysis included 31 co-morbidities, using Charlton’s and Elixhauser’s co-morbidity measures.

RESULTS: For patients with LOS ≥ 5 days, only 61.1% received TP. TP utilization ranged from 32.2% to 87.5% across the hospitals. Patients with longer LOS, history of thrombosis, myocardial infarction, cardiac arrhythmias, valvular disease, obesity or greater number of co-morbidities were more likely to receive TP. Patients with mild liver disease, anemia, or older patients are less likely to receive TP.

CONCLUSIONS: Rate of TP use should be increased to achieve desired improved clinical and economic outcomes. Further study is needed on the factors influencing use of TP and specific role(s) for pharmacists.


PURPOSE: The Clinical Pharmacy Cardiac Risk Service (CPCRS) of Kaiser Permanente of Colorado (KPCO) collaborates with primary care physicians and cardiologists in co-managing cardiac risk factors in approximately 10,000 patients with cardiovascular disease. Since its inception in 1998, no evaluation of physician satisfaction has been conducted. The purpose of this study was to determine physician satisfaction with services provided by CPCRS.

METHODS: Eligible physicians from internal medicine, family practice, preventive medicine and cardiology, who had one or more patients enrolled in CPCRS for at least one year were mailed a 21-question survey. The survey was reviewed for content and face validity by experts prior to mailing. Surveys were mailed, collected, and tabulated by an independent research firm to maintain confidentiality. The questions pertained to overall satisfaction and to individual components of the service using a Likert-type scale for the majority of questions. Analysis of results was primarily descriptive.

RESULTS: Of 183 surveys mailed, 84 (46%) were returned. The majority of physicians (91%) were aware of the services provided by CPCRS. Most (88%) were satisfied with services provided by CPCRS. Most (88%) were satisfied with the extent to which they were able to meet their patients’ needs. Their popularity (81%) felt that cholesterol control in their patents had improved since enrollment.

CONCLUSIONS: Overall, physicians indicated a high level of satisfaction with the services provided by clinical pharmacy specialists at CPCRS and to a lesser degree with various components of the service.

22. Atherosclerotic risk factor control in peripheral arterial disease is better managed in patients with a concomitant diagnosis of coronary artery disease. Ryan S. Stolpstad, Pharm.D., Thomas F. Rehring, M.D., Brian G. Sandhoff, Pharm.D., Harris W. Hollis, M.D., John A. Merenich, M.D.; Kaiser Permanente Colorado Region, Aurora, CO.

PURPOSE: Peripheral arterial disease (PAD) is a common diagnosis in elderly patients and is considered a coronary artery disease (CAD) risk equivalent. Current guidelines suggest identical risk factor reduction strategies in these patient populations. The purpose of this study was to determine the quality of atherosclerotic risk factor control in patients with isolated PAD compared to patients with a diagnosis of CAD in addition to PAD.

METHODS: We administratively identified patients with a diagnosis of PAD at two regional clinics serving 92,939 individuals. This cohort was stratified into two groups, those with isolated PAD (PAD) and those with both PAD and CAD (PAD + CAD). Full physical examination, pharmacy and laboratory data were available for all patients. Care for the PAD group was provided by the primary care provider. The PAD + CAD group was managed by a clinical pharmacist administered risk factor control service.

RESULTS: We identified 2,418 patients with PAD.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>PAD (n=1733)</th>
<th>PAD + CAD (n=685)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average yrs</td>
<td>67.4 ± 13.7</td>
<td>72.6 ± 8.6</td>
</tr>
<tr>
<td>Percent Male</td>
<td>43% (742/1733)</td>
<td>63% (431/685)</td>
</tr>
<tr>
<td>*Annual Cholesterol Screen</td>
<td>54% (931/1733)</td>
<td>96% (656/685)</td>
</tr>
<tr>
<td>LDL &lt;100 mg/dL</td>
<td>44% (413/931)</td>
<td>82% (536/656)</td>
</tr>
<tr>
<td>*Satin Therapy</td>
<td>31% (543/1733)</td>
<td>79% (542/685)</td>
</tr>
<tr>
<td>ACE/ARB Therapy</td>
<td>32% (562/1733)</td>
<td>58% (399/685)</td>
</tr>
<tr>
<td>Aspirin therapy</td>
<td>Unable to validate</td>
<td>86% (586/685)</td>
</tr>
</tbody>
</table>

* (P<0.001)

CONCLUSIONS: Atherosclerotic risk factors are more aggressively treated in PAD patients that have a concurrent diagnosis of CAD. We submit that implementation of a pharmacist managed risk factor control service targeting all PAD patients might ameliorate this discrepancy.


PURPOSE: Warfarin response studies have been conducted primarily in Caucasians. The objective of this study was to identify demographic and environmental factors contributing to warfarin dose requirements in African Americans.

METHODS: Sixty African Americans on a stable dose of warfarin, defined as the same dose for 3 consecutive clinic visits, were enrolled and asked to complete a questionnaire assessing dietary vitamin K intake and warfarin adherence. Information on demographics, laboratory values, and concomitant medications was also collected. Vitamin K intake was assessed in terms of units based on published content of vitamin K in specified foods. Data were compared between patients on low (<5mg/day) and traditional (≥5mg/day) warfarin doses using the Wilcoxon Rank-Sum or Pearson’s χ2 test as appropriate.

RESULTS: Sex, warfarin adherence, hepatic function, and INR were similar between the low (n=22) and traditional (n=38) warfarin dose groups. Advanced age, lower body mass index (BMI), and lower vitamin K intake were associated with lower warfarin dose requirements. Median (range) values in the low and traditional dose groups, respectively, were as follows: age = 70 (49–87) and 59 (23–80) years (p=0.006), BMI = 29 (22–53) and 34 (24–80) kg/m2 (p=0.02), and vitamin K intake = 1.1 (0.7–1.7) and 6.3 (0.4–16) units (p=0.007).

CONCLUSIONS: Demographic and dietary factors are strongly associated with warfarin dose requirements in African Americans. Our data suggest that warfarin doses <5 mg/day should be started in African Americans of advanced age, of lower body weight, or with minimal intake of vitamin K-containing foods.

24. Racial differences in spironolactone response. Larisa H. Cavallari, Pharm.D., Lucy A. Fashinhauer, B.S., Vicki L. Groo, Pharm.D., Mary R. Southworth, Pharm.D. 1; Desiree Fontana, R.N., BA 1; Randall E. Williams, M.D., 2; Paul Vaitkus, M.D. 1; (1)University of Illinois at Chicago, Chicago, IL; (2)Northwestern University, Northfield, IL.

PURPOSE: The benefits of spironolactone in heart failure have largely been demonstrated in Caucasians. The objective of this prospective study was to determine whether there are racial differences in spironolactone response by comparing the effects of spironolactone on potassium concentrations between Caucasians and African Americans with heart failure.

METHODS: Spironolactone-naïve heart failure patients of African American (n=22) or Caucasian (n=10) race were enrolled and started on spironolactone 12.5 mg/day, titrated to 25 mg/day if tolerated. Serum potassium and creatinine concentrations were determined at baseline and one week after spironolactone dose titration. Serum aldosterone was measured before and 3 months after spironolactone initiation in a subset of patients.

RESULTS: Heart failure severity, medications, and laboratory values were...
similar between racial groups at baseline. Spironolactone was titrated to a mean±SD dose of 21±7 mg/day in African Americans and 17.5±6 mg/day in Caucasians, p=NS. Neither concomitant medications nor creatinine concentrations changed significantly in either group during the data collection period. With spironolactone, mean±SD potassium increase significantly from baseline in Caucasians (3.4±0.5 to 3.2±0.4 mmol/L, p<0.01) but not African Americans (4.3±0.3 to 4.5±0.5 mmol/L). Caucasians also tended to have greater increases in aldosterone with spironolactone; median (range) increase in aldosterone was 165 (-43 to 1712) pmol/L in Caucasians (n=5) versus 60 (-103 to 721) pmol/L in African Americans (n=10).

CONCLUSIONS: Heart failure treatment with spironolactone was associated with greater serum potassium elevation in Caucasians compared to African Americans. Our data suggest that African Americans may be less responsive to the hemodynamic effects of spironolactone.

25. Phosphodiesterase-type 3 inhibition increases microcirculatory vasodilatation. John M. Dopp, Pharm.D. 1, Alexey V. Agapitov, M.D. 2, Christine A. Sinkey, R.N. 2, William G. Haynes, M.D. 1, Bradley G. Phillips, Pharm.D. 2, (1)University of Wisconsin-Madison, Madison, WI; (2)University of Iowa, Iowa City, IA.

PURPOSE: Phosphodiesterase-type 3 (PDE-3) inhibitors have important effects on vascular function and performance. Skin microcirculation constitutes important parameter for assessment of resistance and regulation of blood pressure. The effects of PDE-3 inhibition on microcirculation have not been investigated. The purpose of this study was to evaluate the role of PDE-3 inhibition on microvascular reactive using a double-blind, crossover fashion to receive sildenafil 100 mg or placebo on separate study visits. Blood pressure and forearm skin blood flow (SBF) were determined at rest before and 45 minutes after study drug administration. Hemodynamic studies were then completed (n=16) by infusing 10 ng/mL intra-brachial (IB) drugs to evaluate the contribution of alpha-receptors (IB phentolamine), cyclic AMP (IB isoproterenol), and sympathetic vascular tone (IB phenolamine) on skin blood flow following sildenafil and placebo. SBF was measured at the end of each IB infused drug and skin vascular resistance (SVR) was calculated by dividing mean arterial pressure by SBF.

RESULTS: PDE-3 inhibition reduced resting SVR from 99±7 at baseline to 42±4 (p<0.04) following sildenafil. SBF was unchanged after placebo (11±3 vs. 8±4; p>NS). Following sildenafil, SVR changes mediated by alpha-receptors, cyclic AMP and sympathetic vascular tone were different than placebo (p<NS for all).

CONCLUSIONS: PDE-3 inhibition significantly increased resting microcirculatory vasodilatation in healthy, middle-aged men. These responses were not explained by differences in alpha-receptor sensitivity, cyclic AMP mediated dilation or sympathetic vascular tone. Microcirculatory changes may contribute to the hemodynamic changes associated with PDE-3 inhibition.


PURPOSE: Fluoroquinolone antimicrobial medications (FQs) have been speculated to influence the risk of Torsades de pointes (Tdp). Methods of evaluating this risk are varied and not systematic. QTc-interval prolongation, while the most commonly used marker of Tdp, has questionable utility. QTc-dispersion may be a more selective marker of Tdp risk. No assessment of QTc-dispersion.

METHODS: We studied 17 healthy males (44±2 years) who were randomized to receive sildenafil 100 mg or placebo on separate study visits. Blood pressure and forearm skin blood flow (SBF) were determined at rest before and 45 minutes after study drug administration. Hemodynamic studies were then completed (n=16) by infusing 10 ng/mL intrabrachial (IB) drugs to evaluate the contribution of alpha-receptors (IB phentolamine), cyclic AMP (IB isoproterenol), and sympathetic vascular tone (IB phenolamine) on skin blood flow following sildenafil and placebo. SBF was measured at the end of each IB infused drug and skin vascular resistance (SVR) was calculated by dividing mean arterial pressure by SBF.

RESULTS: PDE-3 inhibition reduced resting SVR from 99±7 at baseline to 42±4 (p<0.04) following sildenafil. SBF was unchanged after placebo (11±3 vs. 8±4; p>NS). Followling sildenafil, SVR changes mediated by alpha-receptors, cyclic AMP and sympathetic vascular tone were different than placebo (p<NS for all).

CONCLUSIONS: PDE-3 inhibition significantly increased resting microcirculatory vasodilatation in healthy, middle-aged men. These responses were not explained by differences in alpha-receptor sensitivity, cyclic AMP mediated dilation or sympathetic vascular tone. Microcirculatory changes may contribute to the hemodynamic changes associated with PDE-3 inhibition.

27. Development of an updated risk model to predict post-cardiac surgery atrial fibrillation in patients receiving amiodarone prophylaxis. Brian J. Barnes, Pharm.D., Patricia A. Howard, Pharm.D., FCCP, BCP (AQ CV), Dennis W. Grauer, M.S., Ph.D., Erin A. Oswald, Pharm.D., Brian C. O'Neal, M.S., Pharm., Dr. Gregory F. Muehlebach, M.D., Jeffrey B. Kramer, M.D., Michael E. Gorton, M.D.; The University of Kansas Medical Center, Kansas City, KS.

PURPOSE: Prophylactic amiodarone has been shown to reduce postoperative atrial fibrillation (POAF) which occurs in 32.3% of cardiac surgery patients. This study evaluated the predictive accuracy of a validated risk index (VRI) for POAF (JAMA 2004;291:1720-1727) and updated the model in a contemporary population receiving amiodarone prophylaxis (AMP).

METHODS: We conducted a retrospective analysis of institution-specific data (08/2002-12/2003) obtained from the Society of Thoracic Surgeons and the University HealthSystem Consortium. The effect of AMP on POAF was evaluated among 3 risk groups generated by the VRI (chi square analyses). Logistic regression was used to determine the predictive accuracy of the VRI in our patients and to develop and validate a new model to predict POAF in patients receiving AMP.

RESULTS: When applied to 713 patients the VRI classified 62.7% at low risk, 33.9% at medium risk, and 3.4% at high risk for developing POAF AMP was used in 47% (334/713) of patients and decreased POAF by 32% (37% vs. 5%, p<0.001), 22% (28% vs. 6%, p<0.001), and 40% (40% vs. 0%, p<0.052) in these respective groups. The 11 variable VRI model yielded a predictive accuracy of 79.7% in our patients. Our newly developed model based on two variables (age and AMP), achieved similar accuracy in our derivation (80.8%) and validation (79.3%) cohorts.

CONCLUSIONS: The use of AMP significantly decreases the risk of POAF in cardiac surgery patients. We developed a simplified model, based on the contemporary use of AMP, which achieved similar predictive accuracy compared to the more complex VRI.

28. Evaluation of nesiritide in postoperative coronary artery bypass patients. Corrie A. Martin, Pharm.D. 1, Kerry Pickworth, Pharm.D. 1, Benjamin S. Sherman, M.D. 2, (1)The Ohio State University Medical Center, Department of Pharmacy, Columbus, OH; (2)The Ohio State University Medical Center, Division of Cardiothoracic Surgery, Columbus, OH.

PURPOSE: Nesiritide may offer a therapeutic benefit in patients with left ventricular dysfunction (LVD) undergoing coronary artery bypass grafting (CABG), however, this has not been investigated. The objective of this study is to evaluate nesiritide plus standard of care for improving hemodynamics and medical stabilization after CABG, among patients with LVD.

METHODS: A retrospective analysis was conducted of adult patients with LVD, who underwent CABG, and received nesiritide plus standard of care postoperatively. Patients with ventricular assist devices were excluded. Primary endpoints were change in mean pulmonary artery pressure (MPAP), pulmonary artery diastolic pressure (PAD), and dose / duration of intravenous inotropes. Hemodynamic data and laboratory values were collected during 48 hours following nesiritide initiation. Duration of intravenous vasoactive medications and adverse effects were recorded.

RESULTS: Twenty-four patients received nesiritide after open-heart surgery from 03/02 through 03/04, and thirteen met inclusion criteria. After nesiritide initiation, MPAP and PAD did not change from baseline. Six of eight patients, receiving concomitant inotropes, were down titrated or discontinued at 48 hours. Four patients, not on an inotrope at baseline, required addition of an inotrope after nesiritide initiation. The incidence of hypotension was 20%.

MPAP (mean) (PAD) (mean) (VS) (p-value (compared to baseline).

Baseline 29 33 22 NS
8h 33 33 22 NS
16h 30 22 22 NS
24h 31 23 NS
48h 33 24 NS

NS= non significant for MPAP and PAD compared to baseline.

CONCLUSIONS: Nesiritide did not offer any therapeutic benefit over standard care after CABG. Further studies are needed to elucidate nesiritide’s role after CABG.

29. Survey of prophylaxis against venous thromboembolism in acutely ill medical patients. Carla M. Peterman, Pharm.D. 1, Daniel Kolansky, M.D. 2, Sarah Spintel, Pharm.D. 1, (1)Philadelphia College of Pharmacy, Philadelphia, PA; (2)University of Pennsylvania, Philadelphia, PA; (3)Philadelphia College of Pharmacy, University of the Sciences in Philadelphia, Philadelphia, PA.

PURPOSE: To assess the frequency and type of VTE prophylaxis modalities utilized in acutely ill medical patients.

METHODS: An investigator reviewed charts of consecutive patients with a primary admission to 3 general medical units lasting ≥ 3 days. Patients excluded from the study were those transferred from another floor to the medicine units, and those that were discharged before 3 days.

RESULTS: 170 were enrolled (72 males) with an average age of 69 years and an average length of hospital stay of 7.2 days. Concurrent review of patient medical records revealed that 138 (77.1%) patients received one or more forms of prophylaxis during their hospital stay and 41 (22.9%) patients received no prophylaxis. Of those that received prophylaxis, 6.6% received...
non-pharmacologic prophylaxis, 36.9% received therapeutic doses of anticoagulants for indications other than VTE prophylaxis, 70.3% received low-dose anticoagulants for VTE prophylaxis and 25.4% received more than one form of prophylaxis at some time during hospital admission. Of the 41 patients who received no prophylaxis, 22 (54%) did not meet the diagnosis of heart failure; 11 (27%) received anticoagulants for indications other than VTE prophylaxis, and yet did not meet the diagnosis of heart failure (1.5±0.9 days to 0 days, p=0.05, for diagnosis of heart failure [average time in program 3.38 months]. Admission for diagnoses other than heart failure went from 5.1±0.6 days to 0 days, p<0.05, for the same time period. The Average Score on the Modified Kansas City Cardiomyopathy QOL Questionnaire (1-7 worst, 0-best) went from 3.1±0.6 to 3.9±0.7 (P=0.05). Four patients have been discharged from program, 2 patients have expired, and the rest continue to get nesiritide on routine basis.

CONCLUSIONS: Preliminary results of this program are encouraging for decreased days in hospital, decreased INR levels, and increased QOL scores. Further studies on pharmacoeconomics of this type of program are warranted.


CONCLUSIONS: Using the prophylactic amiodarone regimens from the AFIST trials reduces LOS by 3.0 days and the incidence of POAF by 22.7%.


PURPOSE: This study determined baseline control of hyperlipidemia in high-risk patients as classified by National Cholesterol Education Program Adult Treatment Panel III Guidelines. We sought to determine need for intense lipid management through a pharmacist-managed hyperlipidemia clinic at the University of Utah Hospitals and Clinics (UUCH).

METHODS: We identified patients with diagnoses of diabetes and/or coronary heart disease as high-risk patients in an electronic medical record. We collected retrospective data including lipid profiles, liver function tests (LFTs) and lipid panels, prescribing of lipid lowering medications and percent with LFT expired, and the rest continue to get nesiritide on routine basis.

CONCLUSIONS: The need for anticoagulation was 20.3% (2.0±0.6) for the same time period. The Average Score on the Modified Kansas City Cardiomyopathy QOL Questionnaire (1-7 worst, 0-best) went from 3.1±0.6 to 3.9±0.7 (P=0.05). Four patients have been discharged from program, 2 patients have expired, and the rest continue to get nesiritide on routine basis.

32. Oral ritonavir increases expression of myocardial P-glycoprotein. J. Jason Simms, Pharm.D.1, Jennifer M. Loeb, B.S.1, Nicolas A. Wiegert, B.S.1, Robert M. Tweedy, B.S.1, Brian L. Neifeld, B.S.1, Craig I. Coleman, Pharm.D.1, (1)University of Connecticut, Hartford, CT; (2) Hartford Hospital, Hartford, CT.

PURPOSE: The Atrial Fibrillation Suppression Trials (AFIST) showed that prophylactic amiodarone reduces the incidence of postoperative atrial fibrillation (POAF). However, these previous studies were not powered to evaluate length-of-stay (LOS) and showed inconsistent effect on stroke.

METHODS: A large, retrospective cohort study was conducted in patients undergoing cardiothoracic surgery (CTS) at our institution between February 1998 and October 2003 to evaluate the impact of prophylactic amiodarone on LOS, stroke and POAF. Patients receiving any of the prophylactic amiodarone regimens utilized in the AFIST trials (e.g., >50% over 5 days or >70% over 10 days) were propensity score matched (1:1 matching) with patients not receiving prophylaxis for age, valvular surgery, history of atrial fibrillation, gender, beta-blocker intolerance and preoperative digoxin use.

RESULTS: A total of 2,046 patients (n=186 amiodarone, n=1,860 control; 68.9±9.8 years, 75% male, 21% valvular surgery) were evaluated. Patients receiving prophylactic amiodarone had a decreased days in hospital (11±6 vs. 14±0, p=0.003) and a reduction in POAF (23% vs. 29.9%, p=0.05). The incidence of stroke was not significantly impacted (2.0% vs. 2.7%, p=0.61 and 2.7% vs. 5.8%, p=0.09, respectively).

CONCLUSIONS: Further studies on pharmacoeconomics of this type of program are warranted.

33. Nesiritide in the outpatient setting in a small community hospital. John Novinsky, Pharm.D.1, Rick Simpson, R.N.2, Shirley Smith, R.N.2, Kathy Lee, Rph.2, (1)St Elizabeth Medical Center, Utica, NY; (2) Rome Memorial Hospital, Rome, NY.

PURPOSE: The use of nesiritide in the outpatient setting is currently being trialed in many locations. This study provides observational information about one community hospital experience.

METHODS: The demographic data collected include patient age, sex, weight, and diuretics. Outcome measures were collected before and after entry into program include hospital stay, quality of life (QOL) assessment, and Beta-Natriuretic Peptide (BNP) levels.

RESULTS: Thirty patients entered into the program, with average age of 74±3 (1.1) years, weight of 81±1 (2.6)Kg, and furosemide dose of 109±74mg. Mean BNP went from 1615±2 (1221) to 812±3 (961.6), p<0.09, after program entry. Hospital days per patient went from 0.7±3 (4) days in the 6 months prior to program to 0.3±3 (0.9) days, p<0.05, for diagnosis of heart failure (average time in program 3.38 months). Admission for diagnoses other than heart failure went from 5.1±0.6 days to 0 days, p<0.05, for the same time period. The Average Score on the Modified Kansas City Cardiomyopathy QOL Questionnaire (1-worst, 0-best) went from 3.1±0.6 to 3.9±0.7 (P=0.05). Four patients have been discharged from program, 2 patients have expired, and the rest continue to get nesiritide on routine basis.

CONCLUSIONS: Preliminary results of this program are encouraging for decreased days in hospital, decreased INR levels, and increased QOL scores. Further studies on pharmacoeconomics of this type of program are warranted.
36. Cost-effectiveness analysis of antithrombotic therapy in non-urgent percutaneous coronary intervention. Kelly M. Summers, Pharm.D., David A. Holdford, Ph.D., Michael A. Crouch, Pharm.D.; Virginia Commonwealth University Medical Center/VCU School of Pharmacy, MCV Campus, P.O. Box 980533, Richmond, VA.

PURPOSE: Periprocedural unfractionated heparin (UFH) and glycoprotein IIb/IIIa inhibitor therapy are standard treatments during percutaneous coronary intervention (PCI). An alternative strategy consisting of bivalirudin with provisional GPI inhibitor therapy was shown in the REPLACE-2 trial to be non-inferior, based on acute ischemic endpoints, to UFH plus planned GPI inhibitor therapy. This trial also demonstrated lower hemorrhagic endpoints in the bivalirudin group. The current study describes a cost-effectiveness analysis (CEA) comparing three treatment approaches: 1) bivalirudin and provisional GPI inhibitor therapy, 2) UFH and epifibatide, and 3) UFH and abciximab.

METHODS: This CEA is a literature-based decision analysis model from an institutional perspective. We considered patient populations undergoing contemporary non-urgent PCI (EPISTENT, ESPIRIT, TARGET, and REPLACE-2 served as reference studies) to identify probabilities of MI, urgent revascularization, adverse events, outcomes, and costs were documented at 30 days. Costs were assigned to each of these outcomes incorporating DRG or CPT-assigned costs, institutional drug acquisition costs, and unit costs of platelets and blood.

RESULTS: In the base case analysis, the bivalirudin with provisional GPI inhibitor therapy dominated the UFH/epifibatide and UFH/abciximab approaches. The corresponding cost-effectiveness ratios were $985, $1067, and $1771, respectively. Sensitivity analyses incorporating a range of efficacy and cost estimates to assess the model's robustness will be presented.

CONCLUSIONS: Initial analysis from this literature-based, cross-sectional comparison of antithrombotic treatment strategies in non-urgent PCI indicates bivalirudin with provisional GPI inhibitor therapy is the most cost effective approach. Additional research is necessary to evaluate bivalirudin in urgent PCI.

37. Perioperative use of nesiritide in cardiac surgery patients. Laura T. Ota, Pharm.D., Pat L. Masters, Pharm.D., BCP, Carolyn A. Maroun-Monaco, RPh, M.S.; Caritas St. Elizabeth's Medical Center, Boston, MA.

PURPOSE: Brief reports have documented the potential additive benefits of nesiritide in the treatment of cardiac surgery patients with renal insufficiency and left ventricular dysfunction. The purpose of this series was to evaluate the use of nesiritide in cardiac surgery patients.

METHODS: During August 2003–June 2004, 37 cardiac surgery patients received nesiritide perioperatively. Patient demographics, medical history, dose and duration of nesiritide, concomitant medication use, change in renal function, adverse events, outcomes, and costs were documented at 30 days.

RESULTS: Of 23 patients reviewed, the average baseline EF was 33.9% and the average baseline Scr and calculated CrCl were 1.9 mg/dl and 43.2 ml/min, respectively. The average duration of infusions was 38.2 hours. Postoperatively, the average urine output during the first 24 hours was 1935 ml. The average peak Scr was 2.65 mg/dl (0.7–8.8 mg/dl), and 40.9% (9/22) of patients met the criteria for acute renal failure. Hypotension occurred in 26.1% of patients and 4 patients receiving doses greater than 0.1 µg/kg/min required vasopressor infusion in order to maintain blood pressure. The average length of stay in the ICU and duration of hospitalization was 2.96 days and 11 days, respectively. The average cost of nesiritide per patient was $816 ($408–$2040).

CONCLUSIONS: Patients that received nesiritide had improved hemodynamic parameters and urine output postoperatively. Acute renal failure occurred in 40.9% of patients and hypotension occurred more frequently in patients receiving doses greater than 0.1 µg/kg/min. Formal randomized studies are needed to determine in which patients nesiritide will be most beneficial and cost effective.


PURPOSE: Hypertension affects over 20% of Americans between the ages of 35 and 74 and accounts for more than 20,000 deaths per year. Pharmacist-managed clinics aid in improving quality of care by providing education, ensuring treatment goals, and improving compliance. The Pharmacist’s Hypertension Intervention and Treatment (PHT) Clinic was developed to assess patients on a bi-weekly basis and promptly adjust medications to achieve standard goals.

METHODS: A comprehensive protocol was developed and presented to the Pharmacy and Therapeutics committee for approval. Patient enrollment began in September 2003 with appointments scheduled at 2-week intervals. Patients are followed by the PHT clinic until their blood pressure is goal for at least 2 consecutive visits.

RESULTS: On average, 20 patients were enrolled each month and 158 patients have come to at least one visit. Majority of patients (64.5%) have no compelling indications and have a goal blood pressure of less than 140/90 mm Hg. Thirty-eight patients (22.7%) have diabetes or renal problems and 20 patients (13.4%) have proteinuria. The 162 interventions included increasing doses (50%), initiating new medications (32%), discontinuing medications (13%), and decreasing doses (4%). ACE inhibitors (30.9%) and hydrochlorothiazide (18.3%) are the medications most often modified. Thirty-eight patients (24.1%) have been referred back to their Primary Care providers at goal. Sixty-three patients are actively followed in PHT clinic at present and 13 patients are scheduled for initial visits.

CONCLUSIONS: The PHT clinic is making an impact on controlling hypertension with an average of four patients a month discharged at goal.

39. Amiodarone dose response for preventing atrial fibrillation following cardiac surgery: a meta-analysis. Mitchell S. Buckley, Pharm.D., Paul E. Nolan Jr., Pharm.D., Marion K. Slack, Ph.D., James E. Tisdale, Pharm.D., Daniel E. Hilleman, Pharm.D., Jack G. Copeland, M.D.; (1)University of Arizona, Tucson, AZ; (2)Purdue University, West Lafayette, IN; (3)Creighton University Medical Center, Omaha, NE.

PURPOSE: We previously reported that amiodarone (AM) significantly reduces post-cardiac surgery atrial fibrillation (PCS AF). The purpose of this study was to examine the dose-response relationship between AM and reduction in PCS AF, and to determine whether preoperative (PRE) or postoperative (POST) AM administration is superior in reducing PCS AF.

METHODS: Using MEDLINE database for English language reports published between January, 1966 and June, 2004, 14 prospective, randomized, placebo-controlled trials were identified as using AM to prevent PCS AF 13 studies (n = 26600 total patients) were used in this analysis. For each study total AM dose was categorized as low (<3000 mg), medium (3000 mg–5000 mg) or high (>5000 mg) and PRE or POST, and then aggregated using standard meta-analytic techniques.

RESULTS: Compared to placebo, patients administered AM had a lower incidence of PCS AF regardless of dose (low: OR=0.60, CI: 0.44–0.80, p=0.001; medium: OR=0.44, CI: 0.33–0.58, p=0.001; high: OR=0.45, CI: 0.30–0.69, p=0.001). A comparison of the mean risk reductions suggested a greater reduction in PCS AF with medium and high doses (56% and 53%) as compared to low dose (40%). Compared to placebo the reduction in PCS AF was similar between PRE and POST AM (OR=0.70, CI: 0.57–0.89, p=0.001; and OR=0.50, CI: 0.39–0.63, p=0.001, respectively) corresponding to mean risk reductions of 51% and 50%, respectively.

CONCLUSIONS: Total doses of AM >3000 mg appear optimal for reducing PCS AF. Similar outcome benefits should be expected whether this dose is administered preoperatively or postoperatively.

40. Prophylactic amiodarone decreases atrial fibrillation and hospital length of stay following cardiac surgery: a meta-analysis. Mitchell S. Buckley, Pharm.D., Paul E. Nolan Jr, Pharm.D., Marion K. Slack, Ph.D., James E. Tisdale, Pharm.D., Daniel E. Hilleman, Pharm.D., Jack G. Copeland, M.D.; (1)University of Arizona, Tucson, AZ; (2)Purdue University, West Lafayette, IN; (3)Creighton University Medical Center, Omaha, NE.

PURPOSE: The purpose of this study was to evaluate the effectiveness of prophylactically administered amiodarone (AM) with respect to reducing atrial fibrillation (AF) and hospital length of stay (LOS) following cardiac surgery (CS).

METHODS: Using MEDLINE database for English language reports published between January, 1966 and June, 2004, 16 prospective, randomized, controlled trials (RCTs) and 2 nonrandomized studies were identified as using AM to prevent post-CS AF. For each study the number of patients, incidence of post-CS AF, LOS and a number of other clinical variables were recorded for both AM and control groups and then aggregated using standard meta-analytic techniques.

RESULTS: Using all 18 studies (n=6096 patients), AM decreased post-CS AF by 43% (OR=0.57, CI: 0.51 0.64; p<0.001). Subanalysis using only RCT data (n=4987 patients) showed AM decreased post-CS AF by 48% (OR=0.52, CI: 0.43 0.62; p<0.001). AM also reduced LOS by a mean of 1.04 days (p=0.001).

CONCLUSIONS: In patients undergoing CS AM significantly decreases both the incidence of AF and LOS.

41. Adherence to recommendations for low-density lipoprotein lowering in patients with type 2 diabetes mellitus. Nuba I. Ahmed, Pharm.D., Stephanie L. Evans, Pharm.D., Julie A. Brousil, Pharm.D.; St. Louis College of Pharmacy/Family Medicine of St. Louis, St. Louis, MO.

PURPOSE: The purpose of this study was to determine the impact of pharmacy initiated recommendations to 1) improve compliance with the recommended LDL monitoring schedule for patients with type 2 Diabetes Mellitus (DM) and 2) increase the percentage of patients that meet goal LDL cholesterol levels in a family medicine residency clinic.

METHODS: The study was a retrospective chart review of 217 patients with type 2 DM seen between June 2002 and July 2003. Data was collected to determine if a fasting lipid profile (FLP) had been performed within the previous year and whether or not the patient had achieved the recommended
32E. Health care and drug utilization patterns in patients receiving long-term thienopyridine therapy. Patrick L. McCollam, Pharm.D.1, Maureen J. Lage, Ph.D.2, Lee Bowman, Ph.D.1, (1)Lilly Research Laboratories, Indianapolis, IN; (2)HealthMetrics Outcomes Research, LLC, Groton, CT.

Published in Value in Health 2004;7:325.

43E. Total cost of acute coronary syndromes patients in a managed care population during the one-year following initial presentation. Patrick L McCollam, Pharm.D.1, Lida Etemad, Pharm.D., M.S.;2, (1)Lilly Research Laboratories, Indianapolis, IN, (2)Ingenix, Eden Prairie, MN.

Published in Journal of Managed Care Pharmacy 2004;10:202.

44E. Altered aldosterone disposition in P-glycoprotein knockout mice. Robert B. Parker, Pharm.D3, C. Ryan Yates, Pharm.D., Ph.D.1, S. Casey Laizure, Pharm.D.1, (1)University of Tennessee Dept of Pharmacy, Memphis, TN; (2)University of Tennessee Dept of Pharmaceutical Sciences, Memphis, TN.

Presented at the American College of Cardiology Scientific Sessions, Chicago, IL, April 2003.

45E. Management of acute coronary syndrome within a veteran population: A six-month review. Suzanne T. Thompson, Pharm.D., Judy H. Tseng, Pharm.D., Deidree E. Edwards, Pharm.D., Veterans Affairs Medical Center, Miami, FL.


46. Adjunctive sedation during shock delivery with an implanted atrial defibrillator (IAD): pharmacokinetic and pharmacological responses to triazolam. Tanya J Fabian, Pharm.D., Ph.D.1, Michael R. Ujhelyi, Pharm.D.1, David S. Schwartzman, M.D.1, Sharon E. Corey, Ph.D.1, Kristin L. Bigos, B.S.1, Bruce G. Pollock, M.D., Ph.D.1, Patricia D. Kroboth, Ph.D.1; (1)University of Pittsburgh, Pittsburgh, PA; (2)Medtronic, Inc, Minneapolis, MN.

PURPOSE: Significant anxiety and discomfort have been associated with patient-activated atrial shock delivery. The purpose of this study was to determine whether adjunctive oral triazolam produced the desired therapeutic effects of sedation and anterograde amnesia without interfering with the patient’s ability to administer the atrial shock.

METHODS: 32 IADs: Implantable, pulse-controlled, trial 15 men and women (39 to 77 years; 59 ± 9.6 years) were randomly assigned to receive triazolam 0.375 mg or placebo 75 minutes prior to shock delivery. Serial blood samples were obtained for measuring plasma concentrations of triazolam. Assessments of sedation and memory were collected throughout the study.

RESULTS: Nearly a four-fold difference in triazolam concentration was observed at the peak (1.20 mg/ml to 4.46 mg/ml) and at the time of shock (0.75 mg/ml to 2.86 mg/ml). Despite the dose administered, patients were not overtly sedated, and all were able to self-activate their IAD device. Maximum decrement in memory impairment (33%) and psychomotor performance (28% to 34%) were relatively low. There were no correlations between triazolam exposure and response.

CONCLUSIONS: This is the first placebo-controlled clinical evaluation of an oral sedative administered prior to shock delivery in patients with IADs. These data suggest that triazolam 0.375 mg produced the desired therapeutic effects of sedation and memory impairment for the purpose to mitigating atrial shock discomfort in this group of patients. The absence of a concentration effect relationship suggests that other factors may influence triazolam sensitivity in this population including varying levels of shock-related anxiety.

47. Th1- and Th2-related cytokine and chemokine balance in blood pressure responders and non-responders to metoprolol monotherapy. Issam Zineh, Pharm.D.1, Xiaoping Luo, M.D.2, Taimour Y. Langaee, Ph.D.1, Julie A. Johnson, Pharm.D.1, Nasser Chegini, Ph.D.1, (1)Department of Pharmacy Practice, University of Florida, Gainesville, FL; (2)Department of Obstetrics and Gynecology, University of Florida College of Medicine, Gainesville, FL.

PURPOSE: Inflammation mediates many diseases including hypertension. Additionally, some cardiovascular drugs exhibit immunomodulatory effects. We investigated T-helper (Th)1- (pro-inflammatory) and Th2-related (anti-inflammatory) cytokine/chemokine balance in blood pressure (BP) “responders” and “non-responders” to metoprolol.

METHODS: The following were measured by 2-step detection (Upstate, Charlottesville, VA): IL-1α, IL-6, IL-1β, IL-18, IL-2, IL-4, IL-9, IL-10, IL-12 (p70), IL-12 (p40), IL-13, IL-15, GM-CSF, IFNγ, TNFα, eotaxin, MCP-1, RANTES, MIP-1α, and IP-10. Median concentrations were calculated for five patients that achieved goal BP and five that did not in response to a minimum four weeks of metoprolol at maximum tolerated doses.

RESULTS: There were no differences in demographics between groups (not shown): IL-1 isoforms, IL-3, and IL-10 were 1.5–7 times higher in non-responders (p<0.05, Table). GM-CSF, IL-12p40, and IL-4 trended to being higher in non-responders (p=0.1).

Table. Cytokine/chemokine profiles for metoprolol responders and non-responders

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Eotaxin</th>
<th>GM-CSF</th>
<th>IFNγ</th>
<th>IL-10</th>
<th>IL-12 p40</th>
<th>IL-12 p70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-resp</td>
<td>1.8</td>
<td>14.7</td>
<td>0.58</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Resp</td>
<td>1.0</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>IP-10</td>
<td>1.9</td>
<td>33.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>MCP-1</td>
<td>1.4</td>
<td>33.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>MIP-1α</td>
<td>1.3</td>
<td>11.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>RANTES</td>
<td>1.5</td>
<td>33.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>TNFa</td>
<td>1.5</td>
<td>33.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Critical Care

48. Propofol associated hypertriglyceridemia and pancreatitis: an incidence and risk factor analysis. John W. Develin, Pharm.D., BCPS, FCCM, Adahl Lau, Pharm.D.1, Maged Taniaos, M.D., M.F.H., FCCP,1; (1)Northeastern University School of Pharmacy, Boston, MA; (2)Tufts-New England Medical Center, Boston, MA; (3)Long Beach Memorial Medical Center, Long Beach, CA.

PURPOSE: Propofol is routinely used for sedation at our institution but has been anecdotally associated with hypertriglyceridemia (HTG) and HTG-related pancreatitis. We sought to characterize the incidence, severity, and risk factors associated with propofol-related HTG and pancreatitis.

METHODS: Consecutive ICU patients administered propofol for ≥ 4 hours during 2003 were reviewed to identify incidence of related pancreatitis. We defined HTG as triglyceride (STG) ≥ 400 mg/dL and pancreatitis [amylase ≥ 125 IU/L and lipase ≥ 80 IU/L and abdominal CT or exam consistent with pancreatitis]. Patients with baseline STG ≥ 250 mg/dL, receiving another lipid product, or with baseline pancreatitis were excluded.

RESULTS: Of 512 patients reviewed, only 159 patients (31%) had ≥ 1 STG drawn. Of these, 29/159 (18%) developed HTG with 6/29 (21%) having a STG ≥ 1000 mg/dL. At initial HTG detection, the average maximum STG was 696 mg/dL (403 to 1737) (median [range]), propofol infusion rate 50 mg/kg/min (5 to 273) and duration of propofol therapy 54 (34 to 159) hours. Propofol therapy was discontinued within 24 hours of HTG detection 64% of the time. Independent risk factors associated with HTG include patient age (p=0.029), ICU length of stay (p<0.008), and duration of propofol therapy (p<0.001). Of the 29 (10%) HTG patients developed pancreatitis.

CONCLUSIONS: HTG and HTG-associated pancreatitis are commonly seen in ICU patients receiving propofol at our institution. Serum TG concentrations should be routinely monitored for patients receiving propofol therapy and the dose decreased or held when HTG is detected.

49. Glycemic control in critically ill patients via implementation of an “insulin drip” protocol. Jessica Bollinger, Pharmacy, Intern, Harrison Weed, M.D., Samuel Cataldan, M.D., Anthony Gerlach, Pharm.D., BCPS, The Ohio State University Medical Center, Columbus, OH.

PURPOSE: Strict control of hyperglycemia with continuous insulin infusion has been shown to decrease morbidity and mortality in ICU patients, but tight glucose control carries the risk of hypoglycemia. As a safety initiative, we implemented an insulin infusion protocol in our ICUs. We studied the impact of this initiative on the incidence of hypoglycemia and the time to glycemic control.

METHODS: Subjects were ICU patients receiving continuous insulin infusion. We collected data by retrospective chart review. We defined hypoglycemia as blood sugar below 64 mg/dL and controlled glucose as blood
sugar below 150 mg/dL. We used χ² to analyze categorical data and Student's t-test to analyze continuous data.

RESULTS: As a baseline we studied 49 patients in the ICU from 6/16/03 to 7/30/03. After implementation of the protocol we studied 47 patients in the ICU from 9/24/03 to 11/14/03.

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Post-Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>49</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Our implementation of a continuous insulin infusion protocol resulted in significantly less hypoglycemia without effecting glycemic control.
contradictory platelet aggregation tests in 30% of patients, negative ELISA assay in 78%, and performance of serotonin release assays in only three patients. Although commonly ordered (72% of patients), platelet aggregation tests were seldom useful in diagnosing HIT. Drug acquisition costs were approximately $450,000 in these patients.

CONCLUSIONS: Critically ill patients may require lower doses of lepirudin and argatroban than usually recommended. These drugs should be started at lower doses and titrated to achieve targeted aPTT and avoid increased risk of bleeding. Appropriate diagnostic methods should be used to avoid unnecessary drug use. Platelet aggregation tests should not be used in evaluating HIT.

55. Low dose recombinant factor VIIa in trauma or coagulopathic patients

William Ogea, Pharm.D.1, Michael Regalia, Pharm.D.1, Dean Williamson, Pharm.D.1, Robert Gosselin, CLS, John Owings, M.D.1, Jeffering King, Pharm.D.1, University of California, Davis Medical Center, Sacramento, CA.

PURPOSE: Coagulopathies associated with trauma related massive hemorrhage, extensive organ damage or liver impairment causing impaired thrombin generation and thrombocytopenia resulting in continued bleeding, declining hematocrit and/or elevated INR/aPTT despite aggressive blood product transfusions can be challenging to manage. An alternative strategy for achieving hemostasis in these patients includes recombinant activated factor VIIa (rFVIIa; NOVOSEVEN). rFVIIa becomes a prohemostatic agent once bound to tissue factor released from damaged endothelium. The dose response of rFVIIa in non-hemophilic patients with continued bleeding; declining hematocrit or elevated INR/aPTT despite aggressive blood product transfusions including fresh frozen plasma (FFP) is unclear.

METHODS: An ongoing consecutive series of non-hemophilic patients receiving low dose rFVIIa (< 90µg/kg) were evaluated. rFVIIa was not dispensed until pre-administration assessment determined that adequate blood product transfusions (including FFP) or other adjunct therapies to reverse the symptomatic coagulopathy were not sufficient. Laboratory values and bleeding observations pre and post-rFVIIa were recorded.

RESULTS: After administration of < 90µg/kg rFVIIa (n=9; ~30-45 µg/kg in most cases), small vessel (field) bleeding in the traumatic injury patients rapidly reversed (within 10-15 minutes) and correction of laboratory measurements of coagulation (mean initial INR=2.5; post rFVIIa INR=1.1) was noted. Additionally, a very small dose (1.2mg rFVIIa with FFP) corrected life-threatening bleeding with concurrent warfarin (INR 5.08 to 3.93).

CONCLUSIONS: Low dose rFVIIa can rapidly reverse traumatic small vessel “field” bleeding in coagulopathies in rare occasions where traditional management using FFP or other blood products is insufficient to achieve desirable hemostasis.

56. Use of drotrecogin alfa activated in septic AIDS patients. Annette M Rowden, Pharm.D.1, The Johns Hopkins Hospital, Baltimore, M.D.

PURPOSE: Drotrecogin alfa (DA) was FDA approved for the treatment of severe sepsis in patients at high risk of death. Few patients with known HIV were included in the PROWESS trial. Advanced HIV patients (CD4 < 500µM) were excluded due to presumed high risk of death within the 28 day study period from preexisting non-sepsis related disease. AIDS patients are not excluded from The Johns Hopkins Hospital (JHH) DA guidelines. Purpose is to review outcomes of such patients at JHH.

METHODS: Electronic medical record data collection for AIDS patient receiving DA during the period December 2001–May 2004 was conducted. The following data elements were collected: last CD4; infection; organ failure(s) at therapy initiation; APACHE II score; infusion duration; complications; 28 day survival.

RESULTS: Seven AIDS patients received DA. Two patients survived. Both surviving patients had single organ failure.

Drug Information

99. Increased availability of information resources and the effects on the complexity of drug information requests asked to an academic center. Erin M. Tingpe, Pharm.D.1,2, B.C.P.S., Susan E. Moil, Pharm.D.1, University of Tennessee College of Medicine, Memphis, TN.

PURPOSE: With the increased availability of information on the Internet, we hypothesized that the number of requests asked to our Drug Information Center has decreased, while becoming more complex. Secondly, the classification of requests has also changed, since questions about general drug information are easily accessible on the Internet.

METHODS: Drug information requests from 1995–2003 were reviewed. Descriptive statistics assessing the difficulty of requests were evaluated for each year; specifically focusing on the total number of requests, time spent answering each request, the type and number of resources used to answer each request, and questions changed very little during this time period, with a decrease in the classifications of the questions changed very little during this time period, with a decrease in reference and monograph requests (10%), product identifications (5%), and content evaluation increased from 11% of the total requests to 37% (p<0.0001). The time spent on the requests requiring a literature search and content evaluation increased from 11% of the total requests to 37% (p<0.0001). The time spent on the requests requiring a literature search also increased from an average of 70 minutes to 104 minutes, however this increase was not statistically significant (P=0.064). The classifications of the questions changed very little during this time period, with a decrease in reference and monograph requests (10%), product identifications (5%), and product availability (2%).

CONCLUSIONS: The increased availability of information may be aiding healthcare professionals in answering basic drug information requests. Although a correlation analysis was not conducted, requests requiring a primary literature search and the time spent on requests significantly increased over time while the total number of requests decreased.

60. Preparation of sphingosomal vincristine is a reliable procedure at clinical pharmacies. Georgea Pascualau, M.Sc.1, Paul Johnson, Ph.D.1, Thomas P Weber, Ph.D.1, Inex Pharmaceuticals Corp., Burnaby, BC, Canada.

PURPOSE: Sphingosomal vincristine is supplied as a 3-vial kit. Prior to administration, the contents must be constituted to load vincristine into the sphingosomes. A Laboratory Study and a Field Test were conducted to assess the effect of minor variations in constitution conditions on final product quality and if the product can be reliably constituted in clinical pharmacies.

METHODS: The Laboratory Study determined the effects of deliberately varying the constitution conditions, including such key parameters as administration, the contents must be constituted to load vincristine into the sphingosomes. A Laboratory Study and a Field Test were conducted to assess the effect of minor variations in constitution conditions on final product quality and if the product can be reliably constituted in clinical pharmacies.

Published in Crit Care Med 2003;31:A432.
RESULTS: In the Laboratory Study, samples that were incubated at 60–75°C for 5–60 minutes met all the acceptance criteria. However, acceptable loading was not achieved for samples that were incubated at 55°C for 10 minutes or less. In the Field Test, all the pharmacist-prepared samples passed all acceptance criteria, with the results for free vincristine demonstrating a high degree of statistical confidence in the reliability of the loading procedure.

CONCLUSIONS: Constitution of sphingosomal vincristine from the 3-vial kit is robust with respect to minor variations in the time and temperature of incubation. The reliability of the constitution procedure in clinical pharmacies was demonstrated with a high degree of confidence.

61. Evaluation of the accuracy of health studies presented in the written media. Susannah E. Motl, Pharm.D., Erin M. Timpe, Pharm.D., BCPS, Samantha F. Eichner, Pharm.D., University of Tennessee, Memphis, TN.

PURPOSE: The public is flooded daily with media releases on new medical findings. This excessive amount of information has the potential to be miscommunicated in the media due to the volume and speed of release. The Consolidated Standards of Reporting Trials (CONSORT) guidelines direct reporting of randomized controlled trials, but there are no criteria guiding communication of this information in the media. The purpose of this project was to evaluate communication of clinical research in the media for content and accuracy.

METHODS: All media reports discussing RCTs published in two national newspapers, two news magazines, and two online news sources over three months were reviewed. The corresponding RCTs were identified and evaluated. A modified, validated form of the CONSORT guidelines was used to evaluate the reports. The main areas evaluated were content areas identified in the RCT and, if present, were evaluated in the media report. Each report was evaluated and scored by three reviewers. An average was calculated, and media reports were classified as poor, fair, or excellent.

RESULTS: From 10/1/02-12/2002, there were 60 media reports discussing results of 26 RCTs. On average, reports were categorized as fair. However, numerous content areas received poor rankings, specifically, adverse effect reporting. No content area was rated excellent.

CONCLUSIONS: This pilot project identified areas in media reports of RCTs that are often incomplete. Future goals include helping major journalism associations develop quality assurance measures for media releases on RCTs.

Education/Training

62. Validation of an experiential teaching peer assessment tool. Craig D. Cox, Pharm.D., BCPS, Bradford L. Stanford, Pharm.D., BCPS, Sara Brouse, Pharm.D., BCPS, Krystal K. Haase, Pharm.D., BCPS, Ronda L. Akins, Pharm.D., Venita L. Bowie, Pharm.D., James P. Tsokolakis, Pharm.D., Anthony J. Busti, Pharm.D., BCPS, Sachin Shah, Pharm.D., BCOP, Ronald Hall, Pharm.D., BCPS, Brian Burleson, Pharm.D., BCPS, Charles F. Seiffert, Pharm.D., FCCP, BCPS, 1(Texas)Tech University Health Science Center, Lubbock, TX, (2)Texas Tech University Health Sciences Center, VA Medical Center, 4500 South Loop, East Tarrant, Dallas, TX, (3)Texas Tech University Health Science Center, Amarillo, TX.

PURPOSE: Documentation of excellence in teaching plays a pivotal role in the promotion process of pharmacy practice faculty. Peer evaluation of didactic teaching is commonplace for schools of pharmacy. However, a validated peer teaching assessment tool for experiential teaching is not available. Previously we developed a peer assessment tool for evaluating experiential teaching (Cox CD et al. Pharmacotherapy 2003;23:1336). Herein, we describe the prospective validation of this tool for internal medicine experiential rotations.

METHODS: The assessment tool was implemented for faculty peer evaluation of clerkship rotations during the 2003–04 academic year. For validation of the tool, responses to eleven questions that appeared identically on the student and peer evaluation forms of the preceptor (n=6) and practice site (n=5) were directly compared.

RESULTS: Eight internal medicine pharmacy practice faculty utilized this evaluation form for experiential peer review. Twenty students completed evaluations of the faculty during the same rotations as the peer review. No statistically significant differences were found between student and peer evaluations for any of the eleven questions assessed. In addition, no differences between preceptor and site questions were found.

CONCLUSIONS: The validity of the form was demonstrated between student and peer evaluation of experiential rotations in our institution. Future plans involve expansion of its use to the entire pharmacy practice faculty to verify its applicability across multiple practice settings.

63. Assessing the effectiveness of a student-driven course design as a teaching method. Denise D. Hopkins, Pharm.D., University of Arkansas for Medical Sciences College of Pharmacy, Little Rock, AR.

PURPOSE: The purpose of this project was to determine if a student-driven elective course on women's health is an effective method of teaching.

METHODS: An elective course titled "Topics in Women's Health" was developed for 3rd year Pharm.D. candidates. Enrolled students selected topics to be studied (15 of 22 topics) in addition to those provided by guest lecturers (7 of 22 topics). Each student was responsible for leading the discussion of their topic one week after providing class participants with a current review article. The student facilitating the discussion also provided 10 objectives that promoted class participation as well as behaviors potential exam material. Three exams were generated from these objectives in addition to guest lecturer material. At the end of the semester, students completed a course evaluation that consisted of 14 questions.

RESULTS: Exam scores from 86% to 100% with class averages of 97(exam 1), 98(exam 2), and 94(exam 3). Thirteen of the fifteen enrolled students completed course evaluations and indicated that the class was intellectually stimulating (mean of 4.92 on a scale of 1 to 5) and enhanced their learning (mean of 3 on a scale of 1 to 5).

CONCLUSIONS: The class was effective in introducing the students to a variety of issues relating to women's health. It also provided an excellent opportunity for self-directed learning. A student-driven elective course on women's health is an effective method of teaching.

64. Teaching students to diagnose drug-induced etiology where formal consultancy is requested by prescriber. Dan Moselien, Pharm.D., Marybeth Boudreau, Pharm.D., Eastern Maine Medical Center, Bangor, ME.

PURPOSE: Evaluate student performance of symptom-based, physician-ordered pharmacology consults.

METHODS: Students from 4 Colleges of Pharmacy trained in methods to evaluate in-patients referred to clinical pharmacists by physicians. Over 2 year period, 9 students attended rounds with the original resident pharmacist, a staff, and a clinical pharmacist. Pharmacoepidemiology, drug-disease, drug-drug interaction databases including pgp, UGT, CYPIA2, reviewed in context of symptoms. Categories requested: dermal, motor weakness, syncope, neuropsychiatric, changes in bowel function or smell, gastrointestinal disorders, pain, stroke, bladder control, and memory-loss. Outcomes measured as probability of reduction in length of stay, laboratory tests, imaging, etc., and corrected for EMNC DRG average.

RESULTS: Medication side effects are sometimes missed by physicians because interactions are un-published, rare, or newly discovered. Pharmacy students trained in school to perform rule-out drug assessments, but need added skills. All 9 students taught to assess drug-induced symptoms and provide written consults in charts with suggestions for alleviating or attenuating symptoms. All students able to discover missed drug-induced symptoms/etiology without assistance by week 4. Average LOS decreased 0.7 days in student-reviewed cases. Average cost-reduction $255.00 per patient. Each student averaged 7 self-initiated interventions over 4 week period. Students had other functions.

CONCLUSIONS: Where pharmacy students are utilized to review specific patients referred to a clinical pharmacist for consult by a physician having ruled out most likely medical causes, outcomes can be positive for medical center, patient, and student. Using students can produce a reduction in patient LOS or hospitalization costs where drug-related etiologies are found.

65. Adherence to HMG coenzyme-A reductase inhibitor therapy in a north Dallas suburban area. Decarrat Seafonn, Pharm.D., Trina Ballard, Pharm.D., (1)Texas Tech University Health Sciences Center, Dallas, TX, (2)Pfizer, Inc., Frisco, TX.

PURPOSE: Medication adherence remains the cornerstone of good clinical outcomes. Lowering cholesterol is critical in reducing morbidity and mortality from coronary heart disease (CHD). Persistence to pharmaceutical treatment for hyperlipidemia is paramount for positive therapeutic responses where treatment with medication is warranted. To evaluate a pharmacy claims database as a measure of patient adherence to statin therapy. To define and identify adherence performance measures including, average days of therapy, persistence, medication possession ratio and median gap days. To design and discuss interventions to improve adherence with a patient's primary care physician.

METHODS: This was a retrospective review of 12 month pharmacy claims data for patients getting statin prescriptions filled at Community Pharmacy. All dates and patient identifiers were de-identified to assure patient confidentiality. Blinded pharmacy claims were converted to a Microsoft Access® 2000 database and imported into the Standardized Therapy Adherence Research Tool (START®) developed by Pfizer, Inc. This software was utilized to calculate all adherence performance measures.

RESULTS: The average days of therapy for all statins was less than 6 months. Terminal persistence at month 12 was 32 % regardless of product. Statin medication possession ratio was 0.84 based on average of days of therapy and average median gap calculation was 10.07 days.

CONCLUSIONS: The database demonstrates the quick and massive decline of patients having statin prescriptions refilled. Results of this data identify a significant opportunity to improve medication adherence among patrons of Community Pharmacy and ultimately improve patient outcomes.

66. Using multiple-choice test questions as a means of assessing the influence of the pharmaceutical industry on the selection of medications by medical residents. Fei Wang, M.Sc, Pharm.D., BCPS, Cunegundo M. Vergara, PHARMACOTHERAPY Volume 24, Number 10, 2004
respond breast cancer (37% vs. 27% p<0.05). Diabetes (DM) and age>65 were less likely to be associated with CVD in survey I, but identification increased after the educational intervention (DM: 74% to 94% p<0.0001, age>65: 76% to 92% p=0.0002). Seventy-five percent indicated that the informational pamphlet increased their awareness in this patient population.

70. Clinical pharmacy impact on appropriate renal dosing in an urban academic medical center. Michael J. Gonyea, B.S., Pharm.D., BCPS, Jane Lee, Pharm.D., Danielle Dalton, Pharm.D.; Northeastern University School of Pharmacy, Boston, MA

PURPOSE: To evaluate patients with renal insufficiency and assess medications requiring renal dose adjustment, assess impact and acceptance of pharmacy interventions on appropriate dosing, and calculate cost avoidance of potential adverse drug events.

METHODS: A 6 week prospective interventional study was performed. Computer generated reports of 19 pre-specified medications requiring renal adjustment identified patients. Demographic and lab data were obtained, and average values for serum creatinine were calculated. Based upon pharmacy evaluation, verbal interventions were attempted in patients requiring dosage adjustment. Three attempts were made to contact clinicians. If no response occurred, the intervention was considered rejected. Three days of additional follow-up was conducted to assess response recommendation.

RESULTS: We evaluated 292 patients, resulting in 104 renal dosing interventions. Intervention patients were older (79 vs. 66 (p<0.0001)) and more likely female (64% vs. 48% p=0.003). Interventions for antibiotics were the most common (63%), followed by meformin (12%) and furosemide (12%). Intervention resulted in a 15% increase in appropriate renal drug dosing (66.5% to 81.2% p<0.0001), with 38% of interventions accepted. The major reason for rejection was failure to renal adjust within 72 hours (38%). Other reasons included: clinician did not find adjustment necessary (23%) and lack of response (17%). An estimated 5 adverse drug reactions and 3 medication errors were prevented through intervention, accounting for savings of $429,190.

CONCLUSIONS: Pharmacy interventions increased appropriate renal dosing of medications. Education efforts to further improve renal dosage compliance to established references with a focus on follow-up is warranted.
PURPOSE: This survey was designed to approximate pharmacy resident attrition and termination rates. In addition, we sought to determine the most common circumstances behind each cause for resident loss.

METHODS: Survey recipients were primarily identified using online residency directories. Surveys were distributed to residency contact email addresses by an email-marketing firm. The survey questionnaire addressed residency demographics, rates of attrition and termination, and specific circumstances behind each resident loss reported.

RESULTS: A total of 679 email surveys were successfully delivered of which 239 email surveys were completed (35% response rate). Residency sites completing the survey reported that a total of 2,426 residents completed their residency programs between July 1999 and June 2004. During that time span, 68 residents were reported as having resigned (2.70%) and 25 residents were terminated (0.99%). The most common reasons for attrition as reported by those who withdrew were: personal or family health (23.8%), change in career paths (14.3%), and lack of competency (12.7%). In 22.2% of the withdrawals, the cause was unknown or related to other issues. Terminations commonly occurred for the following reasons: lack of competency (32%), failure to obtain licensure (32%), and unprofessional behavior (12%).

CONCLUSIONS: The low pharmacy residency attrition rate of 2.7% over the last five years is encouraging. Most attrition-related losses were related to issues beyond the control of the residency program. Although the overall termination rate was low; they were most commonly related to competency issues; thus pharmacy education may not be adequately preparing students for residency training.

74. Evaluation of the accuracy of multiple-choice questions in testing students’ understanding of complex concepts. Reza Taheri, Pharm.D.; Loma Linda University, 11262 Campus Street, Loma Linda, CA.

PURPOSE: To evaluate the success of multiple choice questions in assessing students’ ability to analyze and apply knowledge.

METHODS: Students in the second year of a Pharm.D. Curriculum completed a case based, multiple-choice (MC) examination. Immediately following the written exam, an oral interview was conducted during which students were to provide rationale for their responses to three pre-selected higher-level questions requiring analysis and evaluation of data. The oral interview responses were compared with the response in the written exam using a Wilcoxon Signed Ranks Test.

RESULTS: The entire class, 92 students, completed the study. The individuals who had chosen the correct response in the written exam but could not justify a plausible rationale in the oral exam amounted to 26 on question #1 (p<0.001), 29 on question #2 (p<0.001), 62 on question #3 (p<0.001).

CONCLUSIONS: The lack of correlation between multiple-choice responses and their justification in an oral defense, demonstrates the inadequacy of multiple-choice questions in assessing students’ ability to apply, analyze and synthesize knowledge in a complex question. The results suggest that multiple-choice questions may over-estimate students understanding of complex concepts.

Table 1: Analysis of Question #1

<table>
<thead>
<tr>
<th></th>
<th>Correct Justification</th>
<th>Incorrect Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>Correct Answer</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Incorrect Answer</td>
<td>26</td>
</tr>
<tr>
<td>Incorrect Answer</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

Table 2: Analysis of Question #2

<table>
<thead>
<tr>
<th></th>
<th>Correct Justification</th>
<th>Incorrect Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>Correct Answer</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Incorrect Answer</td>
<td>29</td>
</tr>
<tr>
<td>Incorrect Answer</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Table 3: Analysis of Question #3

<table>
<thead>
<tr>
<th></th>
<th>Correct Justification</th>
<th>Incorrect Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>Correct Answer</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Incorrect Answer</td>
<td>62</td>
</tr>
<tr>
<td>Incorrect Answer</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

75. Assessment of pharmacists’ perceptions of psychiatric medications and illnesses. Kellely E. Fadley, Pharm.D., BCPS; J. Michal McGuire, Pharm.D., BCPS; Leigh Anne Nelson, Pharm.D., BCPS; (1)St. Louis College of Pharmacy, St. Louis, MO; (2)Bristol-Myers Squibb Company; St. Louis, MO; (3)Bristol-Myers Squibb Company; Kansas City, MO.

PURPOSE: This study evaluated pharmacists’ knowledge of psychiatric medications and comfort level with psychiatric drug therapy counseling. Associations with training in psychiatric therapeutics were examined.

METHODS: A survey assessed pharmacists’ self-reported knowledge of medications (psychiatric versus non-psychiatric) and comfort level with drug therapy counseling (psychiatric versus non-psychiatric illnesses). Subjects rated their knowledge of 16 medications from 1 to 5 (1=excellent; 5=needs improvement). Comfort level of counseling for 10 illnesses ranged from 1 to 3 (1=very comfortable; 3=uncomfortable). Academic preparation in psychiatric therapeutics was also reported. This anonymous survey was mailed to 1000 randomly selected community and hospital pharmacists.

RESULTS: Pharmacists (N = 182) rated their knowledge of non-psychiatric medications higher than their knowledge of standard psychiatric medications. They also rated their knowledge of non-psychiatric and standard psychiatric medications higher than their knowledge of newer psychiatric medications. With regard to drug therapy counseling, pharmacists rated their comfort level higher for non-psychiatric than psychiatric illnesses. Continuous education (CE) hours on psychiatric topics in the previous 12 months moderated these effects: pharmacists with more than 4 CE hours indicated greater knowledge/confidence regarding psychiatric medications/illnesses than pharmacists with < 4 CE hours. No interactions or main effects were found with regard to time devoted to psychiatric therapeutics in pharmacy school, post-graduate training, gender, age, or years since graduation.

CONCLUSIONS: Pharmacists rated knowledge of psychiatric medications as less adequate compared to knowledge of non-psychiatric illnesses. Pharmacists were less comfortable counseling on drug therapy for psychiatric illnesses than non-psychiatric illnesses. CE hours on psychiatric topics reduced these differences.

76. Evaluating preparedness for clinical rotations: a pilot study of senior pharmacy students. Shirley M. Hogan, Pharm.D., Holly Moore, Pharm.D., BCPP, Lisa Murphy, Pharm.D., BCPP, Carter Haines, Pharm.D., Billy Brown, Pharm.D.; University of MS School of Pharmacy-Department of Pharmacy Practice, Jackson, MS.

PURPOSE: The purpose of this study was to evaluate students’ assessment of their preparedness for rotations after completing the University of Mississippi School of Pharmacy problem based learning (PBL) curriculum during the third professional year. This information serves as baseline data for future surveys and in continuous program improvement.

METHODS: Survey questions were developed utilizing the group performance evaluation tool. Participants were to rate the adequacy of their preparation in knowledge, self-directed learning, and clinical reasoning on a 1–5 scale with 1 = very well and 5 = very poorly. The survey was administered to graduating pharmacy students in May 2004.

RESULTS: Sixty-nine of 79 students (87%) completed a survey. Greater than 50% reported PBL prepared them to perform well or very well in retrieving medical information (75%), discussing disease states and drug therapies at the basic science level (64%), evaluating regimen appropriateness based on patient problems (56%), and identifying drug interactions (53%) and therapeutic monitoring problems (53%). Fifty percent or more reported only somewhat or poor preparation to accurately performing calculations (68%), incorporating knowledge from various disciplines (59%), and evaluating regimen appropriateness based on characteristics of agents within a class (50%). Students reported very poor preparedness to identify and utilize drug assistance programs (35%) and process a prescription/hospital order to dispense medications (38%).

CONCLUSIONS: Graduating students report PBL effectively prepares them for rotations in a variety of areas. However, areas in need of further evaluation have been identified and will be addressed in future research initiatives.

77. Impact of a diabetes educational program on state health plan members knowledge of diabetes self-management. Sharmi Steadman, Pharm.D., BCPP, BCPS, CDE; Tim Mullinenix, Pharm.D., M.S.; (1)USC Department of Family and Preventive Medicine, Columbia, SC; (2)Pfizer Inc, Irving, SC.

PURPOSE: To determine whether an interactive pharmacist directed patient education diabetes program on diabetes results in improved knowledge of diabetes self-management for members of a State Health Plan.

METHODS: This prospective study consists of the following two components: 1) an interactive patient education program targeted at plan members with diabetes; and 2) a comparison of participant knowledge of diabetes self-management practices prior to and one month following the above educational program. The participants’ diabetes knowledge was measured utilizing “The Diabetes Knowledge Test” from the Michigan Diabetes Research and Training Center.

RESULTS: There were 40 participants in the study group who attended the educational intervention and completed the initial baseline survey. After the intervention, participants were mailed a follow-up test to complete and 15 tests were returned representing a 38% response rate. The average age for the baseline and follow-up respondents were 60 (22 to 82) and 61 (45 to 72), respectively. 75% of the baseline respondents were female and 25% male, versus 87% females and 13% males in the follow-up respondents. The baseline average percent correct was 61.4% and ranged from 8.7% to 91.3%. The percent correct 70% and above for the 11 survey components was 66.7%. The difference between the percent correct baseline and the post test evaluation was significantly different using a 2-sample t-test with p=0.04 (CI -17.7, -0.3).

CONCLUSIONS: Baseline diabetes knowledge scores for state health plan members with diabetes were generally low. Members knowledge measured one month following an pharmacist directed educational intervention resulted in significantly improved scores.

78. Assessment of third year pharmacy students’ attitudes and abilities in evidence-based medicine (EBM). Timothy E. Welty, Pharm.D., Paula A Thompson, Pharm.D., M.S.; Michael G Kendrack, Pharm.D., Jennifer W Brall, and
PURPOSE: This study evaluated whether cardiovascular risk factor self-assessment and measurement of these risk factors would influence behavior. More than 50% denied knowing their lipid panel or FBG. Mean factor improvement and disease prevention should be the top priority of Caucasian) had complete follow-up data. At baseline, 98.7% agreed that risk assessment and measurement of these risk factors would influence behavior.

METHODS: In Fall 2003, fifth-year Pharm.D. students reported their coronary heart disease (CHD) risk factors and perceptions of these risk factors via a questionnaire. Fasting lipid panel [total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides] and fasting blood glucose (FBG) were measured using the Cholesterol LX20®; blood pressure (BP) was also measured, covering EBM principles. Attitudes toward and competencies in EBM were assessed using a standardized tool published in literature. Assessments were on the first day of Therapeutics, before the two-day lecture on drug information, at the end of the first semester, and at the end of the year.

RESULTS: Competency in EBM terminology increased over the year. When comparing attitudes toward the value of EBM skills to future practice, perceived usefulness of developing a clinical question decreased from 65.5% to 54.6%. However, perceived value of EBM instruction to future practice increased from 58.6% to 75.9%. Other attitudinal responses decreased from September to December then increased from December to May. Students had fewer correct responses to objective questions related to EBM in May compared to September or December assessments.

CONCLUSIONS: The perceived value of EBM in students’ future work increased over the year, as did understanding of terminology. The decrease in competency contradicts data from assessments in the drug literature evaluation course, and may be due to timing of the administration of the final assessment.


PURPOSE: This study evaluated whether cardiovascular risk factor self-assessment and measurement of these risk factors would influence behavior among fifth-year Pharm.D. students.

METHODS: In Fall 2003, fifth-year Pharm.D. students reported their coronary heart disease (CHD) risk factors and perceptions of these risk factors via a questionnaire. Fasting lipid panel [total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides] and fasting blood glucose (FBG) were measured using the Cholesterol LX20®; blood pressure (BP) was also measured, covering EBM principles. Attitudes toward and competencies in EBM were assessed using a standardized tool published in literature. Assessments were on the first day of Therapeutics, before the two-day lecture on drug information, at the end of the first semester, and at the end of the year.

RESULTS: Competency in EBM terminology increased over the year. When comparing attitudes toward the value of EBM skills to future practice, perceived usefulness of developing a clinical question decreased from 65.5% to 54.6%. However, perceived value of EBM instruction to future practice increased from 58.6% to 75.9%. Other attitudinal responses decreased from September to December then increased from December to May. Students had fewer correct responses to objective questions related to EBM in May compared to September or December assessments.

CONCLUSIONS: The perceived value of EBM in students’ future work increased over the year, as did understanding of terminology. The decrease in competency contradicts data from assessments in the drug literature evaluation course, and may be due to timing of the administration of the final assessment.
Veterans Affairs Medical Center

METHODS: Screening bone mineral density (BMD) measurements were obtained through quantitative ultrasound of the heel of the dominant foot during regular home visits by a member of HBPC team to identify patients with osteopenia (T score < -1.25) or osteoporosis (T score < -2.5). Medical records were reviewed to assess disease states and medications associated with osteoporosis. A binary logistic regression model was used to identify significant risk factors for osteoporosis/osteopenia. Patients with a T score < -2 will be referred for dual energy x-ray absorptiometry (DXA) to confirm the diagnosis of osteoporosis.

RESULTS: BMD screening was completed in 74 patients (mean age = 75.2 years). The mean T score was -1.47 ± 1.28 (range = -3.9 - 1.2). Based on heel ultrasound results, 28 patients (37.8%) and 19 patients (25.7%) met the diagnostic criteria for osteopenia and osteoporosis, respectively. The mean number of medications (p = 0.71) and disease states (p = 0.86) associated with bone loss was similar in patients with and without osteopenia/osteoporosis. The presence of osteoporosis/osteopenia could not be predicted by a specific disease state or medication that has been associated with bone loss.

CONCLUSIONS: Osteopenia/osteoporosis was revealed in 63.5% of men in the HBPC program who underwent quantitative ultrasound screening for low BMD. BMD screening in elderly men resulted in a substantial number of referrals for DXA.

85. Barriers to medication adherence in poorly-controlled diabetes mellitus.

Peggy Ogledor, Pharm.D., M.S., BCPS; (1)University of Washington, School of Pharmacy, Seattle, WA.

PURPOSE: Limited information is available about medication adherence barriers in Diabetes Mellitus (DM). The primary objectives were to 1) describe potential barriers to DM medication adherence, and 2) examine if adherence barriers are associated with A1c.

METHODS: As part of a randomized, multi-clinic, controlled, intervention trial, 32 medication adherence factors and the influence of these factors on A1c were assessed. Bivariate linear regression was used to correlate each adherence variable independently with baseline A1c. Multivariate regression for significant variables (p<0.05 in bivariate analysis) was used to examine the correlation with A1c.

RESULTS: Seventy-seven subjects (mean 52 years old, 7 years DM, 1.9 DM medications, 6.5 total medications, 44% women, 80% high school education) enrolled with A1c ≥ 7.5%. At baseline, 45% of subjects were using insulin. The mean new DM medications, 38% had side effects, 30% were not monitoring home blood glucose, 24% were not taking DM medications as prescribed, 17% were taking >2 doses daily, and 6.5% did not believe adherence was important. Subjects reported difficulty with paying for medications (34%), remembering when to take medications (27%), finding time to take medications (25%), and difficulty interpreting medication labels (12%). Difficulty reading the label (p = 0.04) and taking >2 doses daily (p = 0.02) correlated with poorer diabetes control at baseline (A1c mean 0.8 higher).

CONCLUSIONS: Ability to read the prescription label and taking more than 2 doses of DM medications daily correlated with worse A1c. Risk modification may facilitate A1c improvement in those with poor control.

Gastroenterology

86. Safety and tolerability of the reformulated pantoprazole for injection compared with the original formulation in healthy adult subjects. Brinda K Tammana, Ph.D, Kathy Weisel, R.N., BSN, Gayle Orczyk, M.D., Ph.D, Meng Xu, Ph.D; Wyeth Research, Collegeville, PA.

PURPOSE: To evaluate the safety and tolerability of the new IV pantoprazole formulation, containing a small amount of EDTA, which eliminates the requirement of the in-line filter by the original formulation.

METHODS: This was a single-blind, randomized, parallel group study in 53 men and women aged 18 to 74 years. Subjects were randomly assigned to receive the new formulation or the original formulation, 80 mg every 8 hours for 7 days. Safety evaluations included: serum alanine aminotransferase, total bilirubin, direct bilirubin, and magnesium, and urine albumin levels, serum creatinine, uric acid, and sodium levels. Subjects were followed for 30 days post-dosing for safety evaluations.

RESULTS: There were no clinically significant changes from baseline for any safety parameter measured. All 53 patients completed the study.

CONCLUSIONS: The new formulation of IV pantoprazole can be administered without an in-line filter as safely as the original formulation with an in-line filter.

87. Effect of a ginger extract on acute and chronic inflammation in Mongolian gerbils.

Gail B. Mahady, Ph.D.; Susan L. Pendland, Pharm. D.; Dawn Israel, Ph.D.; (1)University of Illinois at Chicago, Chicago, IL; (2)Vanderbilt University, Nashville, TN.

PURPOSE: This study determined the effect of a standardized ginger extract on acute and chronic inflammation induced by infection with Helicobacter pylori.

METHODS: A ginger extract was administered in a rodent model of H. pylori-induced disease, the Mongolian gerbil, to examine the effects of extract on both prevention and eradication of infection. The animals were administered 100 mg/kg body weight/day of the ginger extract in rations every 3 weeks prior to infection and treated for a further six weeks post-infection. Bacterial load and acute and chronic levels of inflammation were assessed four weeks after treatment.

RESULTS: As compared with controls, a significant reduction in bacterial load, as well as chronic and acute inflammation scores was observed in gerbils treated with the ginger extract (containing 6-, 8-, 10-gingerols and 6-shogaol, in a ratio of 7.5:1:13:2% w/w) and these changes were paralleled by reductions in the severity of epithelial cell degeneration and erosion. Importantly, the extract did not increase morbidity or mortality. Treatment with the standardized HP load as compared with controls and significantly (P<0.05) reduced both acute and chronic mucosal and submucosal inflammation, cryptitis, as well as epithelial cell degeneration and erosion induced by HP.

CONCLUSIONS: Ginger extracts reduce bacterial load, and reduced both acute and chronic inflammation in HP-infected Mongolian gerbils.

88. Intestinal and hepatic P-glycoprotein expression is preserved in mice receiving parenteral nutrition.

Gordon S. Sacks, Pharm.D., B.S.; Brien L. Neudeck, Pharm.D., Jennifer M. Loeb, B.S.; The University of Wisconsin - Madison, Madison, WI.

PURPOSE: Parenteral nutrition (PN) administration has been associated with mucosal atrophy, bacterial overgrowth, and increased intestinal permeability. We hypothesized that PN in mice would alter intestinal and hepatic P-glycoprotein (P-gp) expression and influence drug transport and metabolism.

METHODS: Male ICR mice underwent cannulation with intravenous catheters with ad libitum access to chow and water for 48 hours. On postoperative day 3, animals were randomized to PN or chow for 5 days. After their respective diets, mice were sacrificed and P-gp amounts determined from intestinal scrapings and liver homogenates using Western immunoblotting and densitometry. Intestinal P-gp function was determined with a vitro transport of 20 mg/ml digoxin across an isolated intestinal mucosa (terminal ileum) over 20 minutes. Trace amounts of 14C-PEG4000 were added to the buffer to monitor segment permeability.

RESULTS: No differences in amount of intestinal or hepatic P-gp were detected between chow-fed and PN mice (Intestine: 381 ± 61 vs 391 ± 59 arbitrary units; Liver: 1110 ± 291 vs 1164 ± 287 arbitrary units, p>0.05). Likewise, there were no differences in the mucosal to serosal transport of 3H-digoxin in chow vs PN-fed mice (0.0445 ± 0.020 vs 0.0880 ± 0.043 pg/cm/cm, p<0.05).

CONCLUSIONS: Many patients receiving PN continue taking oral medications that may be P-gp substrates and therefore knowledge concerning P-gp expression and function is important. Both intestinal and hepatic P-gp appear to be preserved in mice after 5 days of PN. Moreover, P-gp mediated transport of digoxin was unchanged compared to chow-fed mice.

89E. Comparative observed healing rates of gastric ulcers with esomeprazole versus ranitidine in patients taking either continuous COX2-selective or nonselective NSAIDs. Jay L. Goldstein, M.D.; John Johanson, M.D.; Lisa Suchower, MA, David R. Rutledge, Pharm.D., FCCP; Douglas S. Levine, M.D.; (1)University of Illinois at Chicago, Chicago, IL; (2)Rockford Gastroenterology Association, Rockford, IL; (3)AstraZeneca LP, Wilmington, DE; (4)AstraZeneca LP, Naperville, IL.

Published in Gastroenterology 2004;126(4 suppl 2):A610.

90. Rebleeding in patients admitted for gastrointestinal bleeding from peptic ulcer. JK Stepler, Pharm.D., C. Mahtora, Pharm.D, P Sellers, Pharm.D., D Lin, Pharm.D., M Rojany, M.D., JW Leung, M.D.; UC Davis Medical Center, Sacramento, CA.

PURPOSE: Recurrence of bleeding in patients admitted for peptic ulcer bleeding(PUB) is reduced by endoscopic intervention(EI) and intravenous proton pump inhibitors(PPIs). We surveyed rebleeding (RB) in patients admitted for PUB.

METHODS: Inpatients endoscoped for PUB from Jan 2001–Dec 2003 qualified. All received EI (heater probe, epinephrine injection, and/or clips). All lesions were oozing blood(OZ), had a visible blood vessel(V), and/or an adherent clot (AC). After EI, patients were followed till discharge. Primary endpoint was RB. Secondary endpoints included mortality, and length of hospital stay. Acid suppressant treatment after endoscopy was recorded. Statistic were done using Minitab with significance being p<0.05.

RESULTS: Of 78 patients, 53 (68%) were ≥ 50 years of age and 35 (45%) were ≥ 70 years of age. Lesions included duodenal ulcer 53, gastric ulcer 34, and gastritis 12. No adverse events indicative of trace metal deficiency were observed. The new formulation of IV pantoprazole can be administered without an in-line filter as safely as the original formulation with an in-line filter.

P-glycoprotein is preserved in mice receiving parenteral nutrition.

Aging and chronic inflammation were observed in Mongolian gerbils.

No adverse events indicative of trace metal deficiency were observed.
There were 28 AC, 38 VV, and 32 OZ. Several patients had >1 lesion and endoscopic findings. Therapy following endoscopy was IV H2RA 39 and oral PPI 39. No IV PPIs were used. There were 6 RRs(7.8%) of those 4(12.8%) received IV H2RA, 2.13%(received ppi(=0.34 Fisher exact). Length of stay was 8.1±10 days. 3 patients expired. Using logistic regression, AC was the only active ingredient that predicted a more frequent re-bleeding rate (RR:12.8;95%CI:1.5-11.2;p=0.02).

CONCLUSIONS: We demonstrate a RB <10% for PB following EI. The RB rate noted in the patients on IV H2RAs is lower than reported recent studies from Asia but similar to that reported in the ranitidine arm of the IV pantoprazole v ranitidine European PUB trial(11.1%)(abstract:Barkun J et al. Gastroenterol;4/04).

92. Antimicrobial therapy in patients with variceal hemorrhage. Kerry Wilbur, B.Sc.Pharm, Pharm.D.1, Kiran Sidhu, B.Sc.Pharm.2; (1)Vancouver General Hospital, Vancouver, BC, Canada; (2)Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC.

PURPOSE: Acute variceal hemorrhage is a serious complication of liver disease and hospital outcome is closely related to infection. Patients with cirrhosis are at greater risk of developing bacterial infection which is associated with failure to control bleeding and higher rates of hospital mortality. Many clinical practice guidelines endorse antimicrobial prophylaxis as standard of care for cirrhotic patients. This study was performed to characterize use of antimicrobial therapy for patients hospitalized with acute variceal hemorrhage.

METHODS: Medical records of 106 patients hospitalized with suspected variceal hemorrhage at a Canadian tertiary care hospital between January 2001 and September 2003 were retrospectively reviewed.

RESULTS: Only half of patients were prescribed antimicrobial therapy at any time during their hospital admission. Those who received antibiotics had more severe liver disease (MELD score 19.6 ± 9.9 vs 12.8 ± 7.8, p<0.05), Child-Pugh C score 78% vs 20%, p<0.05) and clinical or microbiological findings of infection. They also had worse in-hospital outcome (length of stay 20 vs 6.5 days, p<0.05; and mortality 30.5% vs 4.2%, p<0.05). Urinary tract infections (3%) and primary bacteremia (1.5%) caused by gram negative and gram positive organisms, respectively, were most prevalent. Fluoroquinolones were the most widely prescribed agents (47%), followed by cephalosporins (45%).

CONCLUSIONS: Patients with liver disease admitted with variceal hemorrhage were often not prescribed antimicrobial therapy to reduce risk of bacterial infection. Our results imply published practice guidelines are not being consistently observed and offer an opportunity for pharmacists to optimize antimicrobial drug therapy in this high risk population.

93. Pharmacotherapeutic prophylaxis for patients with variceal hemorrhage. Kerry Wilbur, B.Sc.Pharm, Pharm.D.1, Kiran Sidhu, B.Sc.Pharm; (1)Vancouver General Hospital, Vancouver, BC, Canada; (2)Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC.

PURPOSE: Variceal hemorrhage is a frequent and severe complication of portal hypertension due to liver disease. Up to a third of initial episodes are fatal and as many as 70% of survivors have recurrent bleeding within one year. Beta blocker therapy has been demonstrated to decrease risk of first episode of variceal hemorrhage (primary prophylaxis) and recurrent bleeding and mortality in patients with history of prior variceal hemorrhage (secondary prophylaxis). This study was performed to characterize beta blocker therapy for the primary and secondary prevention of variceal hemorrhage.

METHODS: Medical records of 106 patients with liver disease hospitalized with suspected variceal hemorrhage at a Canadian tertiary care hospital between January 2001 and September 2003 were retrospectively reviewed.

RESULTS: Approximately half of patients had varices, 44 (41.5%) of whom had experienced prior variceal hemorrhage. Only 21 (20%) were receiving beta blocker therapy at admission (73% vs 41%, p=0.04). Although more patients with history of >2 variceal hemorrhages were receiving beta blocker therapy at admission (73% vs 41%, p=0.04).

CONCLUSIONS: Patients with liver disease and evidence of varices were not often receiving beta blocker therapy to reduce risk of first or subsequent variceal hemorrhage. Opportunity exists to optimize use of this proven prophylactic treatment and bridge an apparent gap in standard of care.

94. Paradoxical effect of berberine on listeria monocytogenes invasion in Caco-2 cells. Brien L. Neudeck, Pharm., D.1, Jennifer M. Loeb, B.S.S.2, Nancy G. Faith, B.S.S.2, Charles J. Czuprynski, Ph.D.2; (1)University of Tennessee College of Pharmacy, Memphis, TN; (2)Pierce Biotechnology, Rockford, IL; (3)University of Wisconsin Center of Pharmacy, Madison, WI.

PURPOSE: To determine if prophylactic berberine could protect Caco-2 cells from invasion by the foodborne pathogen Listeria monocytogenes (LM) infection.

METHODS: Caco-2 cells were incubated with 10^3, 10^4, or 10^5 of LM for 1 hour and intracellular bacteria quantified. One or four days prior to LM addition, cells were incubated with berberine 3.2 pM or media (n=6 per condition). LM attachment ELISAs were performed with 10^7 organisms (n=16 per condition). P-glycoprotein expression and function was measured using real-time PCR and 3H-digoxin uptake assays since berberine may be a P-glycoprotein substrate.

RESULTS: One day of berberine pre-treatment significantly decreased LM invasion whereas a 4d pre-incubation had no effect (control vs 1d vs 4d: 10^7: 1.53±0.23 vs 0.91±0.42 vs 1.30±0.35; 10^4: 2.9±0.2 vs 2.2±0.15 vs 2.6±0.5; 10^3: 3.57±0.22 vs 3.03±0.24 vs 3.76±0.15; 10^2: 4.86±0.17 vs 3.43±0.18 vs 4.6±0.12; p=0.05 for control vs 1d only). No difference in LM attachment was detected (control vs 1d vs 4d: 1.75±0.23 vs 1.82±0.92±0.4 D.O.). Moreover, 1 or 4 of berberine treatment had no effect on P-glycoprotein expression (0.05±0.02 vs 0.78±0.015 vs 0.74±0.02 AU) or function (digoxin uptake: control vs 1d vs 4d: 146±81±16 vs 146±85 vs 153±16±08 CPM).

CONCLUSIONS: Acute berberine treatment results in a protective effect on LM invasion whereas a 4d incubation had no effect. Berberine did not modulate P-glycoprotein and therefore other mechanisms for protection must be explored.

95. Protective effect of the pluronic block copolymer P85 against listeria monocytogenes infections. Brien L. Neudeck, Pharm., D., Nancy G. Faith, B.S.S., Charles J. Czuprynski, Ph., D., 1,University of Tennessee College of Pharmacy, Memphis, TN; (2)University of Wisconsin School of Veterinary Medicine, Madison, WI.

PURPOSE: Listeria monocytogenes (LM) is a foodborne pathogen that causes considerable morbidity and mortality. Compounds that could protect individuals are a major research interest. This study evaluated P85 as a protective agent against LM.

METHODS: Caco-2 cells and FVB mice were employed. Caco-2 cells were treated with 0.1% P85 or media for 45 minutes prior to 10^7 LM addition (n=6 per condition). To test if differences were due to ATP depletion, ATP (50µM) was added to P85. As a control, cells were treated with (150µM) sodium azide/50µM 2-deoxy-D-glucose (SA2DG) to deplete ATP After 1 hour, viable intracellular bacteria were quantified. Mice received P85 (150mg/kg) or water via oral gavage, 45 minutes prior to intragastric challenge of 10^7 LM (n=8 per group). Mice were euthanized 24 hours later and the liver and spleen harvested to determine LM load.

RESULTS: Pretreatment of Caco-2 cells with 0.1% P85 led to significantly decreased invasion compared to control (3.86 ± 0.06 vs 4.04 ± 0.09 CFU/ml lystate; p<0.002). Supplementation with ATP had no effect. However, SA2DG did protect cells versus controls (2.75 ± 0.37 vs 3.13 ± 0.16 CFU/ml lystate). Compared to controls, P85-treated mice had significantly fewer organisms in the spleen (0.95 ± 0.01 ± 3.60 ± 0.31 CFU/g tissue; p<0.029). No difference was detected in the liver (1.26 ± 0.61 ± 0.93 ± 0.01 CFU/g tissue; p=0.05).

CONCLUSIONS: Pretreatment of Caco-2 cells and mice with P85 led to significantly decreased invasion of LM compared to controls. Further study of P85 is therefore warranted.

Geriatrics

96. Fundamental reading process decline in community dwelling elders. Cynthia Raehl, Pharm.D., CA Bond, Pharm.D, Tresa Woods, M.S., Roland Payt, D. PH., Lynn Bickley, M.D.; Texas Tech University Health Sciences Center School of Pharmacy, Amarillo, TX.

PURPOSE: Evaluate the fundamental reading process skill in elders using a computerized infrared eye recording system and its association with a previously validated health literacy measure used to assess ability to comply with medication regimens.

METHODS: Subjects aged 65 or greater; eye movement recordings were generated by Visagraph II system.

RESULTS: Sixty-one volunteers mean age 73.92 years, 90% Caucasian, 67% females, 12.41 ± 3.11 years schooling completed this study. Subjects were high functioning (clock drawing 13.44 ± 1.69). Most respondents managed their own medications (98%) and 64% lived alone. Overall, study participants were functionally health literate (S-TOPHLA 30.38 ± 6.08). Oculomotor outcomes included: left eye fixations (no. of eye pauses per 100 words) 124 ± 57.62 ± 57.2; right eye fixations 122 ± 56.41 ± 56.2; left eye regressions (no. reverse eye movements per 100 words) 19.46 ± 14.32, and right eye regressions 22.41 ± 16.24. When compared to norms for non-elders, fixations increased 30%, regressions increased 40% and reading rate (words/minute with comprehension 70%) declined 24%. Although more than half of the elders earned a high school diploma, computed reading grade level was only at a fifth grade level (5.30 ± ± 1.71). Multiple regression analysis revealed that performance on the health literacy test (S-TOPHLA) and the computed reading level were the strongest predictors for predicting reading ability.

CONCLUSIONS: The ability to read and comprehend medication regimen instructions may be limited by age related changes in the fundamental reading processes independent of cognitive status and other known confounders of measured health literacy.
97. Effect of antidepressants on cognition in Alzheimer's disease. Joshua Caballero, Pharm.D.1, Michael Hitchcock, B.S.1, Douglas Scharre, M.D.2, David Boversdorf, M.D.1, Milap C Nahata, Pharm.D.1. (1)The Ohio State University, College of Pharmacy, Columbus, OH; (2)The Ohio State University, Department of Neurology, Columbus, OH.

PURPOSE: Approximately 45% of the 4 million Americans with Alzheimer’s disease (AD) may develop depression. It is unknown if cognition in depressed patients with AD declines faster than those not depressed. Antidepressants are used to treat depression in this population. Therefore, the objective of the study was to evaluate the efficacy of antidepressant therapy on cognition in patients with AD.

METHODS: Data for a minimum of nine months were retrospectively collected from patients with AD receiving cholinesterase (ChE) inhibitors. Demographic information included age, gender, medication regimens, and Mini Mental State Exam scores (MMSE). A minimum sample of 96 patients was calculated to provide sufficient power. Data were analyzed to compare patients with AD taking antidepressant therapy and those not receiving antidepressants using chi square and analysis of covariance (p-value < 0.05).

RESULTS: One hundred patients (72% female) of 274 met our criteria. Fifty-one patients were prescribed an antidepressant. Sertraline (n=24) and citalopram (n=23) were the most commonly prescribed antidepressants at an average daily dose of 86 mg and 35 mg, respectively. The baseline mean MMSE score was 15.77 ± 1.07 with an average annual rate of cognitive decline of 2.0 ± 0.47. The percentage receiving antidepressants compared to 16.59 ± 0.90 (p=NS) and 2.44 ± 0.41 (p=NS) for those not taking antidepressants.

CONCLUSIONS: The incidence of depression in our population was similar to previous studies. Depression is known to cause cognitive difficulties. Our data indicates the rate of cognitive decline was no different between either group, suggesting antidepressants are not contributing to cognitive decline.

98. Comparison of two methods to identify elderly patients at risk for medication related problems in a primary care setting. Joanna L. Noh, Pharm.D.1, Theresa R. Prosser, Pharm.D.2. (1)Pharmacy Care Associates, Cedar Rapids, IA; (2)St. Louis College of Pharmacy, St. Louis, MO.

PURPOSE: Pharmacists need to efficiently identify elderly patients who may benefit from pharmaceutical care services. In our primary care clinic for uninsured patients, we perform a medical record screen (MRS) to identify patients to receive pharmaceutical care services. We compared MRS to a validated patient administered questionnaire (Barenholz-Levy Medication Use Questionnaire (BLQ)) for identifying elderly at risk for medication related problems (MRP).

METHODS: Medical records of all subjects over 65 were screened. Per BLQ protocol, subjects on < 2 medications or unable to complete the BLQ were prospectively excluded. “At risk” for MRP is defined as > 2 “yes” responses on the 10 item BLQ (“BLQ+”). Subjects with diabetes, asthma/COPD or specified cardiovascular diseases were classified as “MRS+.” Risk status of each subject by the two methods was compared.

RESULTS: Of 96 records screened, 88 subjects were eligible and 74 BLQs were completed (7 could not complete and 7 declined). Sixty subjects were classified as “BLQ+” and 53 “MRS+.” The results of the two methods concurred in 85% of subjects (51 subjects “at risk” and 12 subjects not “at risk”). The BLQ identified 9 additional “at risk” subjects.

CONCLUSIONS: The advantage of MRS in this setting is that all elderly could be screened for MRP. In contrast, not all elderly will complete the BLQ, but they may better identify risk for MRP. Use of the BLQ in elderly who are not MRS+ would likely identify more elderly at risk for MRP and who may benefit from pharmaceutical care services.


100. Ethnicity and calcium absorption and vitamin D seasonal changes. Mary Beth O’Connell, Pharm.D.1, Tiffany Czili, Pharm.D., Candidate1, Steve A. Abrams, M.D.2, Michael Kleerupker, M.D.3. (1)Wayne State University, College of Pharmacy and Health Sciences, Detroit, MI; (2)USDA/ARS Children’s Nutrition Research Center and Baylor College of Medicine, Houston, TX; (3)Wayne State University, School of Medicine and Detroit Medical Center, Detroit, MI.

PURPOSE: To determine if ethnicity influenced calcium absorption and vitamin D seasonal changes in Black and White senior women.

METHODS: Senior women, with normal GI function and no interfering drugs or diseases, ingested at least 1200 mg calcium (OxCal, Tums, diet) and 650 units vitamin D supplements daily. After fasting, each woman received 1.2 g (ar) Ca as CaGl intravenously and 1.2 g (ar) Ca as buttered toast. Thermal ionization mass spectrometry was used for sample analysis. Fractional calcium absorption (CaF) was calculated as the relative enrichment of the Ca vs. the Ca in the 24-hour urine. SPPS was used for statistical analysis.

RESULTS: Thirteen Blacks and 14 Whites with similar demographics completed the study. Because of diet changes, the expected seasonal CaF(OD) drop was not seen. Primary outcomes [mean±SD] were (CaF (%) within group).

Caf Fall (%) CaF Spring Change
Blacks 13.8±6.4 20.1±1.23 -6.3±1.93 21.9±9.7 25.1±9.5 -3.2±3.6
Whites 13.2±4.9 26.8±1.51 -11.5±1.57 24±6.9 28±1.7±8.4 -4.1±4.9

No difference for any primary outcome or demographic variable existed between ethnic groups. In Blacks but not in Whites for the total sample, a relationship between vitamin D concentration and CaF existed (y = -0.432 ±S 25[OD] & 54.2, P = 0.017, r = 4.0). CONCLUSIONS: Ethnicity wasn’t found to influence responses to seasonal calcium absorption, however, the sample was small and vitamin D did not drop throughout the winter.


PURPOSE: This study looked in the usage patterns of CIM in nursing home residents with Alzheimer’s dementia with special emphasis on indication, monitoring of Mini Mental Status Examination (MMSE) as efficacy parameter and tolerability of medications by the residents.

METHODS: Charts of residents on CIM were retrospectively reviewed. Demographic data such as age, sex, race and current medications were collected. MMSE results were used as a quantitative measure of disease progression. Clinician notes, nursing notes, and minimum data sheets (MDS) were also evaluated.

RESULTS: There were sixty two residents on CIM therapies. Ten (16.1%) residents had baseline and follow up MMSE done, twenty-four (38.7%) had baseline MMSEs only, and sixty-seven (53.7%) had MMSE only after the initiation of therapy. Twenty-two residents (35.5%) had no record of ever having a MMSE done. Ten residents given pre and post treatment MMSEs were analyzed separately. Mean MMSE scores at pre and post treatment were 19.6 and 16.4 respectively. (t=0.2218, SD=4.94, p>0.005) indicated that a null hypothesis of no difference could not be rejected. Five residents had a MMSE score less than ten and CIM was discontinued in two of them. Most common side effects were nausea and vomiting (24.2%), diarrhea (17.7%), anorexia (14.3%), and dizziness (9.7%). CIM therapy was not discontinued in any resident due to side effects.

CONCLUSIONS: All patients on CIM were for appropriate indications. Evaluation of efficacy was difficult due to poor monitoring and documentation. Tolerability of CIM was good with only minor side effects.

Health Services Research

102. A randomized investigation of pharmacist versus physician management of warfarin in the inpatient setting. Lindsay Arnold, Pharm.D.1, Sara Smith-Shull, Pharm.D., M.B.A.2, Lindsay Nissen, Pharm.D.2, Pam Coffman, Pharm.D.2. (1)Boston Medical Center, Boston, MA; (2)The Nebraska Medical Center, Omaha, NE.

PURPOSE: This study compares the effects of two strategies for managing warfarin therapy: standard of care (physician-management) versus pharmacist-management while adhering to a protocol. The primary outcome measure is time to goal International Normalized Ratio (INR). Secondary outcome measures include discharge INR status and length of stay (LOS).

METHODS: All patients initiating warfarin therapy for the first time during hospitalization from February 2003 through December 2003 were eligible. Following approval for participation by their primary physician, consenting patients were randomized through block stratification to management by either a pharmacist or a pharmacist protocol. Fisher’s exact test was used to evaluate categorical data; multivariate and logistic regressions were used to assess time to goal INR and LOS. All regression analyses were completed after controlling for significant drug interactions and goal INR.

RESULTS: The analysis included 39 patients (pharmacist-managed, n=19; physician-managed, n=20). The mean time to goal INR was 3.29 days (95%CI: 2.62–3.97) and 4.61 days (95%CI: 3.18–6.03) in the pharmacist-managed and the physician-managed group, respectively (p<NS). Incidence of therapeutic INR at discharge was 47.4% in the pharmacist-managed and 85.5% in the physician-managed group (p<0.69). Mean LOS was 9.79 days in the pharmacist-managed group and 9.80 days in the physician-managed group (p>0.50).

CONCLUSIONS: No significant difference was found in either the primary outcome or secondary outcomes when comparing physician to pharmacist-managed warfarin therapy in the inpatient setting. While this study is limited by the small sample size and restricted enrollment time, pharmacist management of warfarin therapy warrants further investigation.

103E. An evaluation of clinical pharmacy services in hematolog/ oncology out-patient setting. Sachin R. Shah, Pharm.D., BCPSP1, Jonathan Dowell,
104. Factors of patient trust related to the pharmaceutical industry: a qualitative analysis. Yavonne Q. Evans-Martinez, Pharm.D.1, Michael L. Johnson, Ph.D.1, Kimberly O’Malley, Ph.D.1, (1)Michael E. DeBakey VA Medical Center and University of Texas-Houston School of Public Health, Houston, TX; (2)Michael E. DeBakey VA Medical Center, Houston Center for Quality of Care and Utilization Studies and Baylor College of Medicine, Houston, TX; (3)Pearson Educational Measurement, Austin, TX.

PURPOSE: This study examined factors of patients’ trust related to the pharmaceutical industry and how these factors relate to trust in health care providers and the health care system.

METHODS: As a part of a larger study of patient trust, transcripts of 17 focus groups which had a total of 77 participants were reviewed. Of the seventeen participants who mentioned some aspect of the pharmaceutical industry, eight were contacted and interviewed by telephone. Participants’ beliefs and values regarding pharmaceutical industries’ trustworthiness, influence on health system, and interactions with health systems, facilities, providers, government and patients were explored using both a Likert scale and open-ended questions.

RESULTS: By re-weighting the scale to reflect 1 = strongly disagree and 10 = strongly agree and calculating the group averages, the group believed that pharmaceutical industries had a relatively strong relationship with providers (9.1), mostly influenced the government (7.7) rather than the health care system (6.8), and were not honest (2.6). Common themes discovered by the open-ended questions were: pharmaceutical industries are primarily interested in their finances, their products are trustworthy, health care providers often prescribe the best drug for the patient, and the cost of drugs should be the same world-wide.

CONCLUSIONS: Pharmaceutical industries’ products are trusted by patients; however, patients distrust their intentions and dislike high cost issues. Regardless of the perception of the pharmaceutical industries, patients maintained reasonable trust in the health care providers and health care system to provide the best drug therapy to them as individuals.

105. Population differences are significant prior to initiating therapy on atypical or conventional antipsychotics. Chris M. Kozma, Ph.D.1, 2, (1)Texas Tech University Health Sciences Center, Lubbock, TX; (2)Texas Tech University Health Sciences Center, El Paso, TX; (3)University of Texas at El Paso and University of Texas at Houston, El Paso, TX.

PURPOSE: To describe the magnitude of population differences between patients with prescriptions for conventional and atypical antipsychotics, challenging the notion that treatment decisions are equivalent for the two groups.

METHODS: A retrospective comparison of “new” antipsychotic patients who had at least one claim for either an atypical or conventional antipsychotic between 2000 and 2001 in a large managed care database. The study describes patient characteristics in the year prior to initiating antipsychotic use. Study variables included diagnoses, prescription costs by drug class, cost and frequency of hospitalization, office visits, home health care, emergency room, skilled nursing care, insurance status, and specialist care. Data were evaluated with t-tests, chi squared tests, and logistic regression.

RESULTS: There were 9,563 eligible patients (82.5% atypical antipsychotics, 12.4% conventional antipsychotics). The atypical group was younger (45 yrs 51.1 years of age, p<0.0001) and had more females (61.4% vs 51.0%, p<0.0001). In the year prior to any antipsychotic use, the atypical group was more likely to have a mental health hospitalization (19.5% vs 6.4%, p<0.0001) and to have one or more mental health diagnoses (77.2% vs 47.1%, p<0.0001). Prior to antipsychotic use atypical patients also had higher non-antipsychotic mental health drug costs, lower laboratory costs and “other” claims, and greater mental health specialist use. Conventional patients were more likely to have non-mental health diagnoses. Predictors of atypical or conventional use were identified.

CONCLUSIONS: This study demonstrates that patient characteristics and service utilization in the year prior to atypical or conventional antipsychotic use are very different between these groups. This suggests that treatment decisions should be tailored to each group.

106. Health care utilization across the United States/Mexico border. Jose O. Rivera, Pharm.D.1, Marvin Shepherd, Ph.D.2, Kristin Richards, Ph.D.2, Melchor Ortiz, Ph.D.1, (1)University of Texas at El Paso and University of Texas at Austin, TX; (2)University of Texas at Austin, Austin, TX; (3)University of Texas at Houston, El Paso, TX.

PURPOSE: To determine the extent of healthcare utilization across the border between El Paso, Texas and Ciudad Juárez, Chihuahua, the largest US/Mexico border population.

METHODS: Random selection of 500 households on each side of the border. Trained bi-lingual interviewers conducted semi-structured interviews with a bi-lingual questionnaire. The interviewers followed a strict procedure to select households and participants. Two study coordinators met with the interviewers on a weekly basis on each side of the border. A 2x2 test was used to compare utilization patterns.

RESULTS: El Paso residents (n=300) were older than Juarez residents (n=217) (44.3 vs 37.6 years). An estimated 35% of El Paso residents received health care services in Mexico. One-third of El Paso residents (33.0%) reported purchasing medications in Mexico during the last year. Only 5.2% of Juarez residents reported purchasing medications in the US.

CONCLUSIONS: A significant number of the El Paso population utilizes healthcare services in Mexico. A much lower number of the Ciudad Juarez population utilizes healthcare services in the US. Purchasing medications in Mexico is the most common healthcare service used by the El Paso population.

Hematology/Anticoagulation


PURPOSE: Recombinant factor VIIa (rFVIIa) is FDA-approved for the treatment of bleeding episodes in hemophilia. Our institution restricts rFVIIa to Coagulation Service use for bleeding episodes in patients with hemophilia or factor VII deficiency. Utilization and clinical outcomes of off-label rFVIIa in non-hemophilic patients were evaluated.

METHODS: A retrospective review was conducted for rFVIIa-treated patients between October 2003 and March 2004. Patients with hemophilia or factor VII deficiency were excluded. Data were analyzed with paired Student’s t-test.

RESULTS: Twenty-seven of 31 patients ordered rFVIIa were evaluated. Mean ± SD age was 63 ± 34.17 years and mean ± SD weight was 80 ± 20.6 kg. Mean ± SD total rFVIIa dose was 72 ± 52 ± 1.2 µg/kg (range 35 to 104 µg/kg) as a single dose. Seventy percent of rFVIIa doses were administered in the operating room. Ninety-three percent of doses were requested by Neurosurgery with 88% for intracranial hemorrhage. Mean ± SD INR decreased from 2.46 ± 0.98 to 0.99 ± 0.23 (p<0.001). Twenty-three of 25 patients were able to proceed to neurosurgical intervention, as the INR decreased to ≤ 2. Mortality was 22%. Adverse events included one suspected pulmonary embolism and one craniotomy for clot evacuation.

CONCLUSIONS: The off-label use of rFVIIa in non-hemophilic subjects requiring emergency surgery was effective in decreasing INR preoperatively and bleeding control. Safety concerns with rFVIIa are thrombotic events. Root cause analysis of the two adverse events was not performed. An off-label protocol addressing efficacy, safety and dosing of rFVIIa in non-hemophiliacs was developed at our institution.

108. Development and implementation of venous thromboembolism prophylaxis screening tool in hospitalized patients. Dipit Patel, Pharm.D., Lil-Jen Wang, Pharm.D., BCPS, FASP, COLUMBUS REGIONAL HEALTHCARE SYSTEM, COLUMBUS, OH.

PURPOSE: Venous thromboembolism (VTE) and pulmonary embolism (PE) are two of the most preventable causes of mortality in hospitalized patients. Appropriate pharmacotherapeutic intervention is warranted in those patients presenting with established risk factors to significantly reduce the prevalence of this pathology. The objective of the study was to develop and validate a screening tool that identifies patients at risk of developing VTE/PE and initiate appropriate prophylactic therapy.

METHODS: A retrospective chart review of 97 patients diagnosed with VTE or PE was conducted to obtain baseline data. The screening tool was then constructed based on the results, an extensive literature search and review of current clinical guidelines. Predefined criteria dictated the prophylactic therapy selected for study patients and subjects were followed for at least 90 days.

RESULTS: It was noted from the retrospective chart review that only 33% (n=32) of patients with risk factors for VTE/PE received preventive therapy. Implementation of the screening tool identified 185 patients with risk factors for VTE/PE. Prophylactic therapy was appropriately initiated in 92% (n=169) of patients. VTE was observed in five study patients that received prophylaxis therapy. Three additional patients also developed VTE but were not prescribed prophylactic intervention.

CONCLUSIONS: The implemented VTE screening protocol serves as a valuable tool in identifying patients at risk for developing VTE/PE. The success of this protocol reveals the need to further educate healthcare providers on this easily preventable disease state.

BACKGROUND: Thromboembolism is common after orthopedic surgery. Prophylactic agents with most data supporting their use include warfarin adjusted to an INR of 2.0–3.0 or low molecular weight heparin. Current practice at our hospital includes warfarin sliding scale, which aims to achieve an INR of 1.5–2.0, or enoxaparin 30 mg given subcutaneously twice daily post-operatively. PURPOSE: Determine what drugs and regimens are being used for thromboembolic prophylaxis after total joint surgery, evaluate bleeding and thromboembolic event rates, and evaluate length of stay in patients with and without adverse events.

METHODS: The study was a retrospective chart review. Subjects were excluded if they were under the age of 18, were pregnant, or had cancer. RESULTS: We evaluated 305 patients who had total joint surgery. Warfarin sliding scale was used for 196 patients, of whom 13 (6.6%) had thromboembolic events and 4 (2%) had bleeding events. Of the 93 patients who were given enoxaparin, 3 (3.3%) had thromboembolic events, none of which were considered to be within the time of risk or associated with surgery, and 5 (5.4%) had bleeding events. The other 16 patients were on warfarin prior to admission. The thromboembolic event rate is underestimated, as the patients were not necessarily followed at our hospital after the surgery.

CONCLUSIONS: The warfarin sliding scale is not adequate prophylaxis against thromboembolism in total joint surgery. Switching to enoxaparin or changing the INR goal should result in a decrease in the thromboembolic event rate. Another evaluation after change in practice will be necessary.

110. Differences in time within the target INR range between patients randomized to five fingerstick INR devices. Kenneth M. Shermock, Pharm.D.1, Jason Connor, M.S.2, Jodie M. Fink, Pharm.D., BCPPS,1, Lee Bragg, Pharm.D.2, (1)The Johns Hopkins Hospital, Baltimore, MD; (2)Carnegie Mellon University, Pittsburgh, PA.

METHODS: Two hundred and ninety subjects were randomized to one of five FDA approved fingerstick INR devices (Coaguchek S, Coaguchek ProDM, Hemochron, ProTime, and Rapidpoint). Subjects were followed longitudinally at an anticoagulation clinic by pharmacy anticoagulation specialists. Warfarin dosing decisions were made during clinic visits based on the INR from the randomized fingerstick device. Subjects also provided simultaneous venous blood draws that were analyzed at the local reference laboratory. These laboratory measures served as the gold standard to determine the proportion of time each subject’s INR was actually in the target range. Differences between devices were assessed using a Bayesian hierarchical model.

RESULTS: Subjects were followed for an average of 87 days. Two POC devices, Coaguchek S (58.5% of time in target INR range) and Coaguchek ProDM (55.5%) proved to be superior (posterior probability of being the best device 0.65 and 0.29, respectively), to Hemochron (50.5%), ProTime (48.5%), and Rapidpoint (43.2%). All devices were associated with low test-retest variability (range of median variance: 0.1–0.2 INR units).

CONCLUSIONS: Use of the Coaguchek S and Coaguchek ProDM devices to guide warfarin dosing decisions was associated with subjects’ INR values being within the target range a greater proportion of time compared to other devices.

111. Differences between physician, dentist and pharmacist recommendations for anticoagulation management in patients undergoing dental procedures. Samuel L. Ellis, Pharm.D.1, Sunny A. Linnebur, Pharm.D.1, Jeffrey D. Astroz, DDS, MSPH1, Robert J. Valuck, Ph.D.1, (1)University of Colorado Health Sciences Center, School of Pharmacy, Denver, CO; (2)University of Colorado Health Sciences Center, School of Dentistry, Denver, CO.

METHODS: A total of 1200 physicians, dentists and pharmacists in the state of Colorado were randomized to receive a survey about anticoagulation knowledge. The survey consisted of questions related to warfarin and heparin management in patients undergoing dental procedures.

RESULTS: A total of 713 (23%) surveys were returned. The response rate was 16% for pharmacists, 21% for physicians and 32% for dentists. Dentists appropriately recommended continuing warfarin more often than physicians and pharmacists for routine dental procedures such as cleaning, restorative treatment and oral surgery (p<0.001). There were no differences between the groups regarding more invasive procedures. The majority of dentists were unsure about the role of heparin bridging in patients discontinuing warfarin therapy. Physicians and dentists were more likely to use colleagues to help guide clinical decisions, while pharmacists were likely to use medical literature. Physicians were identified as the provider who should take responsibility for managing warfarin therapy by 86% of dentists, 67% of physicians and 51% of pharmacists.

CONCLUSIONS: Dentists were more likely to recommend appropriate management of warfarin therapy for routine dental procedures. However, dentists were unsure about the role of peri-procedural heparin bridging, indicating a need for education in this area.


METHODS: Purse louse bleeding can be a serious complication of many surgeries, and thrombin is widely used to achieve rapid hemostasis. Bovine thrombin, the major source of topical thrombin currently available for use in the U.S., is derived from a concentrate of bovine plasma thrombin and contains various non-thrombin proteins. A small fraction of treated patients develop antibodies to these impurities that cross-react to native clotting factors, resulting in bleeding diatheses with occasionally fatal outcomes. Recombinant thrombin (rhThrombin), produced from a precursor derived from cell culture, is not expected to contain immunogenic proteins such as the Factor V found in bovine thrombin.

METHODS: Surface Plasmon Resonance technology was used to analyze rhThrombin samples and Thrombin MJ® (lots R114A510 (exp Mar 04) and R114A752 (exp Mar 05)). Anti-Bovine Factor V/α (Haematologix Inc., lot L0918) was immobilized to the sensor surface. Samples of the above Thrombin MJ® lots were run by SDS-PAGE and transferred to PVDF membranes. Bands were excised and subjected to N-terminal sequence analysis using Edman chemistry on Applied Biosystems' Procise instrumentation.

RESULTS: Biacore-SPR experiments detected material specifically reactive to Factor V/α antibodies in two separate lots of bovine thrombin. No response was seen when testing rhThrombin. Additionally, N-terminal sequencing verified the presence of bovine Factor V in the above bovine product lots.

CONCLUSIONS: Several published articles document the immunogenic properties of bovine Factor V in commercially available bovine thrombin. The above studies indicate that there is no Factor V in rhThrombin. Therefore, rhThrombin may be a safer alternative to bovine thrombin for use in surgical hemostasis.

113. Safety evaluation of outpatient tinzaparin for bridge therapy to warfarin. William Dager, Pharm.D., Stacy Chow, Pharm.D., Ruby Ferrer, Pharm.D., Sandy Pak, Pharm.D., Patti Togioka, Pharm.D., Jeff King, Pharm.D., University of California, Davis Medical Center, Sacramento, CA.

METHODS: Several published articles document the immunogenic properties of bovine Factor V (MW 190 kDa). However, LMWHs have been shown to be as effective as unfractionated heparin for the treatment of deep-vein thrombosis (DVT) and pulmonary embolism (PE). The convenience of patients being able to self inject LMWHs has made them an acceptable VTE treatment alternative in the outpatient setting while bridging to warfarin. The safety of using the LMWH, tinzaparin, for outpatient bridge therapy in the treatment of DVT and/or PE in a University Hospital setting is examined.

METHODS: A retrospective review of sequential, eligible patients receiving at least one outpatient tinzaparin dose for treatment of DVT and/or PE. Data was analyzed for recurrent venous and bleeding complications within a 1 and 3 month period after initiation of tinzaparin.

RESULTS: A total of 90 patients (DVT-61%, PE alone 29%, DVT plus PE 9%) received outpatient tinzaparin (175u/kg/day) for a mean of 7 +/- 5 days. The mean INR at discharge was 1.3, and 2.8 when stopping tinzaparin. None of the patients had recurrent symptomatic VTE within the 1 and 3 months was observed. Three patients (3.8%) developed major bleeding complications within the 1-month period. No additional major bleeding complications were observed. Five minor bleeding events (6.3%) occurred at 1 month and one event (1.2%) at 3 months.

CONCLUSIONS: The recurrence rate of VTE and bleeding complications appears to be consistent with previous studies evaluating LMWH use with warfarin. Tinzaparin as outpatient bridge therapy to warfarin for the treatment of deep-vein thrombosis and/or pulmonary embolism appears to be safe.

114E. Cost-effectiveness of FEIBA vs NovoSeven as initial therapy for the treatment of mild-to-moderate bleeds in hemophilia patients with inhibitors. Ariel Berger, M.P.H.1, John Edelsberg, M.D., M.P.H.2, Ellis Neufeld, M.D., Ph.D.3, Karen C. Chung, Pharm.D.1, M.S.1, Gerry Oster, Ph.D.1, (1)Pharmacy Analysis, Inc., Brookline, MA; (2)Children's Hospital, Boston, Boston, MA; (3)Baxter BioScience, Westlake Village, CA.

PURPOSE: This descriptive report will identify outpatients with International Normalized Ratios (INRs) greater than 5.9 and examine the contributing causative factors that caused the elevations. Drug interactions, co-morbid conditions such as liver disease and congestive heart failure, warfarin dose noncompliance and alcohol abuse can acutely increase the INR. Our intent is to identify the top three factors and their percentage occurrence to use the knowledge gained to prevent elevated INRs and ultimately reduce morbidity, hospital visits, and/or admissions.

METHODS: Patients enrolled in one of the 6 anticoagulation clinics (approximately 1500 patients) within the VA Boston Healthcare System and having an INR greater than 5.9 over the last two years were identified using the VA database. Clinical pharmacists conducted a retrospective review of the patients’ electronic medical record to determine and review causative factors. The top three contributing factors were determined.

RESULTS: 207 occurrences of INR greater than 5.9 were identified. Based on current Chest guidelines (2001) we identified 139 patients with INR range of 2-3 and 48 with an INR range of 2.5-3.5. Major identified causes included: unknown cause (20.6%), drug/drug interaction (15.7%), alcohol abuse (13%), nonadherence to warfarin dose (13.9%), and nausea/vomiting/diarrhea (9.9%). Major identified drugs causing interactions were antidepressives (37.1%), corticosteroids (31.4%), and NSMIDs/analogesics (25.7%).

CONCLUSIONS: Our findings for identified causes of elevated INR and related classes of drugs can be used to enhance provider and patient education and awareness to improve identification of potential causes and reduce the number of incidences of elevated INR.

Herbal/Complementary Medicine


PURPOSE: The purpose of this study was to characterize herbs and dietary supplements (DS) marketed over the Internet for recreational use.

METHODS: Four major search engines and the search terms “buy herbal high” and “buy legal high” were used to identify the sites. The first 20 sites from each search engine, excluding duplicates which distributed product to the United States (U.S.) were selected. Sites were characterized for country of origin, compliance with the Dietary Supplement Health and Education Act (DSHEA), ingredients, efficacy claims, comparisons to illicit drugs, side effects, and drug interactions. Up to five products per site were evaluated.

RESULTS: Twenty-eight web sites with 119 products were evaluated. Most sites were in the U.S. (54%), identified the product as a DS (73%) and carried a Food and Drug Administration (FDA) disclaimer (67%). Forty seven percent of products were likened to illicit drugs, typically marijuana (48%) or ecstasy (23%). The most common product ingredients were; ephedra alkaloids (26%), Salvia divinorum (17%), kava (9%), damiana (9%), Acacia catechu (9%), and damiana (9%). Efficacy claims frequently involved the products use in a hallucinogenic (51%) or stimulant (39%). Thirty-four percent of sites mentioned side effects and 54% mentioned drug interactions.

CONCLUSIONS: This study demonstrates that herbs and DS are being marketed as substitutes to illicit drugs. The use of ephedra as a stimulant and Salvia divinorum as a hallucinogen were the most prevalent. Health care professionals need to be aware of this trend and the products that are involved.

117. Chitosan augmenting the inhibitory effect of gymnemic acid on glucose absorption. Hong LUO, M.D./Ph.D., Kazuo YAMADA, M.D./Ph.D.; (1)University of British Columbia and Children’s & Women’s Health Centre, Vancouver, BC, (2)The Ohio State University, College of Pharmacy, Columbus, OH.

PURPOSE: Patients with Alzheimer’s disease (AD) may be given Vitamin E as an antioxidant. Limited data are available on the claim of efficacy of Vitamin E on cognition in patients with AD.

METHODS: Data for a minimum of nine months were retrospectively collected from patients with AD receiving cholinesterase (ChE) inhibitors. Demographic information included age, gender, medication regimens, and Mini Mental State Exams (MMSE). Based on previous results, a minimum sample of 96 patients would yield a power of 0.8 and p-value <0.05. Data were evaluated to compare patients with AD taking Vitamin E and those not receiving Vitamin E using chi square and analysis of covariance.

RESULTS: Medical records of 100 patients were reviewed. Vitamin E (mean dose 1615 IU/day) was prescribed in 76% of patients. The baseline mean MMSE scores were similar between Vitamin E and non-Vitamin groups. Those with mild AD (MMSE 18-26), taking vitamin E had a mean annual rate of decline of 0.67 ±0.46 compared to 3.14 ± 0.96 for patients not taking vitamin E (p=0.021). In the moderate (MMSE 10-17) and severe (MMSE <9) groups, rates of decline did not differ between Vitamin E and those not taking Vitamin E (moderate AD p=0.188; severe AD p=0.823).

CONCLUSIONS: Vitamin E may provide neuroprotective benefits in mild AD but efficacy may be lost as AD progresses. Larger prospective randomized trials are needed to confirm these results.

HIV/AIDS

119E. Post-exposure prophylaxis (PEP) in health care workers (HCWs) after exposure to an HIV-infected source patient (SP). Betty J. Dong, Pharm.D., Princess A. El Khatib, Pharm.D., Kazuo YAMADA, M.D./Ph.D.; (1) Therapeutic Science, Faculty of Medicine, Tottori University, Yonago 683-8503, Japan.

PURPOSE: We have found that gymnemic acid (GA) extracted from Gymnema sylvestre and chitosan inhibited glucose absorption respectively. For more effectively nutrient control in diabetes and obesity, we compared the combinative anti-diabetic dual effect of GA and chitosan on glucose absorption. 

METHODS: Absorption of 20 mmol/l glucose with or without 0.3-2.5 mg/ml chitosan (9%) and gymnemic acid (26%) was studying in Wistar rat small intestine in vitro. To compare effective inhibitory effect on glucose absorption resulting in limited glucose and insulin peaks in blood, which could be a useful method for diet regimen in diabetes and obesity.

118. Adjunctive therapy in Alzheimer’s disease: is vitamin E neuroprotective? Michael Hitchcock, B.S., Joshua Caballero, Pharm.D., David Beversdorf, M.D., Douglas Scharre, M.D., Milap C Nahta, Pharm.D.; (1)The Ohio State University, College of Pharmacy, Columbus, OH, (2)The Ohio State University, Department of Neurology, Columbus, OH.

PURPOSE: Patients with Alzheimer’s disease (AD) may be given Vitamin E as an antioxidant. Limited data are available on the claim of efficacy of Vitamin E on cognition in patients with AD.

METHODS: Data for a minimum of nine months were retrospectively collected from patients with AD receiving cholinesterase (ChE) inhibitors. Demographic information included age, gender, medication regimens, and Mini Mental State Exams (MMSE). Based on previous results, a minimum sample of 96 patients would yield a power of 0.8 and p-value <0.05. Data were evaluated to compare patients with AD taking Vitamin E and those not receiving Vitamin E using chi square and analysis of covariance.

RESULTS: Medical records of 100 patients were reviewed. Vitamin E (mean dose 1615 IU/day) was prescribed in 76% of patients. The baseline mean MMSE scores were similar between Vitamin E and non-Vitamin groups. Those with mild AD (MMSE 18-26), taking vitamin E had a mean annual rate of decline of 0.67 ±0.46 compared to 3.14 ± 0.96 for patients not taking vitamin E (p=0.021). In the moderate (MMSE 10-17) and severe (MMSE <9) groups, rates of decline did not differ between Vitamin E and those not taking Vitamin E (moderate AD p=0.188; severe AD p=0.823).

CONCLUSIONS: Vitamin E may provide neuroprotective benefits in mild AD but efficacy may be lost as AD progresses. Larger prospective randomized trials are needed to confirm these results.


120. Clinically significant inter-patient variability in loganin pharmacokinetics in HIV-infected patients on salvage therapies. Lillian S.L. Ting, BSc.(Chem)1, Chris S. Alexander, Ph.D.(Chem)2, Richard P. Harrigan, Ph.D. (Biochem)3, Julio Montaner, M.D., FRCP(C)1, Mary H. H. Ensom, B.S.(Pharm), Pharm.D.1; (1)University of British Columbia, Vancouver, BC, Canada; (2)BC Centre for Excellence in HIV/AIDS, Vancouver, BC; (3)University of British Columbia and Children’s & Women’s Health Centre of British Columbia, Vancouver, BC, Canada.

PURPOSE: This retrospective study aims to characterize pharmacokinetic parameters of loganin (LPV) in HIV-infected individuals predominantly undergoing salvage salvage therapies.

METHODS: Study patients were on steady-state twice-daily Kaletra® (LPV/ritonavir; 400/100 mg or 533/133 mg) plus ≥2 other antiretrovirals. Plasma samples were collected at pre-dose and at 1, 2, 4, 6, 8, 10 and 12 h post-dose. Loganin concentrations were determined by a validated HPLC-MS/MS assay, and LPV pharmacokinetic profiles were analyzed by non-compartmental modeling using WinNonlin 4.1. Apparent oral clearance (Cl/F), apparent volume of distribution (V/F), mean residence time(MRT), elimination rate constant(1/h) and absorption rate constant(Ka) were calculated. Patients were stratified by Kaletra doses due to potential alteration in pharmacokinetic parameters caused by different doses of ritonavir (a potent CYP450 inhibitor; LPV-boosting agent).

RESULTS: Eighty-eight lopinavir pharmacokinetic profiles (with at least 6 concentrations each) from 73 patients who were predominantly on salvage antiretroviral therapies were analyzed. Sixty-two patients were taking at least one interacting antiretroviral. Pharmacokinetic variability was clinically significant (see Table).

Results in mean(%CV)

LPV dose Cl/F (L/h) V/F (L) MRT (h) 1/h (1/h) Ka (1/h) N
400 mg 8.51 61.52 13.29 0.172 0.378 40
(95.31%) (60.60%) (72.89%) (73.70%) (43.95%)
533 mg 9.82 65.04 13.40 0.146 0.467 48
(92.90%) (67.52%) (30.33%) (73.30%) (78.85%)
CONCLUSIONS: Wide inter-patient variability exists in lopinavir pharmacokinetic parameters of patients on salvage antiretroviral therapies. Therapeutic drug monitoring is recommended and studies of TDM strategies are underway to ensure optimal clinical outcome.


Infectious Diseases

122. Does fluoroquinolone resistance affect the clinical outcomes of patients with Escherichia coli or Klebsiella species bacteremia?. Leticia R. Villafela, Pharm.D.; Ronald G. Hall, Pharm.D.; Robin H. Amirian, M.D.; (1)Veterans Affairs North Texas Health Care System, Dallas, TX; (2)Texas Tech University Health Sciences Center, School of Pharmacy - Dallas/Fort Worth Regional Campus, Dallas, TX; (3)University of Texas Southwestern Medical Center at Dallas, TX.

PURPOSE: This study evaluated the effects of fluoroquinolone resistance (FQR) in E. coli and Klebsiella species bacteremia on length of hospital stay (LOS) and mortality.

METHODS: Patients at the Dallas VA Medical Center with a positive E. coli or Klebsiella species blood culture from January 2001–June 2003 were included. FQR was defined by ciprofloxacin susceptibilities. A retrospective chart review was performed to collect demographics, comorbidities, treatment, and outcomes.

RESULTS: Twenty-three FQR patients and 112 fluoroquinolone-susceptible patients were included. FQR patients were more likely to be located in the intensive care unit (p<0.002) or a long-term care facility (p<0.001), have a central venous catheter (p<0.001), be mechanically ventilated (p<0.001), require dialysis (p<0.046), or have a diagnosis of congestive heart failure (p<0.048). However, APACHE II scores did not differ significantly between the two groups. FQR was associated with an increased LOS (46.7 vs. 21.6 days, p<0.008), 14-day mortality (34.8% vs. 12.3%, p<0.024), and 30-day mortality (43.3% vs. 19.6%, p<0.042). Inappropriate empiric treatment with a fluoroquinolone increased 14-day mortality compared to appropriate empiric therapy with a fluoroquinolone (71% vs. 6%, p<0.003).

CONCLUSIONS: This is the first study conducted in the United States to evaluate the effects of FQR on clinical outcomes for patients with E. coli or Klebsiella species bacteremia. LOS, 14-day, and 30-day mortality were significantly increased in patients with FQR. Although these findings may be confounded by differences between our patient groups, practitioners should note the consequences of inappropriate empiric fluoroquinolone treatment for E. coli or Klebsiella species bacteremia.

123. Heterogeneous glycopeptide resistance in Staphylococcus aureus associated with accessory gene regulator (agr) group II. Brian T. Tsuji, Pharm.D., David Youm, B.S., Michael J. Rybak, Pharm.D.; Anti-infective Research Unit, Wayne State University, Detroit, MI.

PURPOSE: Prolonged exposure to sub-therapeutic levels of vancomycin have been associated with development of glycopeptide heteroresistance in patients with S. aureus infections. In vitro, sub-inhibitory concentrations of vancomycin have been shown to select for heteroresistance in agr-null group II S. aureus. We studied the effect of administering varying concentrations of vancomycin and the development heteroresistance in agr group II S. aureus using time kill experiments.

METHODS: One agr+ group II (RN6007) and the respective agr- group II, E. coli (RN9120) strain of S. aureus were obtained from the Network on Antimicrobial Resistance in Staphylococcus aureus (NARSA). Minimum inhibitory concentrations (MIC) were determined by Etest & microdilution according to NCCLS. Time-kill experiments were performed using vancomycin at 0.25, 0.5 & 1 X MIC over 48h. The development of heteroresistance and resistance was evaluated at multiple time points.

RESULTS: Pre-exposure vancomycin MIC were 1 against both agr+ II and agr II strains. Against both strains, vancomycin treatment curves resembled growth curves, evident by limited bacterial reduction at all time points. Against agr+ II, no heteroresistance was noted at all concentrations. Post-exposure MIC for all concentrations was 1 µg/ml. Against agr+ II, exposure to vancomycin at 0.5 and 1 X MIC produced heteroresistance at 48h. Post-exposure vancomycin MIC was 4 µg/ml.

CONCLUSIONS: Sub-inhibitory concentrations of vancomycin resulted in heteroresistance in agr-null group II S. aureus. This may have implications to current recommended dosing guidelines for vancomycin. No heteroresistance was noted in agr+ group II S. aureus.

124. Inaccurate susceptibility results with VITEK 1 may impair proper empiric antimicrobial selection for Pseudomonas aeruginosa infection. Christopher D Miller, Pharm.D.; Kelly Echevarria, Pharm.D., BCPS, Kimberly K Summers, Pharm.D., BCPS; South Texas Veterans Health Care System, San Antonio, TX.

PURPOSE: The VITEK 1 is an automated microbiology susceptibility testing system still in use by many laboratories despite growing inaccuracy data and the advent of the VITEK 2. This study was designed to measure the accuracy of the VITEK 1 against Pseudomonas aeruginosa, using disk diffusion methodology as a control comparison. The primary outcome measurement was percent susceptibility, as it would relate to antibiotic dosage.

METHODS: Consecutive Pseudomonas aeruginosa patient isolates received by the microbiology laboratory were tested using both the VITEK 1 and disk diffusion according to NCCLS guidelines. Antimicrobials analyzed included cefazolin, cefotaxime, ciprofloxacin, imipenem, and aztreonam/tobramycin. Error rates and percent susceptibility were logged and compared for overall and individual drugs. Differences in percent susceptibility of ≥ 10% were considered substantial, potentially resulting in important alterations in antibiotic data.

RESULTS: In total, 105 Pseudomonas aeruginosa bacterial isolates were tested against the above antimicrobial agents, with 72 susceptibility results available. For all susceptibility results combined, the percent agreement between testing methods was 86.0%. Cefazolin, cefotaxime, and aztreonam displayed a ≥ 10% decrease in susceptibility using the VITEK 1 versus disk diffusion results. Respective differences in susceptibility rates between the VITEK 1 and disk diffusion were as follows: cefazolin (65%, 85%), cefotaxime (72%, 88%), and aztreonam (52%, 63%).

CONCLUSIONS: Susceptibility results from the VITEK 1 varied from the control method for certain antibiotics. Such differences would convey dramatic effects upon antibiotic data and in turn may improperly guide empiric antimicrobial treatment selections.

125. Impact of culture site on antimicrobial pharmacodynamics. Christopher R. Frei, Pharm.D., M.S., BCPS; Burgess, Pharm.D., University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.

PURPOSE: Pharmacodynamic studies typically do not stratify microbiologic data by culture site. This study evaluated the pharmacodynamics of 2 antimicrobial regimens against 6 gram-negative bacteria from 3 culture sites.

METHODS: Blood, pulmonary, and wound MIC distributions for bacteria with >20 isolates for each site were extracted from the 2002 Intensive Care Unit Surveillance System (ISS) database. Pharmacokinetic parameters were obtained from healthy human studies for piperacillin/tazobactam (PTZ) 3.375q4h and piperacillin (PIP) 3g q6h. Monte Carlo simulation was used to model 10,000 patients for each antimicrobial-MIC distribution pair. The probability of target attainment (TA) for a %T>MIC ≥ 50% was determined. A clinically significant difference in the probability of TA was defined as ≥20%.

RESULTS: For PTZ, the probability of TA varied ≤10% by culture site. Likewise, the probability of TA for PIP was similar among the 3 culture sites for A. baumannii, P. aeruginosa, and P. cepacia. However, the probability of TA against E. coli was significantly higher for PIP in pulmonary vs. wound cultures (59% vs. 43%). In addition, the probability of TA against P. aeruginosa demonstrated that the NCCLS breakpoint of 16 µg/ml is appropriate for non-Pseudomonal gram-negative bacteria.

CONCLUSIONS: Culture site appears to be of minor importance for pharmacodynamic studies of piperacillin/tazobactam and piperacillin. Further investigations with additional antimicrobial regimens are warranted.

126. Macrolide pharmacodynamics in serum and epithelial lining for Streptococcus pneumoniae. Christopher R. Frei, Pharm.D., M.S., BCPS; David Burgess, Pharm.D., M.S.; (1)University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX; (2)University of Texas Health Science Center at San Antonio, San Antonio, TX.

PURPOSE: This study evaluated the pharmacodynamics of clarithromycin (CLA) and azithromycin (AZI) in serum and epithelial lining for S. pneumoniae.

METHODS: Susceptibility data were extracted from the 2002–2003 Global Respiratory Antimicrobial Surveillance Project (GRASP). Pharmacokinetic parameters in serum and epithelial lining were obtained from healthy human studies for CLA XL 1000mg q24h, CLA 500mg q12h, and AZI 500mg q24h x 4d. Monte Carlo simulation was used to simulate 10,000 patients. Target attainment (TA) was determined for a free AUC0–24/MIC ratio ≥ 25. A clinically significant difference was defined as a change in TA ≥ 10%.

RESULTS: S. pneumoniae isolates by penicillin (PCN) and erythromycin (ERY) susceptibilities were as follows: (1)828, PCN-S (1,198), PCN-I (291), PCN-R (339), ERY-S (1,283), and ERY-R (545). Overall, the MIC5090 revealed that CLA (≤ 0.068/8) and AZI (≤ 0.125/16) were more potent than AZI (≤ 0.125/16). The AUC0–24 was significantly higher in epithelial lining than serum for all 3 regimens: CLA 500mg q12h (400 vs. 52), CLA XL 1000mg q24h (179 vs. 42), and AZI (30 vs. 1). Likewise, TA was consistently higher in epithelial lining compared to serum for all 3 regimens. CLA 500mg q12h and CLA XL...
1000mg q4h achieved similar TA in serum (74% and 73%) and epithelial ling (88% and 84%). AZI TA was significantly lower than both CLA regimens in the serum (0%) and epithelial ling (71%). Finally, TA rates for CLA and AZI correlated with PCN and ERY susceptibilities.

CONCLUSIONS: Clarithromycin demonstrated better pharmacodynamics than azithromycin in both serum and epithelial lining.

127E. Pharmacodynamics of continuous infusion (CI) β-lactams against Gram-negative pulmonary isolates from ICU patients. Christopher R. Frei, Pharm.D., M.S., BCP, David S. Burgess, Pharm.D.; University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.


128E. Pharmacodynamics of piperacillin/tazobactam and piperacillin for Gram-negative bacteria in ICU patients. Christopher R. Frei, Pharm.D., M.S., BCP, David S. Burgess, Pharm.D.; University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.


129. Lack of clinically significant hepatotoxicity following moxifloxacin therapy. Daniel Havercost, M.S., Sharjeel Chooldri, M.D.; Bayer Pharmaceuticals Corporation, West Haven, CT.

PURPOSE: To evaluate the incidence of hepatic adverse events (AE) of PO/IV moxifloxacin vs. comparators antimicrobials

METHODS: A retrospective search of the oral/mIV moxifloxacin (Bayer) Phase III IV database using SMIOT ce markings for hepatic AE was conducted. Clinical events categorized as definitely, probably, or possibly-related to moxifloxacin were considered potential hepatotoxic events. Liver function test (LFT) abnormalities were also recorded.

RESULTS: Drug-related hepatic AE stratified by route of administration are shown below:

<table>
<thead>
<tr>
<th>Drug-related AE</th>
<th>PO</th>
<th>IVP/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFT abnormal</td>
<td>60 (0.9%)</td>
<td>50 (0.4%)</td>
</tr>
<tr>
<td>Gamma-GT increased</td>
<td>18 (0.3%)</td>
<td>15 (0.3%)</td>
</tr>
<tr>
<td>Cholestatic jaundice</td>
<td>3 (0.1%)</td>
<td>0</td>
</tr>
<tr>
<td>Liver damage</td>
<td>2 (0.2%)</td>
<td>2 (0.2%)</td>
</tr>
<tr>
<td>Bilary pain</td>
<td>0 (0.0%)</td>
<td>0</td>
</tr>
<tr>
<td>Cholangitis</td>
<td>0 (0.0%)</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Hepatic failure</td>
<td>0 (0.0%)</td>
<td>0</td>
</tr>
<tr>
<td>Jaundice</td>
<td>0 (0.0%)</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

*CAP=community-acquired pneumonia

Overall, there were increased rates of drug-related hepatic AE/laboratory abnormalities in the IV/PO vs. oral studies. The incidence of hepatic AE following PO or IV therapy was similar between the moxifloxacin and comparator groups.

CONCLUSIONS: Oral and IV moxifloxacin are associated with a low potential to induce clinically-significant hepatotoxicity.

130. Pharmacodynamics of β-lactams against 2,584 Gram-negative pulmonary isolates from ICU patients. David Burgess, Christopher R. Frei, Pharm.D., M.S., BCP; (1)University of Texas Health Science Center, School of Pharmacy - Dallas/Fort Worth Regional Campus, Dallas, TX.

METHODS: The 2002 ISS database comprised susceptibility data from 1,606 isolates. The number of susceptible isolates was highest for MER (10) followed by LEV (8), CPM (6, MIC ≤ 8), PTZ (2) and TOB (1). Only MEM achieved and maintained bactericidal activity over 24 hrs for all isolates at both inoculum. For standard inoculum, CPM was more likely to maintain bactericidal activity against SHV than TEM (100% vs. 67%), whereas, LEV and PTZ were more likely against TEM than SHV (83%) vs. 50% and 30% vs. 0%). TOB displayed poor bactericidal activity against TEM (0%) and SHV (0%). Bactericidal activity of PTZ and TOB was unaffected by inoculum size. However, CPM and LEV had a significant decline in bactericidal (standard vs high): CPM (80% vs. 0%), LEV (70% vs. 40%).

CONCLUSIONS: Meropenem was the most active antimicrobial irrespective of enzyme or inoculum size. Cephalosporin exhibited a significant inoculum effect. The clinical significance of these findings warrants further investigation in clinical trials.

134. Evaluation of the impact of educational efforts on the use of vancomycin in febrile neutropenic fever. Olga H. DeTorres, Pharm.D., M.S., BCPS; University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.

PURPOSE: The emergence of vancomycin-resistant organisms in hospitals has been associated with increased use of vancomycin. The objectives of this study were to evaluate how educational efforts and interventions impacted the use of vancomycin in febrile neutropenic patients and the rate of vancomycin-resistant Enterococcus faecium in our community hospital.

METHODS: All hospitalized febrile neutropenic patients (n=64) admitted between March–April 2001 initially started on vancomycin were evaluated for appropriateness based on the IDSA Neutropenic Feyer Guidelines (Clin Infect Dis 1997;26:551–73). The results were presented to the hospital’s Quality Improvement Committee and the Medical Board. Letters, educational posters, and pocket cards were developed and distributed to the hematologists/oncologists. A follow-up study was conducted in October–November 2002 (n=63) to evaluate the impact of the educational efforts. Finally, hospital-wide vancomycin-resistant Enterococcus faecium rates were evaluated for 2001–2003.

RESULTS: The appropriateness of vancomycin significantly increased from 49% in 2001 to 76% in 2002 for neutropenic fever patients. Overall, the number of Enterococcus faecium isolates increased from 163 in 2001 to 200 in 2003. However, vancomycin-resistant Enterococcus faecium decreased from 49% in 2001 to 29% in 2003.

CONCLUSIONS: Educational posters and interventions significantly improved the use of vancomycin in the treatment of neutropenic fever at our community hospital. Furthermore, the hospital-wide vancomycin-resistant Enterococcus faecium decreased during this 3 year period.

135E. Fluoroquinolone pharmacodynamics in serum and epithelial lining against S. pneumoniae. Daniel Haverstock, M.S., David S. Burgess, Christopher R. Frei, Pharm.D., M.S., BCP; University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.


132E. Gram-negative resistance in outpatients at an academic medical center. David S. Burgess, Pharm.D., Christopher R. Frei, Pharm.D., M.S., BCP; University of Texas at Austin, University of Texas Health Science Center at San Antonio, San Antonio, TX.


133. Impact of ESBL enzyme and inoculum size on antimicrobial activity as measured by time-kill methodology. David S. Burgess, Pharm.D.; Ronald G. Hall II, Pharm.D.; (1)University of Texas HSC, San Antonio, TX, (2)Texas Tech University Health Sciences Center, School of Pharmacy - Dallas/Fort Worth Regional Campus, Dallas, TX.

PURPOSE: ESBLs are an emerging infectious disease problem. This study evaluated the activity of meropenem (MEM), ceftazidime (CPM), piperacillin/tazobactam (PTZ), levofloxacin (LEV), and tobramycin (TOB) against 10 ESBLs with known genotypes at 2 inocula.

METHODS: NCCLS methodologies were used to determine MICs for 4 SHV and 6 TEM producing isolates. Time-kill curves were performed using standard (1x200 CFU/mL) inocula. The results were presented to the hospital’s Quality Improvement Committee and the Medical Board. Letters, educational posters, and pocket cards were developed and distributed to the hematologists/oncologists. A follow-up study was conducted in October–November 2002 (n=63) to evaluate the impact of the educational efforts. Finally, hospital-wide vancomycin-resistant Enterococcus faecium rates were evaluated for 2001–2003.

RESULTS: The appropriateness of vancomycin significantly increased from 49% in 2001 to 76% in 2002 for neutropenic fever patients. Overall, the number of Enterococcus faecium isolates increased from 163 in 2001 to 200 in 2003. However, vancomycin-resistant Enterococcus faecium decreased from 49% in 2001 to 29% in 2003.

CONCLUSIONS: Educational posters and interventions significantly improved the use of vancomycin in the treatment of neutropenic fever at our community hospital. Furthermore, the hospital-wide vancomycin-resistant Enterococcus faecium decreased during this 3 year period.
136. Influence of a urinary tract infection empiric treatment pathway on physician prescribing in an academic medical center. Ibii Lopez, Pharm.D., Aimée Le Claire, Pharm.D., Robert Kuhn, Pharm.D., Robert Rapp, Pharm.D., Kelly Smith, Pharm.D., Craig Martin, Pharm.D.; University of Kentucky Chandler Medical Center, Lexington, KY. PURPOSE: In an attempt to maintain or improve patient outcomes and contain health care costs, treatment algorithms are often implemented by health care institutions or organizations. In July 2002, a guide to empiric antimicrobial therapy, which includes a urinary tract infection (UTI) algorithm, was distributed to all hospital physicians in an academic medical center. The primary objective of the study was to assess the impact of the guide on physician prescribing of empiric antimicrobial therapy for UTIs. METHODS: A retrospective patient chart review for three months prior to implementation of the guide and the corresponding three months one year after implementation was conducted for patients with a primary or secondary diagnosis of UTI, or those with a concomitant infection, or had no antimicrobial agent received, lacked laboratory or subjective diagnosis of UTI or acute pyelonephritis. Patients who were < 18 years of age, did not receive any antimicrobial agent, lacked laboratory or subjective parameters confirming UTI diagnosis, had a concomitant infection, or had a diagnosis of urosepsis were excluded. Descriptive statistics, primarily incidence rates and percent changes, and $\gamma$ analysis were used to describe data. RESULTS: Prior to the implementation of the guide, 45% (n=52) patients with UTIs were treated consistently with the algorithm. Consistency increased to 51% (n=44) after the implementation of the guide; however, this was not a statistically significant improvement ($p$=0.35). CONCLUSIONS: The implementation of a guide to empiric antimicrobial therapy did not influence physician prescribing habits regarding UTIs. Educational sessions at implementation along with reinforcement of guidelines are essential for impacting prescribing habits.

137. Effects of formulary addition of cefepime on susceptibility of select Gram-negative pathogens to cefazidime and imipenem: analysis by interrupted time series analysis. John A. Bosso, Pharm.D., Patrick D. Mauldin, Ph.D., Medical University of South Carolina, Charleston, SC. PURPOSE: The addition of cefepime (CEF) to the antibiotic formulary may have salutary effects on susceptibility patterns of other beta-lactam antibiotics, especially when used as a substitute agent. METHODS: To assess these potential effects in our institution, quarterly susceptibility rates (SR) of 3 organisms [Pseudomonas aeruginosa (PA), Escherichia coli (EC), Klebsiella pneumonia (KP)] to cefazidime (CTZ) and imipenem (IMI) from 1993 through 2003 were considered. Segmented regression analysis were used to compare changes in SR of these antibiotics over time before and after the introduction of CEF. The Durbin-Waton statistic was used to test for autocorrelation. RESULTS: No effects on SR of KP to CTZ or IMI were observed related to introduction of CEF. With PA, significant negative changes (p=0.0029 and 0.0315, respectively) in slope trend in CTZ and IMI SR were detected (R=0.75 and 0.26, respectively). With EC, a significant negative change (p=0.0078) in the already downward slope of CTZ SR after introduction of CEF (R=0.47) was detected. However, there were no significant effects on IMI SR with EC. CONCLUSIONS: These results should be interpreted with caution. Although some of the detected relationships were statistically significant, the low coefficients of determination suggest a lack of explanatory value for these models. Although utilization of cefepime has risen substantially over the study period (9.54 and 1.32 Gm/1000 patient days for 4th quarter of 2003 for adults and pediatric patients, respectively), it may be that cefepime needs to completely replace the use of other cephalosporins to appreciate positive effects on susceptibility trends.

138. Potential effects on methicillin-resistant Staphylococcus aureus (MRSA) isolation rate assessed by time series analysis. John A. Bosso, Pharm.D., Patrick D. Mauldin, Ph.D.; Medical University of South Carolina, Charleston, SC. PURPOSE: The introduction or use of certain antibiotics has been linked to changes in MRSA isolation rates in hospitals. METHODS: Univariate Rates (IR) of hospital-acquired MRSA over time as a marker, we assessed the effect of introduction of new antibiotics onto our formulary Quarterly IRs of MRSA for 1993 through 2003 were considered. Segmented regression analysis for interrupted time series was used to determine significance for the difference in levels and slopes over time due to three interventions: 1) addition of levofloxacin (L) to the formulary in 1999, with 2) a subsequent switch from L to gatifloxacin in 2001, and 3) addition of cefepime (C) to formulary in 2000. The Durbin-Watson statistic was used to test for autocorrelation. RESULTS: A significant positive change (p=0.0109) in the already upward slope trend of MRSA IR was observed related to introduction of L. However, during the later change from L to G, a strong negative change (p=0.0001) was observed (R=0.79). With C, there was no significant change in the overall slope trend (p=0.1141) from the pre-C period (R=0.72), although there was a change in slope from positive to negative. CONCLUSIONS: While changes in MRSA IR are likely affected by many factors, the introduction and/or use of certain antibiotics may play an important role. These effects may be related to total quantity of an antibiotic class used, although they may also be specific-antibiotic-dependent. Assessment of quantity of use should provide further insight into the nature of these apparent relationships.

139. A multidisciplinary approach to decrease post-cardiac surgical infections through antibiotic timing. John Noviak, Pharm.D., Linda Kokoszki, R.N.1, Lorraine Circelli, R.N.1, Stacey Morosco, R.N.1, James Bramley, M.D.1, Kathy Ward, R.N.1, Nicole Myers, Pharm.D., Candidate1; (1)St Elizabeth Medical Center, Utica, NY, (2)Albany College of Pharmacy, Albany, NY. PURPOSE: Post-cardiac surgical infections increase patient’s morbidity, length of stay, and resource utilization. This project attempted to decrease infection rate through multiple interventions (e.g. mupirocin application, intense blood-glucose control, and improving antibiotic time to incision (TTI)). Of these interventions, TTI is the first to be implemented. METHODS: Infection rate, antibiotic TTI, and other variables of Cardiac Risk Index 1 patients having cardiac surgery were collected. RESULTS: At baseline, our monthly TTI mean (± S.D.) for 48 patients was 76.9 (± 42.6) minutes and additional five patients either received no antibiotic or antibiotic was given after incision. The most common antibiotic delivered was cefazolin 1 gram (98.5%). After intervention, our TTI for 43 patients decreased to 43.5 (± 45.6) minutes (p=0.001) and only one patient received antibiotic after incision. The most common antibiotic given was cefazolin 2 gm (40.4%) and cefotaxime 1 gm (25%). Our rates of post-cardiac surgical infection in 2002 and 2003 were 4.5% and 4.5%. This is above the National Nosocomial Infections Surveillance (NNIS) rate of 3.51%. While our year-to-date (2004) infection rate is above the NNIS rate at 4.13%, our infection rate for the past 4 months (post-TTI implementation) is much improved at 2.8%, 4%, 0% and 0%. CONCLUSIONS: Increased awareness of the importance of antibiotic timing and the incorporation of anesthesiologists in antibiotic administration has led to significant decreases in TTI and the use of weight-adjusted antibiotic doses (cefazolin 2 gram for patients >70kg). An additional early trend of this intervention is a decrease in post-operative infection rate.

140E. Three-year national analysis of outpatient antimicrobial prescribing. Katie J. Suda, Pharm D.1, Kevin W. Garey, Pharm D.1, Carl T. Bertram, Pharm D.1, Larry H. Danziger, Pharm D.1; (1)Baptist Memorial Health Care, Memphis, TN. (2)University of Houston College of Pharmacy, Houston, TX; (3)Walgreens Health Initiatives, Deerfield, IL. (4)UIC College of Pharmacy, Chicago, IL. Presented at the Annual Meeting of the Infectious Diseases Society of America, Boston, MA, September 30-October 3, 2004.

141E. Relationship of incoanut and beta-lactam (BL) exposure on mutation selection in P. aeruginosa. Krystal K Haase, Pharm D.1, Ronda L. Akins, Pharm D.1, Thomas M. Hering, Pharm D.1, James R. Bruckner, Pharm D.1, L. Streptococcus pneumoniae (PP), Kelly Smith, Pharm D.1, Craig Martin, Pharm D.1, University of Kentucky Chandler Medical Center, Lexington, KY. Presented at the 43rd Intesicne Conference on Antimicrobial Agents and Chemotherapy, Chicago, IL, September 14–17, 2003.

142E. Compliance with NCCLS antibiogram (AB) criteria: benchmarking of South Carolina (SC) hospitals. Hiram K. Ughi, Pharm.D., Roger L. White, Pharm.D., Medical University of South Carolina, Charleston, SC. Presented at the 42nd Annual Meeting of the Infectious Diseases Society of America, Boston, MA, September 30–October 3, 2004.


144. Comparing phenotypic expression of community and hospital associated methicillin-resistant Staphylococcus aureus (MRSA) on the basis of SCCmec type. Kerry L. LaPlante, Pharm.D., Anna Ponomareva, Pharm.D candidate, Michael J. Bybak, Pharm, D., Wayne State University, Detroit, MI. PURPOSE: MRSA resistance to beta-lactams is mediated through the mecA gene located on staphylococcal-chromosomal-cassette-locus (SCCmec). Four different SCCmec types, subdivided into types I, II, III and IV have been described. SCCmecIV is found in CA-MRSA and tends to be multi-drug resistant. We evaluated the MIC50 for 11 different
CONCLUSIONS: The low TA rate for PA is a direct reflection of the high resistance rate and high MIC values in a large percentage of the isolates at this institution. Comparable TA rates using surveillance data are higher, yet relatively low when considering levofloxacin for monotherapy in NP when PA is suspected. Good TA rates were attained once susceptibility was confirmed in nosocomial infecting organisms. Patients with NP where PA is strongly suspected should not be empirically treated with levofloxacin at this institution when other alternatives exist.

147. Bactericidal activity of telithromycin against penicillin-non-susceptible, macrolide-resistant, and levofloxacin-resistant Staphylococcus pneumoniae by time-kill methodology. Michael B. Rays, Pharm.D., Christopher L. Liske, Pharm.D., Purdue University School of Pharmacy, Indianapolis, IN.

PURPOSE: To determine the bactericidal activity of telithromycin against penicillin-non-susceptible, macrolide-resistant, and levofloxacin-resistant S. pneumoniae.

METHODS: Ten clinical, non-duplicate isolates of S. pneumoniae were tested. Triplicate MICs (NCCLS) and time-kill (TK) studies were performed using cation-adjusted Mueller-Hinton broth with 5% lysed horse blood and an inoculum of 10^6 CFU/ml. TK studies were performed at 35°C in a shaking water bath. Telithromycin concentrations of 1, 2, 4, and 8xMIC were tested. Colony counts were determined at 0, 4, 8, 12, and 24 h, and recovery plates were incubated at 33°C in 5% CO2 up to 48 h. Bactericidal activity was defined as a ≥2-log, reduction in CFU/ml.

RESULTS: All of the isolates were telithromycin-susceptible (MIC ≤ 0.5 µg/ml), penicillin-non-susceptible (6 Pen-I, 4 Pen-R), macrolide-resistant (7 M phenotype [ermB]), and levofloxacin-resistant (MIC > 8 µg/ml). At 24 h, telithromycin was bactericidal for 0/10, 2/10, 6/10, and 6/10 isolates at 1xMIC, 2xMIC, 4xMIC, and 8xMIC, respectively. At 4-8xMIC, telithromycin was bactericidal for 6/7 M phenotype isolates and 0/3 MLSB phenotype isolates. At 24 h, colony counts were decreased by 2.5-2.7 log10 CFU/ml at 4xMIC and 8xMIC, respectively, for the M phenotype isolate that bactericidal activity was not achieved. For the MLSB phenotype isolates, colony counts were decreased by 1.32 to 2.09 log10 CFU/ml after 24 h at 8xMIC.

CONCLUSIONS: Telithromycin was bactericidal at clinically achievable concentrations for 6 of the 10 penicillin-non-susceptible, macrolide-resistant, and levofloxacin-resistant S. pneumoniae. Telithromycin should be a useful treatment option for respiratory infections caused by resistant pneumococci.

148E. Antitoxin effects of clindamycin against α-hemolysin exotoxin released by methicillin-resistant Staphylococcus aureus (MRSA): could MIC make a difference? Elizabeth A Coyle, Pharm., D., Russell E. Lewis, Pharm., D., Randall A. Prince, Pharm. D., University of Houston College of Pharmacy, Houston, TX.

Published in Crit Care Med Supplement 2003;31(12):A182.

149E. Genome-wide expression profile analysis reveals genes coordinately regulated with CDR1 and CDR2 in association with the acquisition of azole resistance in clinical isolates of Candida albicans. P. David Rogers, Pharm.D., Ph.D.1, Katherine S. Barker, Ph.D.1, Lai Wei, Ramin Homayouni, Ph.D.1, Joel Koch, Robert Maibach, Ph.D.1; (1)University of Tennessee, Memphis, TN; (2) University of Würzburg, Würzburg, Germany.

Presented at the 7th Conference on Candida and Candidiasis of the American Society for Microbiology, Austin, TX, March 18–22, 2004.

150E. Analysis of daptomycin (D) population susceptibility profiles and killing activity against two clinical strains of vancomycin-resistant Staphylococcus aureus in an in vivo simulated endocardial vegetation infection model (SEVM). Ronda L. Akins, Pharm.D., Krista K. Haase, Pharm.D., Carolyn L. Bouma, Ph.D., Andrea J. Morris, B.S., Texas Tech University Health Sciences Center School of Pharmacy, Amarillo, TX.


151E. MIC creep: early detection with geometric mean (GM) and E-test (ET) MICs. Roger L. White, Pharm.D., Lawrence Friedrich, Pharm.D., Kiran K. Ullah, Pharm.D., Greg Puskarich, Ph.D., (1)Medical University of South Carolina, Charleston, SC; (2)Bristol-Myers Squibb, Charleston, SC; (3) New Hanover Regional Medical Center, Wilmington, NC.

Presented at the 11th International Congress on Infectious Diseases, Cancun, Mexico, March 4–7, 2004.

152E. Antimicrobial activity of tigecycline (GAR-936) tested against enterobacteriaceae, and selected non-fermentative Gram-negative bacilli, a worldwide sample. Ronald N. Jones, M.D., Thomas R. Frischke, M.D., Ph.D., Helio S. Sader, M.D., Ph.D., The JONES Group/MI Laboratories, North Liberty, IA.

Presented at the European Congress of Clinical Microbiology and Infectious Disease, Prague, Czech Republic, May 1–4, 2004.
154. Determinants of costs for patients with complicated skin and soft-tissue infections due to suspected or proven methicillin-resistant *Staphylococcus aureus*. Sonja V. Sorensen, M.Ph., 1 Christopher S. Hollenbeck, Ph.D., 2 Larry Z. Liu, M.D., Ph.D., 3 Timothy M. Baker, B.S., 4 Peggy McKinnon, Pharm.D., 5 (1)MEDITAP International Inc., Bethesda, MD; (2)Pfizer Inc., New York, NY, (3)Detroit Receiving Hospital, Detroit, MI.

PURPOSE: Using data from a recent clinical trial, this analysis was performed to identify determinants of treatment cost for complicated skin and soft-tissue infections (cSSSI).

METHODS: Costs per patient were estimated by applying representative per diem hospital costs (in 2003 US Dollars) for days spent in medical/surgical, ICU, or step-down units. Intravenous (IV) administration costs were applied to the duration of IV therapy; study medication was valued at wholesale acquisition cost. Cost of admission was estimated using multivariate regression controlling for patient factors, infection site, adverse events, and death.

RESULTS: A total of 717 patients (366 linezolid, 351 vancomycin) admitted to United States hospitals with suspected or proven methicillin-resistant *Staphylococcus aureus* (MRSA) cSSSI were included in the study. These patients had diagnoses of cellulitis (42%), major skin abscess (30%), and surgical/wound infections (14%). MRSA was confirmed in 32% of all patients. Patients receiving linezolid and vancomycin were similar in terms of age, gender, race, and co-morbidities. Regression analyses showed that hospital cost was $787 lower for patients receiving linezolid vs. vancomycin ($P=0.0004). Other factors significantly associated with increased cost include age ($P=0.0113$), confirmed MRSA infection ($P=0.0262$), comorbid diabetes ($P=0.0118$), number of procedures (P<0.0001), presence of serious adverse event (P<0.0001), and death ($P=0.0026$).

CONCLUSIONS: Cost of hospital care for patients with cSSSI is associated with patient demographics, comorbidities, and antibiotic treatment. After adjusting for all other factors, treatment with linezolid resulted in significantly lower treatment costs vs. vancomycin.

15E. In vitro activity of the glycolcyline tigecycline (GAR-936) tested against a worldwide collection of 10,127 contemporary *Staphylococci*, *Streptococci* and *Enterococci*. Thomas R. Frittsche, M.D., Ph.D., Helio S. Sader, M.D., Ph.D., Ronald N. Jones, M.D.; The JONES Group/JMI Laboratories, North Liberty, IA.

Presented at the European Congress of Clinical Microbiology and Infectious Disease, Prague, Czech Republic, May 1–4, 2004.

156. Community-associated MRSA displaying glycopeptide heteroresistance. Siddhartha Haung, M.D., Gladya S. Dhabhar, M.D.; Pharm.D., Michael J. Rybak, M.S., Pharm.D.; Anti-Infective Research Laboratory, Eugene Applebaum College of Pharmacy & Health Sciences, Wayne State University, Detroit, MI.

PURPOSE: We describe a case of a 24-year-old male from county prison with multiple lower extremity abscesses. The patient had been previously treated with multiple antibiotics with limited success. The patient was treated with both treatment but returned. Cultures grew S. aureus resistant to methicillin but, susceptible to clindamycin, gentamicin, rifampin, vancomycin (V), ciprofloxacin, and levofloxacin. This isolate was identified as part of a larger study evaluating molecular characteristics and risk factors for CA-MRSA per CDC definitions. Repeat V and teicoplanin (TP) MIC by microdilution resulted in an MIC of 32 and 128, respectively.

METHODS: CA-MRSA (R2617, Mu3, and Mu50) were utilized. MICs were performed according to NCCLS. Molecular typing was performed. Subpopulation profiles were evaluated using BHI plates containing various concentrations (0.25–32µg/mL) of V and TP.

RESULTS: R2617 was identified as SCCmec type IV. MICs for non-pressurized R2617 for V and TP were 1-4 and 0.5–4µg/mL, respectively. When pressurized to 2–6µg/mL antibiotic plates, MICs were 232 and >64µg/mL, respectively. V and TP E-tests exhibited colonies of subpopulation growth that varied in sizes. Population analysis for R2617 revealed varying organism growth across 0.25–16µg/mL similar to that found with the control hGISA and GISA strains. Selective pressure shifted greater bacterial densities to higher concentrations compared to no pressure.

CONCLUSIONS: We demonstrated that R2617, CA-MRSA isolate, has hGISA characteristics similar to that of Mu3, a well described hGISA isolated from patient who failed V therapy. Discovery of hGISA in CA-MRSA is of significant importance since it further complicates potential therapy options for patients infected with these isolates.
159. Angiotensin-II receptor blocker (ARB) use without previous angiotensin converting enzyme inhibitor (ACEI) use in a large managed care population: opportunity for member and plan savings. Brent W. Gunderson, Pharm.D.1, Patrick P Gleason, Pharm.D., BCPSc2, Alan H. Heaton, Pharm.D.2; (1)Prime Therapeutics, LLC, St Paul, MN; (2)Blue Cross Blue Shield of Minnesota, Eagan, MN.

PURPOSE: This retrospective analysis described current trends of ACEI trial before ARB and projected member/health plan savings.


RESULTS: 1,734 members newly started an ARB, 996 (56.8%) did not have a previous ACEI claim. During the 3-month analysis period, the 996 members had 1,665 ARB claims: median days supply 30, mean plan paid $33, and mean member copay $26. Median days supply, mean plan paid cost and mean member copay for lisinopril were 30, $7, and $10, respectively. Assuming 100% persistence, ARB members without an ACEI trial would result in an annual plan paid per member (PPPM) cost of $336 or $394,416 as a group, with an annual member copay of $312. If members instead had began therapy with and persisted on lisinopril, annual PPPM would be $84 or $83,664 as a group, with an annual member copay of $120. Maximal potential plan paid annual savings is $331,752 and an annual member copay savings potential $192.

CONCLUSIONS: Members are frequently newly initiated on ARB therapy without an ACEI trial. Persistence is more likely when copays are lower; generic lisinopril copay is 330% less than ARBs. Savings potential exists for current trends of ARB use and projected member/health plan savings.

160. Off-label use of topiramate (Topamax): analysis of a large health plan's medical and pharmacy claims. Patrick P Gleason, Pharm.D., BCPSc2, Brent W. Gunderson, Pharm.D.1, Alan Heaton, Pharm.D.2, Steven V. Johnson, Pharm.D., BCPSc2, (1)Prime Therapeutics, LLC, St Paul, MN; (2)Blue Cross Blue Shield of Minnesota, Eagan, MN; (3)Prime Therapeutics, LLC, Eagan, MN.

PURPOSE: To quantify and characterize the frequency of off-label topiramate use. Topiramate is currently FDA approved for epilepsy treatment. Topiramate therapy is associated with considerable serious adverse events such as markedly low serum bicarbonate (up to 3%–11% of patients exposed), nephrolithiasis, ataxia, oligohidrosis, and ocular syndromes.

METHODS: Medical and pharmacy claims from a midwestern health plan with 1.7 million members were analyzed in 2003 for identification of a miscellaneous antiepileptic drug (MscAED) (AHFS code 281292) claim. Identified members ICD-9 diagnosis codes for all outpatient medical encounters were evaluated. Epilepsy diagnosis defined as ICD-9 code 345.X or 780.3X and all other medical diagnoses were described using validated Schneeweiss diagnostic clustering.

RESULTS: Of 1.7 million members, 34,563 (2.0%) had 205,736 MscAED claims. 4,309 (12.3%) of 34,563 members had 20,931 topiramate claims at a total plan paid cost of $3,498,006 ($167.10 per claim). 113 members had an invalid ICD-9 code, of the remaining 4,366 topiramate utilizing members, 883 (19.9%) had an epilepsy diagnosis code, 3,363 (86.1%) with an epilepsy diagnosis, the top three Schneeweiss diagnostic clusters were: headaches - 2031 members (56.2%), depression, anxiety, and neuroses - 1954 members (54.1%), and fibrositis, myalgia, and arthralgia - 1896 members (46.6%).

CONCLUSIONS: Medical and pharmacy claims identified the vast majority of topiramate utilization appears to be for an off-label indication. This inappropriate use may expose patients to unnecessary risks and costs for uncovered benefits. Plans should considering implementing programs to ensure safe appropriate use of topiramate.


PURPOSE: Physicians frequently seek out specialized tools and services to address operational and financial challenges to patient care. One such service is the Letter of Medical Necessity (LMN), a template document designed to facilitate reimbursement for requested treatments. The LMN document includes relevant supporting medical information, and can be tailored to each patient's medical history. Because the quality and utility of these types of services have not been thoroughly explored, we conducted a survey of pharmacists to ascertain the value Cephalon's LMN service.

METHODS: The survey was mailed and made available via a dedicated Web site to 4031 physicians who made an unsolicited request for LMNs over a 1-year period. No incentive was offered for completing the survey. A satisfactory outcome was defined as reimbursement by the health plan for the requested treatment.

RESULTS: A total of 273 (6.7%) respondents completed the survey. Respondents most often (54.5%) requested LMNs to appeal denied reimbursement. Respondents rated the timeliness of response and overall quality of the service very highly. The majority (73%) experienced a satisfactory outcome 2 to 13 of the time. Furthermore, the primary reason for a negative outcome was use of the requested treatment for an unplanned indication.

CONCLUSIONS: Respondents indicated a high level of satisfaction with the LMN service. Although the immediate value of the LMN service lies in its ability to expedite reimbursement for a requested treatment, this type of service may indirectly improve patient care. Further research is required to quantify the effects of LMNs on patient care.

162. Specialty pharmacy utilization and cost in a large managed care population: analysis of medical and pharmacy benefit claims. Patrick P Gleason, Pharm.D., BCPSc2, Alan H. Heaton, Pharm.D.1, Steven V. Johnson, Pharm.D., BCPSc2, (1)Prime Therapeutics, LLC, St Paul, MN; (2)Blue Cross Blue Shield of Minnesota, Eagan, MN.

PURPOSE: To describe specialty pharmacy utilization and plan paid costs through an evaluation of both medical and pharmacy claims.

METHODS: Specialty pharmaceuticals were defined as therapies that require complex care and special handling or administration. Claims from a 1.7 million member midwestern health plan were analyzed during 2003 identifying all medical benefit processed J-code claims and pharmacy benefit processed claims for 121 retail specialty pharmacy services.

RESULTS: Of 1.7 million members, 141,177 (8.3%) had 568,085 medical processed J-code claims at a plan paid amount of $64,119,166. The top three J-code expense categories were: injectable oncology chemotherapeutics (J9000-J9999) $28,574,883 for 68,823 claims; infliximab a tumor necrosis factor blocker (TNF-blocker) (J1745) $8,604,266 for 488 claims; and miscellaneous unclassified J-code (J449) $3,633,633 for 13,794 claims. The top three specialty pharmacy categories were: multiple sclerosis $16,027,079 for 14,564 claims; TNF- blockers (etanercept or adalimumab) $11,435,348 for 9407 claims; and antimicrobial factors $7,152,534 for 960 claims.

CONCLUSIONS: For this plan, expenses, approximately evenly divided between the medical and pharmacy benefits, totalled $123,824,868 or approximately $6.67 per member per month. With plans being challenged by specialty pharmacy, comprehensively assessing medical and pharmacy benefit claims is important, as only one specialty drug class was in the top three of both the medical and pharmacy benefits. These integrated medical and pharmacy claims evaluations are a necessary precursor to the development of management strategies.

Medication Safety

163. Implementation of a self-administered questionnaire to identify patients at risk for medication-related problems in a family medicine clinic. Bradley J. Langford, BScPhm, Derek Jorgenson, Pharm.D., Debora Kwan, BScPhm, M.Sc., Christine Papoushek, Pharm.D., University Health Network, Toronto, ON, Canada.

PURPOSE: To quickly and systematically identify patients at-risk of MRPs are currently lacking in the ambulatory setting. The usual method for pharmacist referral at the Family Health Centre is largely based on health care professional referral. We hypothesized that this method may under refer patients at high risk for MRPs. This study was designed to identify if a medication-risk questionnaire can more appropriately identify patients at-risk for MRPs compared to usual methods of referral.

METHODS: Ambulatory patients ≥ 18 years old, taking ≥ 2 medications were eligible to complete the questionnaire. A pre-validated five-item self-administered questionnaire statistically correlated with MRP-risk was used. All patients completed the questionnaire and were subsequently randomized for pharmacist-referral by one of two methods; 1) referral by usual methods; or 2) referral according to questionnaire score. Primary outcome was: rate of pharmacist referral by one of two methods; 1) referral by usual methods; or 2) referral according to questionnaire score. Secondary outcomes were: rate of pharmacist referral by one of two methods; 1) referral by usual methods; or 2) referral according to questionnaire score.
drug interaction and adverse drug reaction.

CONCLUSIONS: A self-administered medication-risk questionnaire is an effective complement to usual referral practices for the identification of patients at risk for MRPs.

164. Preliminary evaluation of the impact of clinician order entry on medication errors in an inpatient oncology unit in a community teaching hospital. Danielle M Brundage, Pharm.D.; Kelly Becicka, Pharm.D.; Judy Wilson, R.N.; Methodist Hospital/Park Nicollet Health Services, Minneapolis, MN.

PURPOSE: Clinician order entry (COE) should decrease medical errors. Methodist Hospital has 51 beds for patients with cancer, an on-line system of self-reporting adverse events, and electronic medication administration records. This preliminary study examines medication errors that could be prevented by COE. A 6-month baseline period, and medication errors attributable to COE for 6 weeks after implementation (started 4/19/04). Standardized paper order sets were used for TPN and chemotherapy.

METHODS: Adverse medication events (AMEs) were extracted from Quality Resources database for a 6-month period prior to COE, and for 6 weeks after COE was implemented. Medication events that could be prevented by or attributed to COE were separated from all other AMEs. Two pharmacists independently reviewed events to determine if the event could be prevented by COE (during baseline period), or attributable to COE (COE phase).

RESULTS: During the baseline period of 7357 patient days, 59 medication events were considered preventable by COE (8 per 1000 patient days). Four COE-related medication events occurred within 6 weeks (2.8 per 1000 patient days) of COE. Drug categories associated with COE-related events include: electrolytes 1, insulin 1, opioids 1, and all meds (wrong amount). Changes were developed to prevent the opioid event from occurring.

CONCLUSIONS: COE reduces medication errors that occur in an inpatient oncology unit since COE was new, and the evaluation covered the first 6 weeks, some errors could be attributed to part of the learning process.


PURPOSE: This study assessed the frequency, motivation and safety of sample medication use in primary care practices. Sample medication processes were evaluated and compared to Institute for Safe Medication Practices (ISMP) standards.

METHODS: Eighteen urban and rural Colorado primary care practices participated in a one-day prospective, observational evaluation. A card study assessed provider motivation and sample dispensing. A simultaneous card study assessed patient knowledge of their sample(s). Sample inventories and distribution policies/procedures were documented for each practice.

RESULTS: During 18 days of evaluation, 57 samples were dispensed during 54 of 585 (9.2%) patient encounters. Sixty-five percent were new medications. Motivations for dispensing included availability (57%), cost (20%), and patient request (20%). Providers also stated their plan to continue the medication万次高frequency written prescriptions (54%) and more samples (28%). Seventy-two percent of patient card studies were returned and indicated verbal instruction alone was the primary means of patient education for dose and frequency of use (86%), precautions (68%) and side effects (60%). Twelve percent of patients received no education related to side effects. Of 1,233 samples inventoried, antihypertensives were most prevalent (28.6%).

CONCLUSIONS: These data suggest that sample medications are dispensed during approximately 9% of primary care visits with availability being the strongest impetus for use. Patient education and labeling were not compliant with ISMP standards and potentially increase risk for medication errors.


PURPOSE: To evaluate the effectiveness and impact of an admitting pharmacist in a community hospital setting. This position was added with the following goals: impact patient care by preventing or reducing potential medication adverse events, control cost through formulary management, review medication histories and initial admitting orders, provide patient education and counseling, improve diagnostic test utilization, provide recommendations to enhance initial therapies, and serve as a drug information specialist to all members of the clinical staff.

METHODS: The admitting pharmacist position was proposed, approved, and implemented in August 2002. All interventions and outcomes are recorded on a PDA using Pendragon software. Data analysis occurs quarterly and is submitted to the Pharmacy and Therapeutics Committee.

RESULTS: Medication histories have been reviewed for 2,492 patients, and a total of 2,965 interventions documented from August 2002 to December 2003. Interventions were categorized as: medication omissions, discontinuations, additions, renal dose adjustment, wrong drug or dose, wrong frequency, diagnostic tests, non-formulary drugs, automatic therapeutic substitutions, drug information, herbal consultation, smoking cessation, warfarin teaching, adverse drug reaction reporting, and improved documentation of JCAHO Core Measures required by Medicare.

CONCLUSIONS: The addition of the admitting pharmacist has provided us with a measurable benefit, as well as substantial improvement in patient care. Outlining consults in the medical records for the "pharmacist" to evaluate medication regimens attests to its value, as well as returning patients requesting to see "their pharmacist." In addition, time to receive the first dose of medication is expedited and patient satisfaction greatly improved.

167E. Voluntary reporting of medication errors in critical access hospitals compared to MEDMARXSM. Katherine J Jones, M.S., P.T.; Gary L Cochrain, SM, Pharm.D.; Rodney W. Hicks, R.N., MSN, MPH, Keith J. Muller, Ph.D.; (1)University of Nebraska Medical Center, Omaha, NE; (2)USP Center for the Advancement of Patient Safety, Rockville, MD.

Published in the Journal of Rural Health 2004;20(4).

Nephrology


169. N-Acetylcysteine and its protective role in a murine model of gentamicin nephrotoxicity. George Mathew, M.D.; David Sundin, Ph.D.; Edward Nehus, B.S.; From the Division of Infectious Disease, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN.

PURPOSE: Gentamicin is an aminoglycoside antibiotic that is used predominantly to treat gram negative infections. In 10-50% of cases nephrotoxicity can develop. It is unlikely that there is one single mechanism but rather a net result of disruptions in several cellular pathways. In rats gentamicin affects renal mitochondria and increases the production of reactive oxygen metabolites such as hydrogen peroxide, superoxide and hydroxyl radical. The aim of this study is to find out if N-acetylcysteine (NAC) a free oxygen radical scavenger can decrease gentamicin(Gent) induced nephrotoxicity in a rat model.

METHODS: Male Sprague Dawley rats were randomised to 6 groups and were treated for 12 days. Group 1 (n= 2) received Gent vehicle control at 100mg/kg/dl, group 2(n=4) received NA 100mg/kg/dl, group 3 received Gent at 100mg/kg/dl (n= 8) , group 4 (n= 9) received NA at 100 m kg/gdl and Gent 100mg/kg/dl , group 5 (n= 7)received Gent at 150mg/kg/dl and Group 6 (n=7)received NA at 150mg/kg/dl and Gent at 150 mg/dl.

RESULTS: At peak nephropathy day 8-10 the maximum serum creatinine for gp (1) was 0.1 mg/dl, gp (2) 0.3 mg/dl, gp (3) 0.8 , gp (4) 0.4, gp(5) 1.22 mg/dl and gp(6) 0.7 mg/dl.

CONCLUSIONS: This showed that there was a tendency for decreased nephropathy in rats that were treated with gentamicin(Gent) than rats that got gentamicin alone and that this protective benefit increased as the gentamicin dose increased. These results show that NAC ameliorates gentamicin nephrotoxicity in a murine model.

170. Comparison of hemoglobin response in hospitalized hemodialysis patients receiving either epoetin alfa or darbepoetin alfa in an integrated health care system. Indu Lew, Pharm.D.; Robert Adamson, Pharm.D.; Saint Barnabas Health Care System, West Orange, NJ.

PURPOSE: To measure the hemoglobin response of epoetin alfa (EA) and darbepoetin alfa (DA) in hospitalized hemodialysis patients.

METHODS: Patients for review were identified through an electronic billing system, using the ICD-9 code for hemodialysis and charge codes for EA and DA. The measurement period was from September 2003 to April 2004. Patients charts, 47 EA and 56 DA were requested and abstracted for demographics, information, co-morbidities, admission and discharge hemoglobin, length of stay (LOS), dose, frequency, total number of doses administered of the erythropoietic growth factor and transfusions.

RESULTS: Demographic data was well matched in each group: average age was 66.7, 70.6 years, females 47.8%, 39.3%, diabetes 40.4%, 41%, HTN 46.8%, 42.8%, CAD 29.8%, 39% for EA and DA respectively. The average LOS for EA was 17.4 days versus 13.6 days for DA. EA administration frequency was 57.4% three times a week, 31.9% twice a week and 10.7% weekly. All patients in DA cohort received therapy weekly. The average weekly dose of EA was 14.914 units versus 42.9 µg for DA. The total number of doses administered was 154 for EA and 71 for DA. The decline between admission and discharge hemoglobin was (0.78) and (0.89) g/dl for EA and DA.
CONCLUSIONS: Overall, minimal difference in hemoglobin response was observed between EA and DA patients. These findings are developing an education program and resource for pharmacists at our institution routinely do not calculate CLcr correctly, which can result in inappropriate dosing recommendations. In addition, pharmacists may not be routinely adjusting doses of renally eliminated medications that are not antibiotics or H2 antagonists. Based on these findings, we are developing an education and training materials on the appropriate use of the Cockcroft and Gault equation and dosing of renally eliminated medications.

178A. Comparison of GFR estimates by MDRD and Cockcroft-Gault with 24-hour urine collection.
S. Casey Latzigue, Pharm.D.1, Gary E. Arwood, B.S.2, (1)University of Tennessee Dept of Pharmacy, Memphis, TN; (2)Arlington Developmental Center, Arlington, TN.
Neurology

182E. Fluoxetine-induced orobuccal dyskinesia and persistent mandibular dystonia treated with botulinum toxin type-A. Jack J. Chen, Pharm D.\(^1\), David M. Swope, M.D.\(^2\). (1)Western University of Health Sciences and Movement Disorders Clinic, Loma Linda University, Pomona, CA; (2)Wayne State University, Detroit, MI.

PURPOSE: Rasagiline, a selective, second-generation, irreversible inhibitor of monoamine oxidase type-B, is effective in patients older and younger than 65 years of age with early-to-advanced Parkinson's disease (PD). Jack J Chen, Pharm.D.\(^1\), Richard C. Berchou, Pharm D.\(^2\). (1)Western University of Health Sciences and Movement Disorders Clinic, Loma Linda University, Pomona, CA; (2)Wayne State University, Detroit, MI.

PURPOSE: Rasagiline is an investigational drug demonstrating efficacy in patients with early-to-advanced PD. Age-related differences in clinical effects are unknown and warrants investigation.

METHODS: Data from three multicentered, randomized, placebo-controlled trials were pooled and reanalyzed for differences in efficacy between patients ≥65 or ≤65 years of age. Only patients receiving rasagiline 1mg daily were included. One trial assessed early PD patients for baseline change in Total Unified Parkinsons Disease Rating Scale (UPDRS), which measures motor function/mobility. The standard deviation of the percent difference for MDRD, MDRD-S, and C-G from the 24-hour urine estimate was 36±8, 32±8, and 1±3%, respectively. The GFR estimate using C-G did not differ from the 24-hour urine collection (p=0.359), while the MDRD and MDRD-S estimations of GFR were high compared to the 24-hour urine collection (p=0.02 and 0.012, respectively). The mean±standard deviation of the GFR estimates from the 24-hour urine collection, MDRD, MDRD-S, and C-G were 75±31, 105±37, and 71±21 ml/minute, respectively. The mean±standard deviation of the percent difference for MDRD, MDRD-S, and C-G from the 24-hour urine estimate were 36±8, 32±8, and 1±3%, respectively. The GFR estimate using C-G did not differ from the 24-hour urine collection (p=0.359), while the MDRD and MDRD-S estimations of GFR were high compared to the 24-hour urine collection (p=0.02 and 0.012, respectively).

CONCLUSIONS: The Cockcroft-Gault equation provided a better estimate of GFR than MDRD or MDRD-S in this population.

179E. Intravenous (IV) iron trends in U.S. dialysis patients (1994-2001). Wendy L. St. Peter Pharm.D.\(^1\), Gregorio T Obrador, M.D.\(^2\), Tricia L. Roberts, M.S.\(^3\), Brian J. G. Pereira, M.D.\(^4\), Allan J. Collins, M.D.\(^5\). (1)University of Minnesota and Chronic Disease Research Group, Minneapolis, MN; (2)University of Panamericana, Insurgentes Mexcoco, Mexico; (3)Chronic Disease Research Group, Minneapolis, MN; (4)Tufts-New England Medical Center, Boston, MA.


180E. The effects of lanthanum carbonate and calcium carbonate on bone in patients with chronic kidney disease. Anthony J. Freemont, M.D.\(^1\), J. Denton, M.D.\(^2\), Chris Paug, Pharm D.\(^3\). (1)The Medical School, University of Manchester, Manchester, United Kingdom; (2)Shire, National Medical Science Liaison Manager/Medical Information, Newport, KY.

Presented at the Clinical Meeting of the National Kidney Foundation, Chicago, IL, April 28-May 2, 2004.

181E. Optimal sampling for international normalized ratios in hemodialysis patients with central venous catheters. Alex V Boyd, B.S.\(^1\), Amy B. Pai, Pharm D.\(^2\), Anne Tinklenberg, R.N., BSN\(^3\), Kelly Townsend, B.S.\(^4\), Charles T. Spalding, M.D.\(^1\), Ph.D.\(^5\). (1)University of New Mexico, Albuquerque, NM; (2)Dialysis Clinic Inc, Albuquerque, NM; (3)TriCore Laboratories, Albuquerque, NM.

Published in J Am Soc Nephrol 2003;14:729A.

182E. Fluoxetine-induced orobuccal dyskinesia and persistent mandibular dystonia treated with botulinum toxin type-A. Jack J. Chen, Pharm D.\(^1\), David M. Swope, M.D.\(^2\). (1)Western University of Health Sciences and Movement Disorders Clinic, Loma Linda University, Pomona, CA; (2)Loma Linda University, Loma Linda, CA.

Published in Mov Disord 2004;19(suppl 9):S72-S73.

183. Rasagiline, a selective, second-generation, irreversible inhibitor of monoamine oxidase type-B, is effective in patients older and younger than 65 years of age with early-to-advanced Parkinson's disease (PD). Jack J Chen, Pharm.D.\(^1\), Richard C. Berchou, Pharm D.\(^2\). (1)Western University of Health Sciences and Movement Disorders Clinic, Loma Linda University, Pomona, CA; (2)Wayne State University, Detroit, MI.

PURPOSE: Rasagiline is an investigational drug demonstrating efficacy in patients with early-to-advanced PD. Age-related differences in clinical effects are unknown and warrants investigation.

METHODS: Data from three multicentered, randomized, placebo-controlled trials were pooled and reanalyzed for differences in efficacy between patients ≥65 or ≤65 years of age. Only patients receiving rasagiline 1mg daily were included. One trial assessed early PD patients for baseline change in Total Unified Parkinsons Disease Rating Scale (UPDRS), which measures motor function/mobility. The standard deviation of the percent difference for MDRD, MDRD-S, and C-G from the 24-hour urine estimate was 36±8, 32±8, and 1±3%, respectively. The GFR estimate using C-G did not differ from the 24-hour urine collection (p=0.359), while the MDRD and MDRD-S estimations of GFR were high compared to the 24-hour urine collection (p=0.02 and 0.012, respectively). The mean±standard deviation of the GFR estimates from the 24-hour urine collection, MDRD, MDRD-S, and C-G were 75±31, 105±37, and 71±21 ml/minute, respectively. The mean±standard deviation of the percent difference for MDRD, MDRD-S, and C-G from the 24-hour urine estimate were 36±8, 32±8, and 1±3%, respectively. The GFR estimate using C-G did not differ from the 24-hour urine collection (p=0.359), while the MDRD and MDRD-S estimations of GFR were high compared to the 24-hour urine collection (p=0.02 and 0.012, respectively).

CONCLUSIONS: The Cockcroft-Gault equation provided a better estimate of GFR than MDRD or MDRD-S in this population.
RESULTS: Mean overall baseline FOG-Q score was 12. Rasagiline+LD/CD produced a significant mean 1.2 point decrease from baseline in FOG-Q versus placebo+LD/CD (p=0.05). Entacapone+LD/CD showed a 1.1 point reduction from baseline (p=0.068) versus placebo+LD/CD. FOG-Q reductions with rasagiline+LD/CD correlated significantly with BDI but non-significantly with baseline FOG severity, improvements in total daily OFF time, or total UDPSR. FOG-Q reductions with entacapone+LD/CD correlated significantly with baseline FOG severity and improvements in total daily OFF time and total UDPSR.

CONCLUSIONS: Significant improvement in FOG with once-daily rasagiline 1mg in advanced PD was independent of symptom effects, suggesting additional non-dopaminergic actions. Conversely, the effect of entacapone on FOG appears to be dependent on symptomatic effects. This study was supported by Teva Neuroscience Inc., in partnership with Eisai Inc., and H Lundbeck A/S.

187. Characterization of acute and delayed headache in migraineurs following sublingual nitroglycerin challenge. Tyler M. Smith-Strutz, Pharm. D., Candidate1, Edward M. Bednarczyk, Pharm. D., Linda Hersh, M.D., Ph.D.,2, Ellana Eberhardt, CCRC, R.N.,3,4, (1)State University of New York at Buffalo, Buffalo, NY; (2)Veterans Affairs Medical Center of Buffalo, Buffalo, NY.

PURPOSE: Nitroglycerin is well recognized as a headache inducer. Literature has asserted that migraineurs experience ‘spontaneous’ migraines within twenty-four hours of nitroglycerin challenge. The purpose of this study was to characterize acute and delayed headache in migraineurs following sublingual nitroglycerin challenge.

METHODS: Migraineurs, with and without aura (IHS criteria), recruited from the general population received 0.3 mg of sublingual nitroglycerin. They reported headache occurrence and similarity to their usual migraines on a 0–10 scale immediately following dosing, with 10 being exactly like usual migraine. Volunteers were asked about the presence of laterality, pulsatility, nausea, photophobia, and phonophobia in their induced headache. Volunteers were contacted approximately twenty-four hours later and queried regarding headache occurrence and similarity to usual migraine.

RESULTS: Seventeen migraineurs were enrolled. All experienced acute headache following sublingual nitroglycerin. The median similarity rating of headaches was 4.5 and 4 for patients with aura (N=4) and without aura (N=13), respectively; and six and seven in the two groups (70.6%, 64.7%, 52.9%, 35.3%, and 32.9% of migraineurs experienced the same symptoms of laterality, pulsatility, nausea, photophobia, and phonophobia, during headache after nitroglycerin challenge, respectively. Twenty-four hours following nitroglycerin, 33% experienced headache with a median similarity score of 6.5. Volunteers with aura and without aura reported 24 hour headache recurrence rates of 50% and 30.8% with similarity ratings of 8 and 6, respectively.

CONCLUSIONS: Sublingual nitroglycerin reliably provokes acute headache in migraineurs; however, it does not necessarily induce migraine within twenty-four hours. Even when headache forms, either acute or delayed, these headaches are dissimilar to migraines.

188E. National survey of high-dose steroid prescribing practices following spinal cord injury (SCI). Denise H. Rhoney, Pharm. D., Matissa Didonato, Pharm.D., Lisa L. Larive, Pharm.D; Wayne State University, Detroit, MI.

Published in Crit Care Med 2003; 31(12): Suppl.A88 320.


PURPOSE: It has been estimated that 5% of the US population suffers from tinnitus severe enough to seek medical attention. In spite of this, no effective pharmacotherapy has been identified, and few drugs have been carefully studied. The purpose of this study was to evaluate topiramate for the treatment of subjective idiopathic tinnitus.

METHODS: A randomized double blind, placebo controlled, crossover trial of topiramate was conducted. Patients age 18-75 with history of subjective tinnitus >1 year were recruited via a local tinnitus support group and newspaper advertisements. Patients were excluded based on the presence of significant neurologic or psychiatric disease, previous use of topiramate, concomitant pharmacotherapy of tinnitus or ototoxic drugs, or use of investigational drugs within 30 days. A 10 point visual analog scale (VAS) was used to assess tinnitus. Topiramate was administered at 25mg/day, with dose escalation for up to 2 weeks, then held at this dose for an 8 week period. A 1 week placebo run-in preceded each arm of the study.

RESULTS: Ten subjects were enrolled in the study; 4 continued the study through completion of both arms. Median tinnitus VAS scores were 5, 3.3 and 7 for baseline, topiramate and placebo respectively. Reduction for withdrawal included family emergency (1, topiramate), increasing tinnitus (1, placebo), confusion (1, topiramate) and paresthesias (1, placebo) a final subject was withdrawn by the investigators for misrepresenting their age.

CONCLUSIONS: While the high drop out rate precludes a definitive conclusion, topiramate does not appear to offer significant symptomatic benefit to patients with subjective tinnitus.

Nutrition


PURPOSE: To establish an outcome based cost effective multidisciplinary obesity program.

METHODS: Adult patients >18yr were recruited from an out patient university based setting to participate in a 20 week structured weight management program incorporating behavioral techniques and diet/exercise and disease management. Faculty included a physician (responsible for overall patient care), pharmacist (responsible for medication management and data collection/analysis), and behavioral psychologist (small group facilitator/educator). Specialist consultant such as a dietician and exercise physiologist participate as needed. Clinical outcomes such as weight change, metabolic fitness, health related QOL, depression scores and binge eating severity are documented.

RESULTS: All data are expressed as mean (SD). 90 patients (74 Female), mean age 48+10 yrs started the program. At the start of the program weight was 66+46 lbs (BMI 37+5 kg/m2). Weight (kg) was measured at 13 intervals (n=9). The total # of drugs per patient was 4.9+3.3 (range 0–15). The total # of drugs per patient was 4.9+3.3 (range 0–15). The total # of drugs per patient was 4.9+3.3 (range 0–15). The total # of drugs per patient was 4.9+3.3 (range 0–15). The total # of drugs per patient was 4.9+3.3 (range 0–15). The total # of drugs per patient was 4.9+3.3 (range 0–15).

CONCLUSIONS: This program is a successful model of collaborative therapy management, each faculty team member contributes within their area of expertise to achieve positive patient outcomes.


PURPOSE: Parenteral nutrition (PN) has the potential for serious adverse events involving various health-care system breakdowns, yet many institutions have no standardized method for capturing these adverse events. This study describes the use of a computerized database to record the frequency and type of adverse events related to PN in a large, teaching university hospital.

METHODS: Data was prospectively collected for any patient receiving PN between November 2002 to May 2004. Data was entered into the UHC Patient Safety Net® System, a real-time, Web-based reporting tool that is used for adverse event reporting. Data collection included errors related to wrong formulation preparation, operational system errors, order entry problems with automated technology, and incorrect administration practices. Each event was assigned a harm score (A,B) to assess severity of the adverse event.

RESULTS: The overall error rate was calculated at 15.9 errors per 1000 PN prescriptions filled. The majority of errors (33%) were associated with incorrect administration practices, followed by 23% order entry errors, 12% operational system errors, 9% preparation errors, and 23% miscellaneous errors. The event distribution included 11 (15%) near-miss events (harm scores A, B1, B2), 58 (77%) no-harm events (harm scores C,D), and 6 (8%) harmful events (harm scores E,F).

CONCLUSIONS: Serious adverse events related to PN occurred at a relatively high rate in a large, teaching university institution. Many of the adverse events were related to errors in the ordering process and administration of PN. A standardized ordering process should be created to reduce PN administration and preparation errors.


PURPOSE: to determine the frequency of use of medication associated with weight gain (WG) by participants in a weight loss program

METHODS: Adult patients >18yr were recruited from an out patient university based setting to participate in a 20 week structured weight management program. All data are reported as mean + SD.

RESULTS: Ninety patients (74 female) were recruited. Age 48 + 10 years, BMI 37.6 kg/m2. Participants had multiple diseases including: type 2 diabetes mellitus (n=23), hypertension (n=48), depression (n=18) and dyslipidemia (n=9). The total # of drugs per patient was 4.9+3.3 (range 0–15). The # of WG was 0.84+1.0 per patient (range 0–3). Forty-three (48%) patients were taking at least one WGD. WGD included beta blockers (n=18), SSRI's (n=18), sultfonylureas (n=7), insulin (n=9), and TZDs (n=6). Seven patients
193. A comparison between ICU and LTCT nurses in delivering medications through enteral feeding catheters. Charles F. Seifert, Pharm.D., FCCP, BCPS; Barbara A. Johnston, R.N., Ph.D., Schools of Pharmacy & Nursing, Texas Tech University Health Sciences Center, Lubbock, TX.

PURPOSE: To compare ICU & LTCT nursing practices with regard to the delivery of medications through enteral feeding catheters (EFCs).

METHODS: Two large national surveys (ICU = 1278, LTCT = 1177) of nurses were compared regarding predetermined delivery techniques for administering medications through EFCs.

RESULTS: Significantly more patients received medications through EFCs in the ICU setting (73.3%) than the LTCT setting (66.8%) (p<0.0001). There were more medications administered per day in the LTCT setting (8.8 vs 6.3, p<0.0001) but more doses administered per day in the ICU setting (9.3 vs 7.3, p<0.0001). Significantly more LTCT nurses were aware of guidelines in their facility (70.6% vs 36.4%, p<0.0001) and had attended an in-service (50.6% vs 19.2%, p<0.0001) LTCT nurses were receiving three common ICU medications at a higher overall medication administration rate (15.6%) than LTCT nurses (5.2%) (p<0.0001). Out of eight pre-determined techniques, a significantly higher percentage of ICU nurses (45.1%) utilized three or more inappropriate techniques than LTCT nurses. ICU nurses had a significantly higher medication administration rate than LTCT nurses.

CONCLUSIONS: Significant differences exist between ICU & LTCT nurses regarding administration techniques for delivering medications through EFCs. ICU nurses utilized a significantly greater number of inappropriate techniques than LTCT nurses. ICU nurses had a significantly higher medication administration rate than LTCT nurses.

Oncology


PURPOSE: This study evaluated 1) the hematopoietic response of darbepoetin alfa, 2) determined the effect of modified front-load, weight-based dosing every 3 weeks and 3) assessed the patient's quality of life (QOL).

METHODS: This open-labeled, non-randomized pilot study recruited women receiving chemotherapy for gynecologic tumors who met study criteria. Study was approved by 2 IRBs and started 6/2003. A single 400 µg dose of darbepoetin alfa was given either on the same day as chemotherapy or the day after chemotherapy. A single follow-up dose was given if Hb > 12 g/dL (n=3).

RESULTS: Nineteen patients were included in data analysis. Fifteen patients were receiving no iron supplementation (response rate of 31%). Six patients were receiving iron supplementation (response rate of 62%). Iron status did not influence the hematologic response (p=0.16).

CONCLUSIONS: Iron supplementation contributes to increased rate of hematologic response in hematology/oncology patients receiving darbepoetin alfa.
PURPOSE: We are developing two fusion proteins consisting of a diphtheria toxin (DT) linked to either granulocyte macrophage colony stimulating factor (DT-GMCSF) or interleukin-3 (DT-IL3). In trials, patients with anti-DT IgG concentrations, but multiple transfusions maybe significant.

CONCLUSIONS: One FFP or PLT transfusion should minimally increase the plasma anti-DT IgG concentration content of 0.6 µg/ml) would increase the plasma anti-DT IgG concentration a strong correlation between anti-DT IgG content in PLT cross-reacting with DT-GMCSF and DT-IL3 (Rho=0.895, p=0.0013), and a strong correlation between anti-DT IgG content in PLT cross-reacting with DT-GMCSF and DT-IL3 (Rho=0.624, p=0.04). Assuming a plasma volume of a median (range) anti-DT IgG concentration in FFP against DT-GMCSF and DT-IL3 respectively. There was a strong correlation between anti-DT IgG content in FFP cross-reacting with DT-GMCSF and DT-IL3 (Rho=0.624, p<0.05). There was a strong correlation between anti-DT IgG content in PLT cross-reacting with DT-GMCSF and DT-IL3 (Rho=0.624, p=0.04). Assuming a plasma volume of 50 ml/kg in a 70 kg patient, a single FFP unit (median volume: 257 ml and anti-DT IgG content of 2 µg/ml) would increase the plasma anti-DT IgG content by 0.2 µg/ml. For PLT (median volume: 261 ml with anti-DT IgG content of 0.6 µg/ml) would increase the plasma anti-DT IgG concentration by 0.04 µg/ml.

CONCLUSIONS: One FFP or PLT transfusion should minimally increase anti-DT IgG concentrations, but multiple transfusions maybe significant.

207E. A phase II study of pegfilgrastim to support ACE 14 chemotherapy for the treatment of patients with small cell lung cancer (SCLC; extensive disease). Robert Pirker, M.D.1, E Ulsperger, Merger, J.1 Messemer, M.1 K Aigner, M.1 D Easton, Ph. D.2, P Bacon, Ph. D.2; (1)Division of Oncology, Department of Internal Medicine I, Medical University Vienna, Vienna, Austria; (2)Krankenhaus der Elisabethinen, Linz, Austria; (3)Krankenhaus der Elisabethinen, Linz, Austria; (4)Amgen Ltd, Cambridge, United Kingdom.


208E. Epotein-α (EPO) 40,000 U weekly (QW) vs darbepoetin-α (DARB) 200 µg Q2W in anemic cancer patients receiving chemotherapy: preliminary results of a phase 3 randomized trial. Roger Waltzman, M.D.1, Mark Fesen, M.D.2, Glenn R Justice, M.D.1, Christopher Croot, M.D.1, Denise Williams, M.D.1.


211. Better early and overall hematologic outcomes and lower drug cost with epoetin alfa (EPO) compared with darbepoetin alfa (DARB) in patients with chemotherapy-related anemia. Tami L. Brown, Pharm.D., Megan I. Brown, Pharm.D., Rozalin Sarkisian, Pharm.D., Western University of Health Sciences, College of Pharmacy and Hematology Oncology Medical Group of Orange County, Inc., Pomona, CA.

PURPOSE: Epoetin alfa and darbepoetin alfa have been proven similar in efficacy, yet darbepoetin alfa offers advantage in dosing schedule. This study assessed the feasibility of formulary conversion by monitoring the prescribing pattern, efficacy, safety, and costs of epoetin alfa and darbepoetin alfa in a community oncology practice.

METHODS: Retrospective chart reviews were conducted in anemic cancer outpatients who were prescribed epoetin alfa or darbepoetin alfa per Medicare guidelines. The efficacy endpoints assessed were hemoglobin response, hemoglobin correction, hematopoietic response, mean change in hemoglobin, and RBC transfusions up to 16 weeks. The secondary objectives assessed were safety and cost.

RESULTS: Seventy-three (70 epoetin alfa and 3 darbepoetin alfa) of 140 patients screened were evaluated. Mean age was 66 years. Lymphoma (26%) and gastrointestinal cancer (20%) were the most common cancer types. Inappropriate dosing occurred in 43% of the patients. In the epoetin alfa group, 52.8% achieved hematopoietic response with a mean change of hemoglobin of 1.3 g/dL at week 6. Baseline hemoglobin level significantly affected the response to epoetin (p<0.003). RBC transfusion occurred in 11.4% of patients from week 5 to EOTP in the epoetin group and none in the darbepoetin group. Diarrhea (8.6%) and headache (1.4%) were reported in the epoetin group. The 2-week cost analysis comparison showed benefits with darbepoetin alfa.

CONCLUSIONS: Based on the data collected, additional prescribing education is indicated to optimize the utilization of the erythropoietic agents. Considering the cost benefit of darbepoetin alfa, a formulary conversion to darbepoetin alfa in these patients appears appropriate.

212. Results of a randomized study of every-three-week dosing (Q3W) of darbepoetin-α for chemotherapy-induced anemia (CIA). Timothy Readen, M.D.,1 Venna Chau, M.D.,2 Bruce Saulman, M.D., Ali Ben-Jacob, M.D.,3 Glen J. Justice, M.D.,4 Ajit S. Manaim, M.D.,4 Dianka Katz, M.D.,4 Dianne K. Tomita, M.P.H.,5 Gregory Rossi, Ph.D.,6 (1)Hematology Oncology Consultants, Inc., St. Louis, MO; (2)Pacific Cancer Medical Center, Inc., Anaheim, CA; (3)Medical Oncology Associates, Kingston, PA; (4)Cache Valley Cancer Treatment and Research Center, Logan, UT; (5)Pacific Coast Hematology Oncology Medical, Fountain Valley, CA; (6)Amgen Inc., Thousand Oaks, CA.


213. Phase 1 study of CC-5013 (CC), a thalidomide (T) derivative, in patients with refractory metastatic cancer. Young Joo Choi, M.S.,1 Jung Mi Oh, Ph.D.,2 (1)Department of Pharmacy, Asan Medical Center, Seoul, South Korea; (2)Graduate School of Clinical Pharmacy, Sookmyung Women’s University, Seoul, South Korea.

PURPOSE: To perform the cost-effectiveness analysis (CEA) of amifostine given in combination with paclitaxel or cisplatin in Korean gynecologic cancer patients.

METHODS: Four-one patients with gynecological cancer receiving cisplatin or paclitaxel with or without amifostine (910 μg/kg) every 3 weeks for 6 cycles were evaluated. The ‘effectiveness’ of amifostine was determined by evaluating the frequency and the severity of hematologic, neurologic, and renal toxicities.

The ‘cost’ of the treatment was determined by including the expenses from the drugs, laboratory tests, and any additional medical expenses for treating the chemotherapy-induced adverse effects. C/E ratio, incremental cost-effectiveness ratio (ICER), and ICER graph were evaluated.

RESULTS: The cost per frequency of episode or C/E ratio for toxicity-grade 3, 4 neutropenia was ≤ 20,329 (Korean won)/percent, ≤ 18,454/percent, ≤ 16,840/percent, ≤ 15,058/percent, and ≤ 15,058/percent in TAP, TP, cTAP, and cTP group, respectively. ICER of neutropenia and neuropathy between TAP and TP was 547,730/22.06 and 532,611/9.07, respectively. ICER of neutropenia and neuropathy between cTAP and cTP was 466,275/0.16 and 497,061/4.49, respectively. ICER graph indicated that the groups treated with amifostine were inferior than control groups. All ICER except ICER of neuropathy between cTAP and cTP was located in IV area, indicating pre-treatment of amifostine was less effective and more costly than no amifostine.

CONCLUSIONS: Pre-treatment of amifostine is inferior to that of control groups in pharmacoeconomic analysis.

214. An evaluation of the different methods used to estimate creatinine clearance for patients receiving carboplatin. Andrea Hotsko, Pharm.D.,1 Deborah A. Blamble, Pharm.D.,1 Amy Hallfield, Pharm.D.,2 Helen McFarland, Pharm.D.,2 Michelle Rudek, Pharm.D., Ph.D.2 (1)The Johns Hopkins Hospital, Baltimore, MD; (2)The Johns Hopkins Hospital, Room IM85, Baltimore, MD.

PURPOSE: Differences in physician practice allow for estimating creatinine clearance through a number of methods including the Jelliffe and Cockcroft-Gault equations. The weight parameter used within these equations may be the actual, ideal or corrected body weight of the patient. Providers may also correct creatinine to 0.8 – 1 mg/dL or correct the Jelliffe equation for BSA. The objective of this study was to determine the frequency that practitioners adjust for these parameters and whether this affects carboplatin toxicities.

METHODS: Retrospective chart review of adult patients with head/neck, lung, or gynecologic malignancies who received carboplatin for at least 1 cycle and with at least 1 dose of the 2nd cycle ordered. Toxicities of the 1st cycle were evaluated Day #1 of the 2nd cycle and include: grade of
myelosuppression, thrombocytopenia, and change in creatinine.

RESULTS: Seventy-nine patients were included in this analysis. Only 8.8% of patients had ideal or corrected body weight used within the Cockcroft-Gault equation; no physician corrected for BSA within the Jelliffe equation; and only 19% of patients had their serum creatinine adjusted to 0.8–1.0 mg/dL in either of the two equations. A concise trend between type of weight used and creatinine associated myelosuppression could not be made. However, adjusting serum creatinine resulted in less clinically significant thrombocytopenia (14% vs 18%).

CONCLUSIONS: Results warrant further investigation with greater patient accrual per parameter category. Adjusting serum creatinine to 1mg/dL in patients with serum creatinine < 0.8mg/dL may reduce the incidence of thrombocytopenia but not neutropenia.

PEDIATRICS

218. Antiproteinuric effect of benazepril in pediatric patients: evaluation after formulary change. Irving Steinberg, Pharm.D.1, Jaspreet Bains, Pharm.D.2. (1)Division of Pediatric Pharmacotherapy, Department of Pediatrics, LAC-USC Medical Center, USC Schools of Pharmacy & Medicine, Los Angeles, CA; (2)USC School of Pharmacy, Los Angeles, CA.

PURPOSE: We examined the initial and maintained antiproteinuric effect of ACE-inhibitor therapy when medical center formulary preference shifted from enalapril and captopril (large pediatric experience) to benazepril.

METHODS: Retrospective evaluation was conducted of 45 patients from the pediatric renal clinic who were initiated on or switched to benazepril. Of these, 43 were used for analysis having initial and multiple follow-up urine protein creatinine ratios (Pr:Cr) measured, and compliance with therapy. Two patients had clear therapeutic failure with progressive renal disease. Parametric and nonparametric tests were applied to comparisons.

RESULTS: The mean ± s.d. age = 13.6 ± 3.0 years. The mean Pr:Cr (n = 21) at initiation of benazepril = 3.6 ± 4.6 (range 0.55 to 19.2) fell to 1.5 ± 0.19 (to 5.8, p<0.016) over a follow-up period of 453 ± 241 days. Nephrotic-level proteinuria (≥1000 mg/mg/day correlating to Pr:Cr ≥1.58) was observed in 13 patients when starting benazepril versus 6 at the final follow-up measurement (p=0.03). The median change in Pr:Cr in patients switched from another ACE-inhibitor (n = 7) was +10% (p=0.87 vs zero change), versus -60.6% (p<0.003) for patients initiated on benazepril (n = 14).

CONCLUSIONS: Benazepril maintained and provided antiproteinuric effects in patients switched to or initiated on this ACE-inhibitor in similar magnitude to published prospective pediatric studies of enalapril and ramipril. It is important to assess therapeutic response in subpopulations potentially affected by global formulary changes, where less published or practice experience exists.


PURPOSE: Pentoxifylline, an agent with anti-inflammatory activity, may have a role in preventing or treating chronic lung disease in premature neonates. Pentoxifylline is currently available in the US as an oral tablet, a dosage formulation not applicable in this population. This pilot study investigated the pharmacokinetic profile of pentoxifylline following two novel delivery techniques, intranasal and intratracheal.

METHODS: This pharmacokinetic study, utilizing 20 New Zealand white rabbits, consisted of 4 study groups. Group I was a control group and did not receive study medication. Groups II, III, and IV evaluated intravenous, intranasal and intratracheal routes of administration, respectively. A single 20 mg/kg pentoxifylline dose was administered to each rabbit followed by collection of blood samples over a 24-hour period. The pharmacokinetic parameters analyzed included area under the curve (AUC), max concentration (Cmax), time of maximum concentration (Tmax), elimination rate constant (Kel), and half-life (T1/2). Results: The pentoxifylline pharmacokinetic parameters following the intravenous administration included AUC 3458 ng/ml*hr, Cmax 15106 ng/ml, Tmax 5.4 minutes, Kel 0.036 min-1 and T1/2 19 minutes. The pharmacokinetic parameters following intranasal and intratracheal administration included AUC 4491 ng/ml*hr and 6622 ng/ml*hr, Cmax 10734 ng/ml and 15707 ng/ml, Tmax 24 minutes and 5 minutes, Kel 0.027 min-1 and 0.031 min-1, and T1/2 25 minutes and 22 minutes, respectively.

CONCLUSIONS: Further investigation is required to find an effective combination of pentoxifylline intranasal and intratracheal dosage formulations that would be suitable for use in premature neonates.


Introduction: The American Academy of Pediatrics has no defined criteria for treating bronchiolitis in children. Some studies demonstrate use of a bronchiolitis care path (BCP) does reduce length of stay (LOS).

PURPOSE: To determine if LOS is reduced in pediatric patients by following a BCP in a private practice - based community hospital.

METHODS: A prospective chart review was conducted to compare LOS before (2002–2003) and after (2003–2004) implementation of a BCP. Additionally, LOS during 2003–2004 was compared between patients on the BCP versus LOS in those where physicians did not use the BCP. Secondary endpoints included comparisons in medication usage, suctioning, documentation, diagnostic tool utilization and adverse events (ADEs). Statistical analysis was performed using SYSTAT. Sample size was based on a 20% decrease in LOS. Statistical significance was set at P<0.05. Chi square tests for nominal data and t tests for continuous data were used in the analysis. Descriptive statistics were also reported.

RESULTS: The LOS for patients in 2002–2003 was 1.8 days (N=68) versus 1.3 days (N=64) in 2003–2004 (p<0.03). Those patients who were on the BCP in 2003–2004 had a LOS of 1.19 (N=45) versus 1.78 days (N=10) in those not on the BCP. Medications usage was decreased and documented suctioning, and education increased substantially in 2003–2004 versus 2002–2003. No differences in reported ADEs were found.

CONCLUSIONS: Use of a BCP may be effective in reducing LOS in private practice-based community hospitals.

221. Efficacy and safety of cyclosporine therapy in children with nephrotic syndrome. Myoung-Hun Chun, RPH1, Kye Ho Sonh, RPH, PhD1, Dong-Kyu Jin, M.D., PHD1, Kyung-Eob Choi, Pharm.D.1, Suk-Hyang Lee, Pharm.D., PhD1. (1)Samsung Medical Center, Kang-Nam Gu, Seoul, South Korea; (2)Yonsei University Pharmacy, Sookmyung Women's University, Yong-San, Seoul, South Korea.

PURPOSE: To assess the therapeutic efficacy and safety of six-month cyclosporine treatment with the low-dose deflazacort therapy in children with nephrotic syndrome.

METHODS: Thirty children with steroid dependence (SD), frequent relapse (FR) and steroid resistance (SR) were enrolled. They were treated with 6-month oral cyclosporine plus the low-dose deflazacort therapy from September 2002. The dosage of cyclosporine was started at 5 mg/kg/day and was monthly adjusted to maintain clinical remission and/or a trough blood level while deflazacort dosage was reduced gradually. Clinical evaluation, and monitoring of cyclosporine toxicity were performed every 2–4 weeks. Outcomes were compared to the latest six-month period of steroid only therapy before cyclosporine treatment. Student’s t-test and ANOVA were used for statistical analysis.

RESULTS: Of 28 children with SD and FR, 23 sustained remission, and 5 (17%) experienced 1 or 2 relapses during therapy. Of 2 children with SR, 1 child sustained remission, and 1 child showed no response. The mean duration of remission and occurrence of relapse were significantly improved (p<0.001). In addition, the mean dosage of steroid was significantly reduced (p<0.003). No nephrotoxicity was observed. Twenty out of the 28 children who had been in remission relapsed after withdrawal of cyclosporine. Fifteen of these children showed relapse within a month.

CONCLUSIONS: These results demonstrated that the combination of cyclosporine with the low-dose deflazacort was efficient and safe in children with SD and FR during the six-month treatment.

222E. Establishing a limited sampling strategy for cyclosporine (Neoral®) for pediatric renal transplant patients. Mary H. H. Ensom, B.S.(Pharm), Pharm.D.1, Amanda Lai, B.Sc.(Pharm), student2, David S. Lirenman, M.D.3; (1)University of British Columbia and Children’s & Women’s Health Centre of British Columbia, Vancouver, BC, Canada; (2)University of British Columbia, Vancouver, BC, Canada; (3)Children’s & Women’s Health Centre of British Columbia, Vancouver, BC.

Published in J Informed Pharmacother 2004;15:400.

223E. Utility of anti-xa monitoring in children receiving enoxaparin for therapeutic anticoagulation in the sickle cell trait. Marianna Leung, BScPhm, Pharm.D.1, Donald P. Hamilton, BscPhm1, John K. Wu, MBBS, M.Sc.2, David S. Lirenman, M.D.3; (1)University of British Columbia and Children’s & Women’s Health Centre of British Columbia, Vancouver, BC, Canada; (2)Children’s & Women’s Health Centre of British Columbia, Vancouver, BC, Canada; (3)Children’s & Women’s Health Centre of British Columbia, Vancouver, BC;


224. Clinical experience with spironolactone in infants and children. Marcia L. Buch, Pharm.D., FCCP, University of Virginia Medical Center, Charlottesville, VA.

PURPOSE: In 2003, the Food and Drug Administration placed spironolactone (B) only on its priority list for pediatric studies. The purpose of this study was to describe the use of spironolactone in a large group of children and identify
227. Pharmacokinetics of ganciclovir in children following the administration of valganciclovir. Christine Hogue, Pharm.D., 1 Janette A. Hickey, Pharm.D., 1 Carolyn Kenhin, Pharm.D., 1 BCPs, 1 Hasan S. Jafri, M.D., 2 (1)Children's Medical Center, Dallas, Dallas, TX; (2)Methodist Medical Center of Dallas, Dallas, TX; (3)University of Texas Southwestern Medical Center, Dallas, TX.

PURPOSE: The steady state pharmacokinetic parameters and safety of ganciclovir was evaluated in children taking valganciclovir.

METHODS: Eligible study subjects must have received 48 hours of ganciclovir therapy with no IV or PO ganciclovir within this time period. Twelve children (0.9 to 13 years) qualified for the study. Eleven patients were solid organ transplant recipients and one patient was treated for EBV encephalitis. The average ganciclovir dose was 14 mg/kg/dose given every 12 hours (n=6) or 24 hours (n=6). For 12 hour dosing, ganciclovir levels were obtained at 0, 0.75, 1, 2.5, 5, and 12 hours. For 24 hour dosing, levels were obtained at 0, 0.75, 1, 2, 3, 6, 12, and 24 hours. Drug levels were assayed by HPLC methods and pharmacokinetics were analyzed by non-compartmental methods.

RESULTS: Ganciclovir pharmacokinetic parameters (mean +/- SD) in children on 12 hour dosing were: peak ganciclovir concentration 6.9 µg/mL (range 3.88) and area under the curve 30.0 µg/mL x hr (range 23.5). The ganciclovir peak concentration and area under the curve for 24 hour dosing were 6.6 µg/mL (range -3.5) and 42.0 µg/mL x hr (range 22.6), respectively. Peak ganciclovir concentrations were 9.5 mg/L (± 2.7) for fed patients and 4.1 mg/L (± 1.0) for unfed patients. The time to maximum serum concentration for all patients was 1.7 hr (+/- 0.6). The terminal half-life was 4.6 hr (+/- 2.4).

Neutropenia was reported in 2 patients and nausea and vomiting in 1 patient.

CONCLUSIONS: Valganciclovir was rapidly absorbed and converted to ganciclovir. Pharmacokinetic parameters varied greatly between pediatric subjects.

Pharmacoeconomics/Outcomes

228. Temporal effect of argatroban administration on budgetary impact of heparin-induced thrombocytopenia. Elizabeth J. G. Arnold, Pharm.D., 1 Renee F. Robinson, Pharm.D., 2 John D. Mahan, M.D., 2 Milap C. Nahata, Pharm.D., FCCP, 1 (1)The Ohio State University College of Pharmacy, Columbus, OH; (2)The Ohio State University College of Medicine, Children's Hospital, Department of Pediatrics, Division of Nephrology, Columbus, OH.

PURPOSE: Pamidronate therapy (PT) may increase bone mineral density (BMD) and decrease fracture rates in children with osteogenesis imperfecta (OI) and idiopathic juvenile osteoporosis (IJO).

METHODS: Medical records of all children with OI and IJO receiving PT between 1999 and 2003 were retrospectively reviewed and analyzed via t-test.

RESULTS: A total of 100 patients were evaluated. Average patient age was 9.7±4.4 yrs. Height 111.0±27.3 cm, BMD 0.382±0.192 g/cm2, and BMD Z score -0.58±0.89. Mean age at initiation of PT was 9.7±4.4 yrs. Median dose of PT was 12 mg/kg/yr (range 9–24 mg/kg/yr) with a twice daily interval in 53 patients and once daily in 43. Sixty-six patients received furosemide, 37 received thiazides. Average serum potassium after initiation was 4.4±0.8 mmol/L. Potassium levels were 3.4±0.5 mmol/L at the start of treatment. The difference was significant (p <0.001).

RESULTS: Vd was 0.5 L/kg for all of the 5 age groups (n=23). Kel (hr-1) and T1/2 (hr) were similar among all 3 age groups >30 wks (n=16); 0.16±0.06 and 0.9±0.39, respectively. Five of 7 patients in the age groups <30 wks had PDAs resulting in lower Kel (p<0.005) and higher T1/2 (p<0.0001) compared to all other patients.

CONCLUSIONS: Patients with a PDA have reduced elimination similar to PDAs resulting in lower Kel (p<0.005) and higher T1/2 (p<0.0001) compared to other patients. Some patients, regardless of PDA status, had a Vd of 0.5 L/kg, suggesting a uniform empiric gentamicin dosage of 4 mg/kg/dose. Patients >30 wks PMA and ≥7 days old have similar elimination characteristics, which may suggest a uniform empiric dosing interval of every 12–18 hours for these patients.

229. A predictive model of hospitalization and potential cost savings associated with oxandrolone in cancer patients with IWL. Hind T. Hatoum, Ph.D., 1 A. Simon Pickard, Ph.D., 1 Faith D. Ottery, M.D., Ph.D., 1 Karin A. Greenberg, Pharm.D., 2 (1)Hend Hatoum & Co., Chicago, IL; (2)Georgia State University College of Pharmacy, College, GA.

PURPOSE: We evaluated the financial implications of using the direct thrombin inhibitor argatroban for early treatment (<48 hours after thrombocytopenia onset), compared with delayed treatment (≥48 hours after thrombocytopenia onset), of heparin-induced thrombocytopenia (HIT) with or without thrombosis.

METHODS: A cost analysis model was developed using data from argatroban clinical trials, medical literature, an expert panel, 2003 Physician's Fee Reference, 3 2003 Healthcare Cost and Utilization Project, and drug costs from 2003 Drug Topics Redbook. The total per-patient cost included hospital days, diagnostic tests,heparin, argatroban, major hemorrhagic events and patient outcomes (i.e., amputation, new thrombosis, stroke, or death), multiplied by the probability of each event.

RESULTS: The mean cost per patient having HIT without thrombosis who did not receive argatroban was $38,046. For such patients treated early with argatroban therapy, the mean cost decreased by 6.9%, representing a $2,605 savings per patient. For those receiving delayed argatroban therapy, the mean cost increased by $6,419 per patient. The mean cost for patients having HIT with thrombosis who did not receive argatroban was $48,101, which was 9.0% greater than those receiving early argatroban therapy, representing a $3,957 savings per patient. Mean costs increased by 18.2% (to $52,164) in patients whose argatroban was delayed, representing a cost increase of $8,020 per patient compared with early treatment.

CONCLUSIONS: Early initiation of argatroban therapy upon suspicion of HIT is recommended to reduce the prothrombotic consequences of HIT and associated healthcare costs. Argatroban therapy should not be delayed pending the results of HIT diagnostic tests.

230E. Short-term treatment of posttraumatic stress disorder: venlafaxine XR vs sertraline or placebo. Jonathan Davidson, M.D., 1 Alan Lipschitz, M.D., 2 Jeff Maunig, M.T. 1 (1)Duke University Medical Center, Durham, NC; (2)Wyeth Research, Collegeville, PA.


230E. Short-term treatment of posttraumatic stress disorder: venlafaxine XR vs sertraline or placebo. Jonathan Davidson, M.D., 1 Alan Lipschitz, M.D., 2 Jeff Maunig, M.T. 1 (1)Duke University Medical Center, Durham, NC; (2)Wyeth Research, Collegeville, PA.

231. Quantifying the impact of an automatic antibiotic pharmacy intravenous to oral interchange program across all diagnoses: the physician ‘spillerover effect’. John Dougherty, M.B.A., Pharm.D.1, James Prindiville, BA, CPhT2, Violeta Barac, CPhT2, Philip Sanchez, M.D.2, Lee Adler, M.D.2, Judy McManness, Pharm. D.2, (1)Orlando Regional Medical Center, Orlando, FL, (2)University Hospital, Orlando, FL, (3)Palm Beach Gardens Hospital, Palm Beach Gardens, FL.

BACKGROUND: In 2001, physicians were reluctant to switch inpatients from intravenous (IV) to oral (PO) antibiotics. In 2002, a highly debated pilot program at Florida Hospital assessed an IV to PO automatic interchange. With a successful pilot program, a protocol endorsed by Infectious Disease physician champions allowed pharmacists to initiate an automatic switch of antibiotics from IV to PO.

PURPOSE: Evaluation of pharmacist-generated versus physician-generated “spillerover” conversions, assessment of program cost-minimization, and cost-savings from physician “spillerover”.

METHODS: A retrospective study was conducted on 203 randomly sampled conversions between March - December 2003. Reviews utilized Palm® based Pendragon® software to evaluate: pharmacist and physician conversions, conversion candidacy and actual conversion time, drugs converted, physicians involved, discharge time, and drug cost.

RESULTS: Two hundred-three conversions (171 patients) were evaluated. Eighty-seven (43%) conversions were initiated by pharmacists, 116 by physicians. Conversion candidacy versus actual conversion time was 1.56 days (pharmacists) versus 1.95 days (physicians). Forty percent of physician-generated conversions did not meet criteria for pharmacist conversion had 1.2 greater days on PO versus IV compared to physicians. Annual savings realized from pharmacy interventions were $317,932. Including physician conversions, savings were $282,872 annually. Additional savings ($68,000) are realized if patients are considered upon meeting protocol criteria.

CONCLUSIONS: Pharmacist-directed IV to PO conversions led to cost-savings that doubled when factoring in a physician “spillerover” effect. High numbers of physician-generated IV to PO conversions not meeting criteria suggests the protocol may be conservative and therefore a greater proportion of patients could safely be intervened upon by pharmacists.


PURPOSE: To evaluate medication persistence with OROS methylphenidate (M.P.H.) #91Concerta mixed amphetamine salts extended-release (MAS XR) or Adderall XR), or Extended-Release (ER) M.P.H. (Metadate CD) in the treatment of patients (ages 6-12) with attention-deficit/hyperactivity disorder (ADHD).

METHODS: This was a 9-month retrospective longitudinal study of pharmacy claims data from Verispan for the period October 2002 to June 2003. Patients (ages 6-12) included in the analysis were required to have a new prescription (no prior ADHD medication use in 12 months) for OROS M.P.H., MAS XR, or ER M.P.H. Persistence was defined as a period ≥ the days of medication supplied plus a 30-day grace period between prescription fills. RESULTS: Of the 20,089 patients included in this study, 9,110 were prescribed OROS M.P.H., 9,343 were prescribed MAS XR, and 1,636 were prescribed ER M.P.H. Patients prescribed OROS M.P.H. or MAS XR were 1.47 times (95% CI = 1.29, 1.67; p<0.0001) more likely to persist on their medication than those prescribed ER M.P.H. No significant differences in persistence rates were observed with OROS M.P.H. or MAS XR.

CONCLUSIONS: In patients with ADHD, OROS M.P.H. and MAS XR were associated with significantly greater persistence than ER M.P.H. and were not significantly different from each other. Medication persistence is an important factor to consider when selecting ADHD therapy.


PURPOSE: To identify how new brand or generic drugs enter affect drug prices of those already in the market.

METHODS: Using the First Databank file, average wholesale price (AWP) data for each drug NDC were analyzed from 1986 to 2002. Study drugs were focused on four therapeutic classes: atypical antipsychotics, SSRIs, ACE inhibitors, and statins. Drug prices were calculated and compared as the monthly average AWP of daily dose for each brand and generic drug according to published trend analysis.

RESULTS: Drug prices for all brand names of four therapeutic classes increased overtime. Drug prices for all generic drugs decreased overtime. Drug prices for all atypical antipsychotics, SSRIs and ACEI brand names increased overtime with the introduction of new brand and generic drugs to the weekly Pricevar chart remained high price while Lipitor price was the lowest. Lovastatin price was introduced at 60% below its brand and decreased sharply later. A little impact on drug price after Baycol withdrawal in August 2001. The first generic ACEI captopril was introduced as the same price as its brand in 1994 and decreased dramatically. Enalapril as the second generics introduced as 50% below its brand Vasotec. Risperdal price increased sharply in mid-1999 due to new dose formulation. Clozapine generic drug price introduced at 90% of brand Clozaril and decreased sharply later.

CONCLUSIONS: Brand name drug prices didn't decrease when another new brand or generic drug was introduced. Drug prices for generic drugs decreased overtime due market competition.


235E. Short-term treatment of depressed and anxious primary care patients with multiple, unexplained somatic symptoms using venlafaxine XR. Jeff Maugnon, MT, Kurt Kroenke, M.D., Isma Benattia, Ph.D., Jay Graepel, Ph.D.1, (1)Wyeth Pharmaceuticals, Collegeville, PA; (2)Indiana University School of Medicine, Indianapolis, IN.


236. Impact of new technology payments for drotrecogin-a (activated): the Mercury study. Liesl M Cooper, Ph.D.1, Walter Linde-Zwirble, 2, Jodi Jacoby, Pharm.D., FCCP RC.1, (1)Eli Lilly and Company, Indianapolis, IN; (2)Health Process Management (HPM), Doylestown, PA; (3)Methodist Hospital/Clarian Health, Indianapolis, IN.

Published in Crit Care Med 2003;31(12 Suppl):A119.

237. Impact of glycoprotein use on clinical and economic outcomes in PCI stented patients in academic health centers. Mandy E. Grant, Pharm.D, Candidate1, Michael J. Omonen, Pharm.D.2, Joseph P. Cummings, Ph.D.2, (1)Midwestern University, Chicago College of Pharmacy, Downers Grove, IL; (2)University HealthSystem Consortium, Oak Brook, IL; (3)Medical College of Wisconsin, Milwaukee, WI.

PURPOSE: Acute complications of percutaneous coronary intervention (PCI) are mitigated with the use of IIb-IIIa glycoprotein (GP) inhibitors. New methods of drug eluting stents (DES) for prevention of long-term complications (restenosis) has placed increased cost pressures on health centers. The impact of DES on Iib-IIIa has not been described.

METHODS: GP use within bore metal stents (516e517) and DES (526e527) DRGs was queried from the University HealthSystem Consortium (UHC) Clinical Database-Pharmacy for Q2–Q4, 2003. Patient length of stay (LOS), mortality rates, total hospital and pharmacy costs were studied.

RESULTS: GP were used in 8,023 of 12,600 PCI procedures. Eptifibatide was used most frequently (68% of cases). Absolute GP use dropped 7% over Q2–Q4, while DES use increased 35%. DRGs 526 and 516, acute myocardial infarction (AMI) patients, had the highest GP use in all 3 quarters. When GPs were added to therapy, total hospital costs increased approximately $2,000 for DRGs 516. 9,343 were prescribed for DRG 327. GP use was associated with decreased mortality in patients with AMI, notably DRG 316 (1.5% with GP vs. 2.9% without). LOS was not altered by the use of GP for any DRG.

CONCLUSIONS: Increased use of DES has demonstrated minimal impact on use of Iib-IIIa GP inhibitors. Increased use of DES in patients (AMI), consistent with the demonstrated benefits of the agents. GP are associated with decreased mortality. The cost impact of DES may be reduced with the appropriate use of GP in patients selected for high-risk features.

238. The impact of comorbidities and methylphenidate formulation on ADHD outcomes. Maureen J. Lage, Ph.D.1, Jason E. Kenmer, M.P.H.2, (1)HealthMetrics Outcomes Research, LLC, Groton, CT; (2)McNeil Consumer and Specialty Pharmaceuticals, Fort Washington, PA.

PURPOSE: Examine how co-morbidities and methylphenidate (M.P.H.) formulation impact treatment patterns and use of emergency room (ER) services in children and adolescents with attention-deficit/hyperactivity disorder (ADHD).

METHODS: Patients from a large claims database age 6–18 diagnosed with ADHD who receive either OROS® M.P.H. (Concerta®; N=4,295) or three-times-daily IR M.P.H. (N=884) are included in the analyses. Analyses of covariances examine differences in treatment patterns. Multivariate analyses examine the impact of co-morbidities and medication delivery on ER services use.

RESULTS: Individuals who initiate therapy with OROS M.P.H. are significantly less likely to have a 15 or 30 day therapy gap (85% vs. 99%, p<0.001) and 76% vs. 98%, p<0.001, respectively) or switch ADHD medication (27% vs. 72%, p<0.001) compared to TID M.P.H. Diagnosis of oppositional defiant disorder (ODD) is associated with a greater number of visits to the ER (coefficient=0.32, p<0.016) while the use of OROS M.P.H. compared to TID M.P.H. is associated with significantly less use of ER services.

241. Estimating the cost burden of insomnia in elderly and non-elderly adults. Ronald J. Ozminiewski, Ph.D.3, Sara Wang, Ph.D.1, Lucinda Orsini, Ph.D.1, Daniel F. Luce, R.Ph, M.B.A.2; (1)MEDTAP International, Bethesda, M.D.; (2)Bayer HealthCare, Biological Products Division, Research Triangle Park, NC; (3)National Jewish Medical and Research Center, Denver, CO. Published in Value in Health 2004;7(3):354.

242. Potential medical cost reduction due to decreases in A1c and Research Center, Denver, CO.

245. A pharmacist's impact on medication safety through automation. Anisa Mock, Pharm.D; (1)Pharm.D; Janelle Y. Berg, Pharm.D., BCPS, Fernando J. Zaldívar, RPh, Mercy Hospital, Miami, FL.


245. A pharmacist's impact on medication safety through automation. Anisa Mock, Pharm.D; (1)Pharm.D; Janelle Y. Berg, Pharm.D., BCPS, Fernando J. Zaldívar, RPh, Mercy Hospital, Miami, FL.


245. A pharmacist’s impact on medication safety through automation. Anisa Mock, Pharm.D, Janelle Y. Berg, Pharm.D., BCPS, Fernando J. Zaldívar, RPh, Mercy Hospital, Miami, FL. Published from the Institute of Medicine's 1999 report concluded that medication errors are responsible for about 7,000 deaths, at a cost of up to $136 billion dollars annually to the health care system. A novel approach to enhancing medication safety includes Pyxis MedStation software ALERxT and Clinical Data Categories (CDCs). These programs are site-specific and designed to provide last minute warnings and/or documentation upon removal of target medications. The primary objective of this study is to evaluate the impact of these software enhancements, on medication safety. METHODS: A medication safety subcommittee was formed to serve as a risk management tool and to provide a list of alert names and/or document upon removal of target medications. The primary objective of this study is to evaluate the impact of these software enhancements, on medication safety. RESULTS: In non-profiled areas like the Emergency Room the activated Alerts prevented 23 potential medication errors. In the profiled areas or pilot units, alerts were expected. An additional, a pain scale CDC was implemented in two pilot units. During a 10 day observation period it was found that all pain scores were documented in the Pyxis Medstation as required; however, only 43% were documented in the medical record. CONCLUSIONS: Alert and CDC implementation was successful. These enhancements prevented nursing personnel from carrying out medication errors. In non-profiled areas it is now routine practice to bring the medical record to the Medstation at time of removal.

245A. Cost-efficacy analysis of peginterferon-α2b plus ribavirin compared to peginterferon-α2a plus ribavirin for treatment of chronic hepatitis C. Published in Gastroenterology 2004;126(4 suppl 2):A336,A601.

Daniel C. Malone, Ph.D., Tram T. Tran, M.D., (1) College of Pharmacy, University of Arizona, Tucson, AZ; (2) Cedars-Sinai, Los Angeles, CA.

**PURPOSE**: To compare cost-effectiveness of combination ribavirin (RBV) plus pegylated interferon alfa-2b (Peg-2b) or pegylated interferon alfa-2a (Peg-2a) treatment in hypothetical cohorts of 100 hepatitis C (HCV) patients, using current patient management algorithms. Randomized phase III trials comparing both Pegs to standard interferon have yielded comparable sustained viral responses (SVR), however clinical use of reported 12-week early viral response (EVR) to discontinue eventual nonresponders may affect overall cost-effectiveness (Manns, 2001; Fried, 2002; Davis 2003).

**METHODS**: A decision analysis model was constructed to compare Peg-2b-RBV and Peg-2a-RBV per approved label doses. An additional analysis was done using Peg-2b-RBV (>10.6 mg/kg/d). Base-case assumed average patient weight of 82kg. EVR, a predictor of SVR, was assessed at week-12 for genotype 1 patients with non-responders discontinuing therapy. Genotype 2/3 patients were assumed to be treated for 24 weeks. Product pricing was based on AWP June 2004.

**RESULTS**: Peg-2b-RBV resulted in lower overall cohort treatment costs than Peg-2a-RBV. Results are shown below. Evaluating EVR leads to fewer patient treatment with Peg-2b-RBV as compared to Peg-2a-RBV.

**Conclusions**: These results suggest a cost-benefit to treating HCV patients with Peg-2b-RBV because fewer patients are treated beyond week-12 when achieving treatment success is unlikely.

248E. A comprehensive pooled analysis of remission data in depressed patients: venlafaxine versus SSRIs (COMPARABLE). Charles Nemeroff, M.D., Ph.D.,* Richard Ennslah, Ph.D.,* Mark Demitrack, M.D.,* Isma Benattia, M.D.,* Michael Thase, M.D.,* (1) Emory University School of Medicine, Atlanta, GA; (2) Wyeth Research, Collegeville, PA; (3) University of Pittsburgh Medical Center, Pittsburgh, PA.


**Pharmacoepidemiology**


**PURPOSE**: While metformin is often used in the treatment of type 2 diabetes (T2DM), it is contraindicated in patients receiving drug therapy for heart failure (HF) and in kidney disease (KD). This study examined metformin use in T2DM patients in a U.S. representative population.

**METHODS**: The National Health and Wellness Survey is a survey of 36,452 adults, conducted in June 2003. Patient self-reported characteristics (age, gender, BMI, medication use, and prior diagnosis of T2DM, HF, and KD) were obtained, using stratified sampling to represent the US population based on age, gender, race/ethnicity, and census region.

**RESULTS**: 9.74% of respondents reported having type 2 diabetes; 3.69% of T2DM patients reported having KD and 8.65% had HF. Characteristics were similar for patients with KD (mean age=57.8, 49% female, mean BMI=33.8) and without KD (mean age=58.1, 51% female, mean BMI=33.6), except for duration of T2DM (mean=13.2 vs 7.8 years, p<0.001). Patients with T2DM and HF were older (mean age=63.1 vs 57.6, p<0.001) and more likely to be male (59.5% vs 48.2%, p=0.01) than those without HF. Among patients treated with an oral diabetic medication, 23% of KD patients and 49% of HF patients reported using metformin.

**CONCLUSIONS**: T2DM patients with KD or HF frequently used metformin, suggesting that metformin may be often prescribed inappropriately. Novel therapeutic choices with fewer restrictions may play an important role in the management of T2DM in patients with co-morbidities.


**PURPOSE**: To determine the potential geographic variation in stimulant prescriptions for the treatment of ADHD by U.S. physicians from the 2001 NAMCS dataset. The study utilized the 2001 multi-stage National Ambulatory Medical Care Survey (NAMCS). U.S. office visits associated with ADHD were identified using ICD-9-CM codes. Stimulant treatment was captured by use of the FDA drug classification code. The dependent variable studied was use of a stimulant to treat ADHD with the independent variables assessed including region of country, age group, sex, ethnicity, race, physician specialty and payment type.

**RESULTS**: The 2001 NAMCS randomly sampled a weighted national estimate of 880,486,669 physician office visits in the U.S. A weighted estimate of 4,219,759 office visits associated with ADHD were sampled. Compared to psychiatrists, pediatricians were 66% less likely to have treated a patient with ADHD. Physicians treated with a stimulant medication. ADHD managed by a stimulant medication (OR=0.339; p=0.048; 95% CI 0.116–0.991). Compared to patients living in the Midwest region of the U.S., those living in the Northeast, South and West were 76% (OR=0.242; p=0.014; 95% CI 0.080–0.734). 78% (OR=0.219; p=0.007; 95% CI 0.075–0.642), and 90% (OR=0.103; p=0.019; 95% CI 0.016–0.670), respectively, less likely to be treated with a stimulant medication.

**CONCLUSIONS**: Regional differences existed in the use of stimulant medication for treatment of ADHD, with patients living in the Midwest region of the U.S. having the greatest odds of having their ADHD treated with a stimulant medication. In addition, psychiatrists were more likely to treat patients with ADHD on a stimulant medication.


252. Duration of physician visit and management of drug therapy. Agnes Lo, Pharm.D., Kathryn M Ryder, M.D., Ronald I Shorr, M.D.; University of Tennessee Health Science Center, Memphis, TN.

**PURPOSE**: To determine if the duration of physician visit in ambulatory care setting is influenced by patient age, number and therapeutic class of medications, and co-morbid illness.

**METHODS**: A cross-sectional study of visits to primary care physicians among adults age > 45 was conducted using 2002 National Ambulatory Medical Care Survey data. Primary endpoint is the time patient spent with physician at each visit. Covariates included for analysis were demographics, insurance, previous visits, major reason for visits, number and therapeutic class of medications, and co-morbid illness. Point estimates were obtained using univariate and multivariate linear regression.

**RESULTS**: Of 28,738 visits in the dataset, 3089 were included for analysis. The mean time spent with physician was 17.9±8.2 minutes. Elderly patients (age >75) were prescribed more medications than patients age 45–64 and age 65–74, p<0.001. Elderly patients were also receiving more medications that require specific monitoring (warfarin, digoxin, ACE inhibitors, diuretics, and
leptothymine), p<0.001. Cardiovascular and cerebral vascular diseases were more common in elderly patients than in other groups, p<0.001. Despite these differences, there were no differences in either unadjusted or adjusted duration of physician visit among the groups.

253. Analysis of potential myopathic drug interactions between simvastatin and amiodarone, verapamil, niacin or gemfibrozil. Craig D. Williams, Pharm.D.1, Jim Fuller, R.Ph.1, Jamie Lebester, Pharm.D.2, (1)Purdue University School of Pharmacy, Indianapolis, IN; (2)Hendricks Community Hospital, Indianapolis, IN.

PURPOSE: To screen a large outpatient population for high-risk drug combinations with simvastatin and identify any incidence of myopathy or rhabdomyolysis.

METHODS: Electronic pharmacy and medical record databases for a large, inner-city hospital were screened. The database was queried for all patients prescribed simvastatin 10mg or higher, and any dose of niacin, gemfibrozil, verapamil or amiodarone between October 1, 2001 and October 1, 2002. Electronic medical records were then screened for any elevation of CPK in patients who were on a combination above the simvastatin dosage recommended by the manufacturer.

RESULTS: A total of 19,443 prescriptions for simvastatin were identified in 5,169 patients. 336 patients were on an interacting medication at a higher than recommended dose of simvastatin. Amiodarone and verapamil accounted for 38 and 131 patients respectively while niacin and gemfibrozil accounted for 41 and 108 patients. Five CPK elevations above 10x the upper limit of normal were identified. Four were ruled out as drug induced (two acute MI, one post-trauma, one cocaine intoxication). One patient on verapamil was ruled a possible drug-induced myopathy and did have her simvastatin stopped. However, she was re-initiated on the combination 3 months later and has not had any recurrence of symptoms after more than a year of combined therapy.

CONCLUSIONS: While certain drugs should be used cautiously when combined with higher doses of simvastatin due to the risk of myopathy, we were unable to identify a significant risk from four of these drugs when combined with simvastatin in our health care system.

Pharmacogenomics

254. SNP discovery using denaturing HPLC for the CACNA1C gene. Amber L. Page, Pharm.D.1, Taimour Y. Langaae, Ph.D.1, Jamie A. Johnson, Pharm.D.2, (1)Department of Pharmacy Practice, University of Florida, Gainesville, FL; (2)Department of Clinical Pharmacy, University of Colorado School of Pharmacy, Denver, CO; (3)University of Florida, Gainesville, FL.

PURPOSE: There is wide interpatient variability in sensitivity to warfarin and there is interest in understanding the genetic basis for this variability. Vitamin K epoxide reductase is the target of the anticoagulant warfarin. Four single nucleotide polymorphisms (SNPs) within the vitamin K epoxide reductase gene, VKORC1, have recently been described in individuals requiring high doses of warfarin (greater than 60 mg/week). We sought to determine whether these SNPs occur, and influence warfarin sensitivity, in a large population of patients receiving stable warfarin therapy.

METHODS: Genetic samples were obtained from 350 patients who were within goal INR range and had stable weekly maintenance doses of warfarin over 3 consecutive clinic visits. We determined genotypes of the four SNPs using polymerase chain reaction (PCR) followed by Pyrosequencing. Allele frequencies were determined using gene counting.

RESULTS: Three hundred fifty patients receiving chronic, stable warfarin therapy were included in the analysis. All 350 patients were genotyped at SNP 1 (G538T) and SNP 2 (T747C), and none carried a variant allele associated with decreased warfarin sensitivity. In addition, 200 patients were genotyped at SNP 3 (A1780G) and SNP 4 (T3860G), and again, none carried a variant allele.

CONCLUSIONS: The four recently described SNPs in VKORC1 were not present in our large population of patients on chronic warfarin therapy. Our data suggest that these polymorphisms may represent rare mutations rather than SNPs and therefore may not be useful in assessing interpatient variability in response to warfarin within the general population.

255. Frequency of FY2 haplotype and GPIIIb/IIIa genotype in African American and Caucasian populations. George A. Davis, Pharm.D.1, Jeremy D. Flynn, Pharm.D.1, Elaina M. Carmichael, B.S.1, Wendell S. Akers, Pharm.D.1, Ph.D.1, University of Kentucky; Department of Pharmacy Practice and Science, Lexington, KY.

BACKGROUND: The adenosine diphosphate (ADP) P2Y12 and glycoprotein (GP) IIb/IIIa receptors play a pivotal role in platelet aggregation. However, inter-individual differences in ADP-induced platelet aggregation have been associated with haplotypes of the P2Y12 receptor gene (H1 and H2) in Caucasian males. Several polymorphisms of the GP IIb/IIIa receptor have been identified and a common polymorphism (PLA2) may be a risk factor for acute coronary syndromes and antplatelet resistance.

PURPOSE: To identify the frequency of FY2 haplotype and GPIIIb/IIIa genotype in African American and Caucasian population.

METHODS: In 200 subjects, DNA was analyzed using the polymerase chain reaction (PCR)-restriction fragment length polymorphism (RFLP) protocol. The PCR products were digested with Rsal, MSpi, and Nci restriction enzymes. The substitution of cytosine for thymidine at position 1585 in exon 2 of the GP IIa gene was used to determine the P2Y12 polymorphism. Complete linkage disequilibrium between 4 known single nucleotide polymorphisms (SNP) led to use of the T744C SNP for assessing the FY2 H2 haplotype. Frequencies of polymorphisms between populations were analyzed using χ2.

RESULTS: The frequencies for the FY2 haplotype H2 were 18% in Caucasians and 15% in African-Americans. Frequencies for the GPIIIb/IIIa genotypes PLA1 and PLA2 were 90% and 10% in both populations, respectively. Frequencies of all polymorphisms were in Hardy-Weinberg equilibrium and no ethnic differences were observed.

CONCLUSIONS: The frequencies of FY2 and GPIIIb/IIIa receptor polymorphisms can now be used to define the population size needed to evaluate their potential risk in atherothrombosis and clinical response to antplatelet agents.

257. A global view of thiopurine methyltransferase pharmacogenetics. Mona K. Patel, B.S.1, Derek J. Van Booven, B.S.1, Howard L. McLeod, Pharm.D.1, Washington University School of Medicine, St. Louis, MO.

PURPOSE: Thiopurine methyltransferase (TPMT) catalyses the S-methylation of 6-thiopurine drugs including 6-mercaptopurine, azathioprine, and 6-thioguanine commonly used in leukemia, immunosuppression after organ transplantation, rheumatoid arthritis, and autoimmune diseases. TPMT enzyme activity is controlled by genetic polymorphisms that contribute to differences in toxicity, metabolism, and clinical efficacy of thiopurine drugs among individuals of various ethnic backgrounds. This study documents frequency of variant TPMT alleles in patient populations from seventeen countries, in order to better plan toxicitiy avoidance programs around the world.

METHODS: Textmining of PubMed identified journal articles that detailed variant allele frequencies of the TPMT gene, including TPMT*2, TPMT*3A, and TPMT*3C in 5,392 healthy, adult subjects from seventeen different countries on five continents.

RESULTS: There was a great range in the frequency of variant alleles (1% to 10.6%). The geographic area with highest variant allele frequency was...
sub-Saharan African, while the lowest frequencies were observed in Asia. The TPMT*3C allele was the most commonly observed variant in both African and Asian populations, while TPMT*3A was most commonly observed in Europe, North America, and South America.

CONCLUSIONS: Significant geographic variation in TPMT genotype exists. This has significant implications for toxicity avoidance, use in public health initiatives, and will help the planning of cost effectiveness studies.

258. Defining the opportunity for pharmacogenomic intervention in primary care. Gloria S. Rickkallah, Pharm.D. 1, Terry L. Seaton, Pharm.D. 1, Abigail M. Woodland, Pharm.D. 1, Howard L. McLeod, Pharm.D. 2, (1)St. Louis College of Pharmacy, St. Louis, MO; (2)Washington University School of Medicine, St. Louis, MO.

PURPOSE: This was a cohort study to determine the frequency of use of medications under pharmacogenetic influence, including sixteen ADR-associated medications, in the primary care setting.

METHODS: Consecutive patients over 3 months were asked to answer a verbal survey of demographics and medication use during the past 12 months (later verified by chart review). The survey specifically identified 16 drugs known to commonly cause ADRs and undergo metabolism by polymorphic enzymes (previously published). The primary outcome was the frequency of medication use.

RESULTS: Overall, 28.6% of patients took at least one of the ADR-associated medications. Neither gender nor race appeared to influence the frequency of use of these medications (p=0.5 and p=0.08, respectively). Patients taking >1 of the drugs were older (p=0.001). More patients seen for a chronic visit took >1 of the ADR drugs (than patients seen for an acute visit: 18.3% vs. 18.3%, p=0.001). Overall, patients reported using medications from 7 commonly prescribed drug classes in the primary care setting, all of which contain agents metabolizing, transporting or targeting genes with known genotypic polymorphism.

CONCLUSIONS: The findings indicate that at least 1 in 4 primary care patients take at least one medication that commonly causes adverse drug reactions due to genetic variability in drug metabolism. This represents a minimum, as many other medications are putatively influenced by genetic polymorphism. These findings indicate that there is a role for pharmacogenomics in primary care.

259E. Availability of pharmacogenomics-based prescribing information in drug package inserts for currently approved drugs. Issam Zinel, Pharm.D. 1, Tobias Gerhard, B.S. 2, Christina L. Aquilante, Pharm.D. 3, Amber L. Beitelchees, Pharm.D. 4, B. Niki Beasley, Pharm.D. 5, Abraham G. Tartes, M.S.P.H., Ph.D. 1, (1)Department of Pharmacy Practice, University of Florida, Gainesville, FL; (2)Department of Pharmacy Health Care Administration, University of Florida, Gainesville, FL; (3)Department of Clinical Pharmacy, University of Colorado School of Pharmacy, Denver, CO; (4)U.S. Food and Drug Administration, Rockville, MD.


260. Verified predominance of slow acetylator phenotype for N-acetyltransferase (NAT-2) in a Hmong population residing in Minnesota. Robert J. Straka, Pharm.D. 1, R. Todd Burkhardt, Pharm.D. 1, Nicholas P. Lang, M.D. 2, Kelly Z. Haas, Pharm.D. 1, Tae Vang, Pharm.D. 1, Michael Y Tsai, Pharm.D. 2, (1)University of Minnesota, Minneapolis, MN; (2)Central Arkansas Veterans Healthcare System, Little Rock, AR; (3)North Memorial Hospital, Robbinsdale, MN.

PURPOSE: Hmong refugees from Laos, have a high prevalence of tuberculosis (TB) and select cancers. Given that previous work (Straka J. Clin. Surgery of Trauma, Maui, HI, September 29–October 2, 2004.) known to commonly cause ADRs and undergo metabolism by polymorphic enzymes (previously published). The primary outcome was the frequency of medication use.

METHODS: Blood samples were collected at 0, 4, 8, 24 and 168 hours after ingestion of 12oz can of Coca-Cola® prior to collecting urine for 8 hours. TOL24 was present (r²=0.80, p<0.001), with statistically significant differences between CYP2C9*1/*1, *1/*2, and *1/*3 individuals (mean±SD: 5.9±1.0 vs. 12.0±3.5 vs. 17.7±1.5 µg/ml, p<0.05 between each group), respectively. Correlations between the genotype and TOL24 activity were also observed: Moreover, a significant association between CYP2C9 genotype and TOL24 was present (r²=0.80, p<0.001), with statistically significant differences between CYP2C9*1/*1, *1/*2, and *1/*3 individuals (mean±SD: 5.9±1.0 vs. 12.0±3.5 vs. 17.7±1.5 µg/ml, p<0.05 between each group), respectively. CONCLUSIONS: TOL24 strongly correlated with ClTOL (r=0.96, p<0.001) and significantly differentiated among individuals of diverse CYP2C9 genotype. TOL24 is an easily obtainable phenotypic measure of CYP2C9 activity with potential clinical utility. Future study in larger populations is warranted.

262. Dynamic effects of interferon-beta (IFN-β) on multiple sclerosis patients differing in anti-IFN-β neutralizing antibody status. Renee M. Santos-DeSavoy, B.S. 1, M.S. 2, Bianca Weinstock-Guttman, M.D. 2, Murali Ramanathan, Ph.D. 3, (1)University at Buffalo, Amherst, NY; (2)Jacobs Neurological Institute, Buffalo, NY.

IFN-β is an immunomodulatory drug widely used for the treatment of relapsing-remitting form of multiple sclerosis (RR-MS). However, only 30% of M.S. patients respond well to IFN-β therapy. The clinical relevance of neutralizing antibodies (NAB), which can cause partial responsiveness, is not well established.

PURPOSE: The objective was to determine whether the dynamics of gene expression induced by IFN-β differ in the presence or absence of NABs. Ten RR-MS patients (6 F, 4 M, 45–57 years) with known previous history of NAB status (four were previously NAB positive, five were NAB negative and one was persistently positive) were enrolled.

METHODS: Blood samples were collected at 0, 4, 8, 24 and 168 hours after the first intra-muscular dose of 30 mg of INF-β1a. Total RNA from mononuclear cells was prepared (TRI Reagent method) and reverse transcribed into cDNA. The mRNA levels of 8 genes were measured (Beta-actin, beta-2-microglobulin, STAT1, Mx1, Mx2, TRAIL, IL-8, MMP9) using real-time PCR with Taqman probes.

RESULTS: The results show that early rather than later measurements are more sensitive to NAB status with maximum effect occurring at 4 hours. NAB positive patients did not show any gene expression responses but patients who were previously NAB positive recover their responses; however, there is a trend toward lower values of these genes compared to NAB negative patients, notably for STAT1, TRAIL and Mx1.

CONCLUSIONS: These findings highlight the usefulness of the gene expression profiling to delineate response differences between individual MS patients for the clinically useful NAB profiling.

263E. Pharmacokinetics of enoxaparin in multiple trauma patients. Curtis E. Ham, Pharm.D., BCPS, Jamie I. Nelson, Pharm.D., Krishnan Bhagvandar, M.D., Lydia Lin, Pharm.D., Qing Ma, Ph.D., Alan Forrest, Pharm.D.; University at Buffalo, Buffalo, NY.

Presented at the 63rd Annual Meeting of the American Association for Surgery of Trauma, Maui, HI, September 29–October 2, 2004.
Developing an equation to predict creatinine clearance (CLcr) in adults with moderate to severe hepatic impairment, and to determine the reliability of serum and urine assays for creatinine in this population.

METHODS: Two sequential 24 h urine collections and three serum samples were collected for determination of creatinine excretion and CLcr. Creatinine in both matrices was determined by automated chemistry (clinical laboratory) and HPLC. Predictive covariates were evaluated using step-wise multiple regression and NONMEM.

RESULTS: A total of 27 evaluable patients completed the study. Mean age was 49 in males and 53 in females, and mean weight was 76 and 69 kg, respectively. The mean bilirubin was 6.9 mg/dl, albumin was 2.3 g/dl and INR was 2.0. Estimated creatinine excretion was \( 282 \pm 220 \) mL/h for females and \( 314 \pm 183 \) mL/h for males. Mean measured CLcr was 82 mL/min in males and 61 mL/min in females. Using NONMEM for model building, CLcr could be estimated using the following equations: Male CLcr = 4.69*(sCr x (ABW/70)) and Female CLcr = 4.69*0.8683*sCr. Other more complex candidate models were also evaluated. Serum creatinine was over-predicted to low concentrations and under-predicted at higher concentrations using the above method (routine clinical assay). Urine creatinine concentration tends toward over-prediction at lower creatinine concentrations.

CONCLUSIONS: Urine creatinine excretion and clearance were associated with weight in males but not in females. The new estimation equations provide much less bias than the Cockcroft-Gault equation. Creatinine concentrations determined by clinical autoanalyzer may not be reliable.

265E. Evaluation of precipitated withdrawal in opioid-dependent volunteers given hydrocodone and naltrexone. Donald Jasinski, M.D., Robert J. Cohen, M.D., Ph.D., Robert F. Kutsko, M.S., M.D., Ph.D., John C. Messina, Jr., Pharm. D.

266E. Pharmacodynamics of antimicrobials against Gram-negative bacteria in pediatric patients: a report from the OPTAMA Program. Jennifer M. Ellis, Pharm. D., Brent M. Booker, Pharm. D., A. Richard C. Brundage, Pharm. D., Ph. D., Joseph L. Kuti, Pharm. D., David P. Nicolau, Pharm. D.

267E. Utilization of cyclosporine C2 monitoring in stable Asian transplant patients. Lan Chi L. Bui, Pharm. D., Christopher D. Breder, M.D., Ph. D.

268E. Pharmacokinetics of tr oxacitabine. Richard J. Brandung, Pharm. D., Ph. D., Florence H. Yong, M.S., Tereon Fenton, Pharm. D., Stephen A. Spector, M.D., Stuart E. Starr, M.D., William J. Courney V. Fletcher, Pharm. D., Ph. D., University of Minnesota, Minneapolis, MN; (2)Genzyme Corporation, Cambridge, MA; (3)Harvard School of Public Health, Boston, MA; (4)University of California, San Diego, San Diego, CA; (5)University of Pennsylvania, Philadelphia, PA; (6)University of Colorado, Denver, CO.


Presented at the 14th European Conference of Clinical Infectious Disease, Prague, Czech Republic, May 1–4, 2004.

270E. Optimal sampling strategies (OS) for sparse PK evaluation of multi- drug anti-HIV regimens. Qing Ma, Ph. D., Alan Forrest, Pharm. D., Olanrewaju O. Okusanya, Pharm. D., Ph. D., Sue Rosenkrantz, Ph. D., Michael F. Para, M.D., Elizabeth Adams, M.D., Kevin E. Yarasheski, Ph. D., Sue Rosenkrantz, Ph. D., Richard C. Reichman, M.D., Gene D. Morse, Pharm. D., Ph. D., (1)University at Buffalo, Buffalo, NY; (2)Ohio State University, Columbus, OH, (3)NIH, Bethesda, MD; (4)Washington University School of Medicine, St. Louis, MO; (5)Harvard University, Boston, MA; (6)University of Rochester, Rochester, NY.

Presented at the 8th World Congress on Clinical Pharmacology and Therapeutics, Brisbane, Australia, August 1-6, 2004.

271E. Variability in efavirenz concentrations predicts virologic outcome in HIV-infected children. Richard J. Brandung, Pharm. D., Ph. D., Florence H. Yong, M.S., Tereon Fenton, Pharm. D., Stephen A. Spector, M.D., Stuart E. Starr, M.D., William J. Courney V. Fletcher, Pharm. D., Ph. D., University of Minnesota, Minneapolis, MN; (2)Genzyme Corporation, Cambridge, MA; (3)Harvard School of Public Health, Boston, MA; (4)University of California, San Diego, San Diego, CA; (5)University of Pennsylvania, Philadelphia, PA; (6)University of Colorado, Denver, CO.


272E. Population pharmacokinetics of troxacitabine. Carlton K.K. Lee, Pharm. D., M.P.H., Francis Giles, M.D., Malcolm J. Moore, M.D., Ed Chu, M.D., Manuel Hidalgo, M.D., M.D., Edmund Capparella, Pharm. D., Jacques Jolivet, M.D., Sharyn D. Baker, Pharm. D.; (1)Department of Pediatrics, Johns Hopkins University & Department of Pharmacy, The Johns Hopkins Hospital, Baltimore, M.D.; (2)The University of Texas M.D. Anderson Cancer Center, Houston, TX; (3)Princess Margaret Hospital, Toronto, ON, Canada; (4)Yale Cancer Center, VA Connecticut Healthcare System, West Haven, CT; (5)The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, M.D.; (6)Pediatric Pharmacy Research Unit, University of California at San Diego, La Jolla, CA; (7)Shire Pharmaceuticals, Laval, QC, Canada.
CONCLUSIONS: Covariate modeling supports the use of BSA in current dosing strategies for TROX.

Pharmacy Administration


PURPOSE: To determine pharmacistic profiles of formulated ketorolac transdermal systems and compare with those of oral administration.

METHODS: Male Sprague-Dawley rats weighing 280–320 g were divided into three groups, comprising 6 rats each. KETOROLAC tromethamine was administered by oral (2487 µg/kg), transdermal delivery system (TDS) 1 (2101 µg/kg) and TDS 2 (2392 µg/kg) administration. Disulfiram glycol monooethyl ether (DGME)-propylene glycol monolaurate (PGML) and DGME-propylene glycol monocaprylate (PGMC) at the ratio of 4:6 were employed as a penetration enhancer for TDS 1 and TDS 2, respectively. Serum samples (0.1 ml) were collected from the femoral arterial cannula before and after 0.25, 0.5, 1, 2, 4, 6, 8, 12, and 24 hr after drug administration and analyzed by HPLC.

RESULTS: Lower Cmax and prolonged Tmax of ketorolac were observed with transdermal administration; Cmax and Tmax by oral, TDS 1 and TDS 2 administration were 4182.6 ng/ml and 0.25 hr, 2524.9 ng/ml and 2.0 hr and 1733.7 ng/ml and 3.3 hr, respectively. The AUC values obtained by TDS 1 (14721 ng•hr/ml) and TDS 2 (14797 ng•hr/ml) were comparable with oral administration (15704 ng•hr/ml) whereas half-life by TDS administration increased from 3.6 to 6.7 hr, compared to oral administration.

CONCLUSIONS: Ketorolac TDS using DGME-PGMC or DGME-PGML at the ratio of 4:6 as a penetration enhancer showed comparable AUC, prolonged half-life and Tmax and decreased Cmax compared to oral delivery.

280. Impact of the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003 in low-income patients receiving pharmacare company assistance (PCA) for medications. Dawn E. Havad, Pharm.D.; Estee Graves, Pharm.D.; candidate; William Bender, M.D.; Beth A. Omsundsen, M.D.; (1) Bernard J. Dunn School of Pharmacy, Shenoando University, Winchester, VA; (2)Amherst Family Practice, Winchester, VA.

PURPOSE: To evaluate the effect of MMA2003 drug discount cards (DDC) and prescription drug benefit (PDB) in low-income patients receiving pharmacare company assistance (PCA) for medication, and to compare projected benefits of MMA to PCA.

METHODS: Medicare patients obtaining 1+ medications (oral/inhaled) through PDA within 6months were included. Information obtained included: household size, total yearly income, medication/dosage. Cash prices obtained distribution volume (VdM8) & clearance (ClM8). Volumes are in L, clearance in L/h (all conditioned on NFV bioavailability); ClM8, VdM8 & ClM8 are also conditioned on fraction of NFV metabolized to M8.

Fits were good but M8 troughs tended to be overestimated & peaks were underestimated.

CONCLUSIONS: NFV PK is well-described by this model. M8 may require a model with saturable elimination. The long t1/2 appears to be drug re-distributing from the peripheral compartment. This model may allow a more appropriate analysis of NFV/M8 disposition, especially when combined with intracellular data, in future studies.

278. Evaluation of ketorolac transdermal systems using rats. Hyuen Gwah, Pharm.D.; Ph.D.; Youngho Cho, M.S.; College of Pharmacy, Chosun University, Gwangju, South Korea.

PURPOSE: To determine pharmacokinetic profiles of formulated ketorolac transdermal systems and compare with those of oral administration.

METHODS: Plasma samples from 111 cancer patients receiving IV doses of 0.12–12.5 mg/m² were used to develop the PK model with NONMEM. About 13 samples per patient were obtained from the 1st dose. 2 covariate groups (1: BSA, SEX, AGE, SCR; II: WT, HT, SEX, AGE, SCR) & PK parameters were evaluated by linear multiple regression. The 2 final PK models were validated by internal & external methods.

RESULTS: TROX PPK was characterized by a 3-compartment model, exponential interpatient variability (IPV) error model, combination residual error model, & FOCE INTERIM estimator method. Clearance was influenced by BSA (27% decrease IPV) or WT (20% decrease IPV). Central compartment volume was influenced by BSA (12% decrease IPV). Model validations reveal both final models accurate in predicting plasma TROX concentrations with the addition of covariates.

CONCLUSIONS: Covariate modeling supports the use of BSA in current dosing strategies for TROX.
PHarmacotherapy Volume 24, Number 10, 2004
through www.drugstore.com; eligibility/details of DDC and PDB obtained from MMS; discounts for DDC obtained from www.medicare.gov. Paired t-tests and Mann-Whitney test were used for continuous and categorical data, respectively.

RESULTS: 137 patients met eligibility. 79.4% qualified for $600 credit with DDC; 85.4% for low-income benefits with PDB. Mean number of medications taken was 3.5 ± 2.4 with 3.1 ± 1.8 from PCA. With PCA, total yearly cost of medications was $778.01 ± 931.35 compared to estimated cash cost of $3493.74 ± 1903.39 (p < 0.001). Use of PCA resulted in significantly greater yearly savings (76% ± 23.2%) versus DDC (25.3% ± 20.7%, p < 0.0001) compared to cash costs for all patients. $600 credit with DDC would last 3 ± 2.6 months for eligible patients and still resulted in yearly costs of $2629.22 ± 1743.93. Patients with total yearly income meeting federal poverty level (FPL) < 135% had more savings with PDB (94.2% ± 2.0%, p < 0.0001) compared to PCA. Patients with FPL < 135% had less cost-savings with PDB (39.0% ± 18.8%, p < 0.0001) compared to PCA.

CONCLUSIONS: PCA will result in less yearly drug costs for low-income patients compared to DDC including those eligible for $600 credit. Low-income patients meeting FPL < 135% will benefit more from PCA versus PDB.

Psychiatry


283. Differential rates of clinical trial discontinuation as a measure of treatment effectiveness among antipsychotic medications. Bruce J Kinon, M.D., Hong Looi-Seifert, Ph.D.; Eli Lilly and Company, Indianapolis, IN.

PURPOSE: Antipsychotic treatment discontinuation may be used to measure overall treatment effectiveness. Few studies systematically assess early treatment discontinuation differences among antipsychotics. We investigate olanzapine discontinuation compared to other atypical antipsychotics.

METHODS: A post hoc, pooled analysis of 4 randomized, double-blind clinical trials of 24–28 week duration included 822 olanzapine-treated and 803 risperidone-, quetiapine-, or ziprasidone-treated patients. Discontinuation rate difference was assessed using Fisher's exact test comparing olanzapine to the other atypicals combined. Kaplan-Meier estimators for probability of staying in treatment were obtained for both groups and treatment difference investigated by the log-rank test.

RESULTS: Olanzapine-treated patients were significantly more likely to complete treatment (53.9% vs. 39.3%, p < 0.001) and stayed in treatment longer (19.1 vs. 16.1 weeks, p < 0.0001) than other atypical-treated patients. Treatment discontinuation was primarily driven by differential discontinuation due to poor response/symptom worsening (olanzapine 14.3% vs. other 24.0%, p < 0.0001). There was no difference in discontinuation due to medication intolerability or other reasons.

CONCLUSIONS: The predominant reason for difference in early discontinuation between olanzapine and other antipsychotics was significantly higher dropouts due to poor response/symptom worsening with the other antipsychotics. Early treatment discontinuation may be an important gauge of relative treatment effectiveness among antipsychotics.


PURPOSE: To describe the burden of care for bipolar disorder in outpatient mental health practice in the United States.

METHODS: Data for 5 years (1997–2001) of the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) were pooled for analysis and weighted to provide unbiased national estimates. Summary statistics were computed to examine visit characteristics, payer source, major reason for visit, and provider specialty.

RESULTS: There were an estimated 19.4 million visits with a recorded bipolar diagnosis, representing 0.39% of all outpatient visits for the period. The majority of bipolar visits were to psychiatrists (82.3%), with bipolar visits constituting 10.7% of all visits to psychiatricians. 14.2% of bipolar visits were to primary care specialists. The most common major reason for a bipolar visit was routine follow-up for a chronic problem (64.4%), followed by flare-up for a chronic problem (17.2%). This was in contrast to the general population where the most common reason for visit was an acute problem (35.6%), followed by routine follow-up for chronic problems (28.2%). The primary payment source for bipolar visits was private insurance (41.2% vs. 53.2% in the general population), but with more visits reported as “self-paid” (18.2% vs. 12%). Medicare/Medicaid visits were similar (29.5% vs. 28.8%).

CONCLUSIONS: Visits for bipolar disorder take up less than 1% of health care visits overall, but comprise over 10% of visits to psychiatrists. Visits for bipolar disorder are more frequently self-paid than healthcare visits in general.

285. Atypical antipsychotic treatment in Alzheimer's disease: effect on cognition. Joshua Caballer, Pharm.D.; Michael Hitchcock, B.S.; Douglas Scharr, M.D.; David Beversdorf, M.D.; Milap C Nahata, Pharm.D., FCCP; (1)The Ohio State University, College of Pharmacy, Columbus, OH; (2)The Ohio State University, Department of Neurology, Columbus, OH; (3)The Ohio State University College of Pharmacy, Columbus, OH.

PURPOSE: Approximately 60% of the 4 million Americans with Alzheimer's disease (AD) develop psychotic features. Studies suggest cognitive decline is faster in patients with AD and psychosis than those without psychotic features. Atypical antipsychotics are often used to treat psychosis, but the effects on cognition are uncertain. Therefore, the objective of the study was to evaluate the effects of these agents on cognition.

METHODS: Data for a minimum of nine months were retrospectively collected from patients with AD taking atypical antipsychotics and those not receiving antipsychotic therapy using chi square and analysis of covariance (p < 0.05).

RESULTS: One hundred patients (72% female) of 278 were studied. Thirty-four patients were prescribed atypical antipsychotics, 23 of which were quetiapine (n = 24) was the most commonly prescribed antipsychotic (mean dose 71 mg/dl). The baseline mean MMSE score was 13.90 ± 1.09 and a mean annual rate of cognitive decline 2.37 ± 0.46 in patients receiving atypical antipsychotics versus 17.23 ± 0.84 (p < 0.026) and 2.26 ± 0.40 (p = NS) in those without psychosis.

CONCLUSIONS: The baseline mean MMSE score was lower in patients with psychosis, consistent with previous findings of increased risk of psychosis with AD progression. Unlike some studies, annual cognitive decline was similar in patients receiving antipsychotics versus those without psychosis, suggesting no adverse impact of atypical antipsychotic therapy on cognition.


PURPOSE: To compare the efficacy and safety of OROS® methylphenidate (MPh) (CONCERTA®) and atomoxetine (Strattera®) in children with attention-deficit/hyperactivity disorder (ADHD).

METHODS: Children (N = 1,323) ages 6–12 with ADHD were randomized (2:1 in a prospective, open-label, 29-week study of OROS MPh and atomoxetine). Subjects were newly diagnosed or were suboptimally managed on previous ADHD treatments and had an ADHD-Rating Scale (ADHD-RS) score ≥224 and a Clinical Global Impressions-Severity of Illness score ≥24. Dose was titrated based on investigators' clinical judgment in accordance with each product's labeling. Investigators rated treatment response using the ADHD-RS and the Clinical Global Impressions-Improvement of Illness (CGI-I). Parents evaluated treatments using a daily diary.

RESULTS: OROS MPh produced significantly greater improvement in...
investigator-evaluated ADHD-RS scores compared with atomoxetine at all 3 weekly evaluations (P<0.0001). Response rates (percent of subjects with 23% reduction from baseline ADHD-RS score) at each week were significantly greater for OROS M.P.H. compared with atomoxetine (76.1% vs. 63.0%, respectively, by Week 3; P<0.0001). Remission rates (percent of subjects with ≥50% reduction from baseline ADHD-RS score) at each week were also greater for OROS M.P.H. versus atomoxetine (36.8% vs. 40.7% by Week 3; P<0.0001). Investigator CGI-I ratings and parental diary scores were consistent with these findings. The incidences of adverse events were similar in both treatment groups.

CONCLUSIONS: Children with ADHD demonstrated significantly greater symptom improvement with OROS M.P.H. versus atomoxetine at all 3 weeks with similar rates of adverse events. Response rates and parental diary ratings were also greater with OROS M.P.H.

287E. Adherence/digitization improvement with orally-disintegrating olanzapine in schizophrenics, D. Houminer, M.D., Angela Hill, Pharm.D., Hong Liu-Sedlert, Ph.D., Bruce Kinon, M.D.; Eli Lilly and Company, Indianapolis, IN


288. Evolution of mood stabilizer utilization among patients with bipolar disorder in a managed care Medicaid program. Jeff J. Guo, B Pharm, Ph.D., Paul E. Keck Jr., M.D., Hong Li, Ph.D., Raymond Jing, Ph.D., Williams Carson, M.D., (1)University of Cincinnati College of Pharmacy, Cincinnati, OH; (2)University of Cincinnati College of Medicine and Cincinnati Veterans Affairs Medical Center, Cincinnati, OH; (3)Bristol-Myers Squibb Company PRI, Wallingford, CT; (4)Otsuka America Pharmaceutical, Inc., Princeton, NJ

PURPOSE: Drug utilization of mood stabilizers is evolving to new agents from different classes. Atypical antipsychotics olanzapine, risperidone, and quetiapine were approved for bipolar in 3/2000, 12/2003, and 1/2004, respectively. This study objective is to identify the evolution of mood stabilizer utilization, and to measure use of atypical antipsychotics before and after FDA approved indication.

METHODS: Using a multi-state managed care Medicaid claims database from 1/1/1998 to 12/31/2002, a total of 13,471 patients (age<65) who had at least 3-months continuous enrollment and at least one bipolar diagnosis were selected for this study. A time-series trend analysis was used to measure the drug utilization pattern.

RESULTS: Of 13,471 patients, 64% were female, average age was 29.4 years (SD=13.8). Percentages of mood stabilizer utilization changed from 1998 to 2002: 10% to 6% for lithium, 9% to 20% for atypical antipsychotics, 25% unchanged for other anticonvulsants, 12% to 13% for typical antipsychotics, and 47% to 33% for antidepressants. Consequently, the percentage of bipolar-related prescription costs changed from 1998 to 2002: 21% to 42% for atypical antipsychotics, 50% to 28% for antidepressants, unchanged for lithium (3%), anticonvulsants (23%), and typical antipsychotics (4%). Atypical antipsychotics were used off-label for bipolar treatment. After olanzapine received FDA approval in March 2000, both cost and utilization of atypical antipsychotics increased at about 10–40% annual rates.

CONCLUSIONS: Use of atypical antipsychotics as new mood stabilizers for bipolar disorder has increased while the use of lithium has decreased overtime.

289. Clinical characteristics and medication regimens of patients treated for schizophrenia with conventional depot antipsychotics. Licheng Shi, Ph.D., Ya Hasy-Asher-Svanum, Ph.D., Baojin Zhu, Ph.D., Qin Jiang, M.S., Douglas Fantes, Ph.D., Scott Andersen, M.S., David McDonnell, M.D., Steve Marder, M.D.; (1)Eli Lilly and Company, Indianapolis, IN; (2)UCLA, Veteran Affairs Great Los Angeles Healthcare System, Los Angeles, CA

PURPOSE: To assess clinical characteristics and medication regimens of schizophrenia patients treated in usual care with conventional depot antipsychotics (depos) as compared to patients treated with oral antipsychotics.

METHODS: Analyses included 2,186 participants in the U.S. Schizophrenia Care and Assessment Program (SCAP), a 3-year prospective naturalistic observational study of schizophrenia patients (7/1997–9/2003). Participants were recruited from a broad geographical area, and represented large systems of care. Enrollment characteristics were assessed using multiple sources, including patients’ medical records, a validated self-report health questionnaire, and various standard psychiatric clinician-rated scales.

RESULTS: Compared to patients receiving only oral antipsychotics during the 3-year study period (n=1,617), participants treated with depot (n=569) were significantly more likely to be younger, male, less educated, and with Medicare/Medicaid coverage (all p<0.01). Depot recipients were more frequently hospitalized for psychiatric purposes in the year prior to enrollment (44% vs. 35.4%, p<0.001). Rehospitalization rates were higher among patients treated with oral or illicit drugs (39% vs. 33.7%; p<0.001), scored poorer on a global measure of functioning (GAF; p<0.001), and exhibited higher psychopathology levels, particularly positive psychotic symptoms, hostility/excitement, and cognitive dissociation (all p<0.01). During the 1-year post initiation, depot-treated patients were on the drug for a mean of 331 days (median: 365 days) and frequently augmented with oral antipsychotics (68.3%) (mean: 164 days, median: 144 days).

CONCLUSIONS: Schizophrenia patients treated with depot appear to be distinctively different from those treated with only oral antipsychotics. Findings suggest that current depot utilization is largely restricted to a specific group of schizophrenia patients.


PURPOSE: To examine current trends of antipsychotic prescribing in children and adolescents enrolled in Texas Medicaid.

METHODS: Antipsychotic prevalence was defined as the number of individuals under the age of 20 years with at least 1 prescription claim for an antipsychotic agent, regardless of subclass, per 1,000 enrolled children and adolescents. Time trends in antipsychotic prevalence were assessed. Physician specialty and psychiatric diagnoses associated with antipsychotic prescribing were also evaluated.

RESULTS: From 1996 to 2001, the prevalence of total antipsychotic use increased, as an additional 9.2 youths per 1,000 enrollees received an antipsychotic prescription. The proportion of oral antipsychotics used decreased (3.1), while the prevalence of atypical antipsychotics dramatically increased (12.4). Psychiatrists accounted for 74.9% of all antipsychotic prescriptions over the 6-year period, and primary care physicians accounted for 11.0%. The number of atypical antipsychotic prescriptions from psychiatrists (224%) and primary care physicians (494%) increased, attributed to atypical antipsychotics. Disruptive behavioral disorders accounted for the highest percentage of diagnoses associated with antipsychotic treatment, followed by depressive disorders. Approximately 3% did not have a psychiatric or behavioral diagnosis.

CONCLUSIONS: The appropriateness of atypical antipsychotic use should be evaluated as limited data supporting safety and efficacy are available in children and adolescents.

291E. Immediate switching of antidepressant therapy: results from a clinical trial of duloxetine. Madalina Wohlteth, M.D., Craig Mallinckrodt, Ph.D., Megan Jones, Pharm.D., John Watkins, Ph.D., Michael Wilson, Ph.D., John Greist, M.D., Pedro Delgado, M.D., Mauricio Fava, M.D.; (1)Eli Lilly and Company, Indianapolis, IN; (2)Butler University, Indianapolis, IN; (3)Healthcare Technology Systems, Madison, WI; (4)Case Western Reserve University, Cleveland, OH; (5)Massachusetts General Hospital, Boston, MA


292E. Extended-release carbaZapine for treatment of manic and mixed symptoms. Richard H. Weisler, M.D., Paul E. Keck Jr., M.D., AC Swann, M.D., AJ Cutler, M.D., Terrance A. Ketter, M.D., Steven D. Vaffiere, Pharm.D., M.S.; (1)Duke University and the University of North Carolina, Raleigh and Chapel Hill, NC; (2)Eli Lilly and Company, Indianapolis, IN; (3)Quintiles CNS Therapeutics and University of California, San Diego and Irvine, CA; (4)Shire, National Medical Science Liaison/Medical Information Services, Newport, KY


293E. Treatment of manic and mixed patients with extended-release carbaZapine. Richard H. Weisler, M.D., Terrance A. Ketter, M.D., AH Kalali, M.D., Chris Paap, Pharm.D.; (1)Duke University and the University of North Carolina, Raleigh and Chapel Hill, NC; (2)Stanford University of Medicine, Stanford, CA; (3)Quintiles CNS Therapeutics and University of California, San Diego and Irvine, CA; (4)Shire, National Medical Science Liaison/Medical Information Services, Newport, KY


294E. Course of weight and metabolic benefits 1 year after switching to risperidone. Antony Loehf, M.D., Peter J. Weiden, M.D., David G. Daniel, M.D., Stephen Murray, M.D., Ph.D., Ruoyong Yang, Ph.D., Harold Lebowitz, M.D., Ph.D. of Psychiatry, New York, NY; (2)Mead Johnson Downstate Medical Center, Brooklyn, NY; (3)Bioniche Development, Inc, McLean, VA


295E. A longitudinal study of atypical antipsychotic prescribing patterns in the Iowa Medicaid population. Ryan M. Carnahan, Pharm.D., M.S., Brian C. Lund, Pharm.D., M.S.; Paul J. Perry, Ph.D., Elizabeth A. Chrischilles, Ph.D.; Michael A. Flaum, M.D.; (1)University of Oklahoma College of Pharmacy, Tulsa, OK; (2)Laureate Psychiatric Research Center, Tulsa, OK; (3)University of Iowa

PURPOSE: Eszopiclone is a non-benzodiazepine under development to rapidly induce and maintain sleep in patients with insomnia. Data from four studies were analyzed to determine if results were similar in elderly and nonelderly patients with primary insomnia.

METHODS: Data were from randomized, double-blind, placebo-controlled studies of eszopiclone: two 2-week studies of eszopiclone 2 mg in elderly patients (polysomnographic and subjective study: n=264; subjective study: n=199), and two non-elderly studies utilizing eszopiclone 3 mg (6-week polysomnographic and subjective study: n=204; 6-month subjective study: n=188). Each evaluated sleep onset, duration, and maintenance (wake time after sleep onset—WASO).

RESULTS: In all 4 studies, eszopiclone significantly improved patient reports of sleep (onset, p<0.01; WASO, p<0.05; total sleep time, p<0.01) compared with placebo in the relevant study period in elderly and non-elderly patients. In the two studies with polysomnographic data, eszopiclone significantly improved objective measures of sleep onset, total sleep time, and WASO in both populations (p<0.05). For most next day measures, eszopiclone positively impacted improvements (p<0.05) relative to placebo.

CONCLUSIONS: In these four studies, eszopiclone provided consistent improvements in patient-reported and polysomnographic measures of sleep and patient ratings of daytime functioning in non-elderly and elderly patients with primary insomnia.


298. Maintenance treatment for bipolar depression using olanzapine or olanzapine/fluoxetine combination. Scott Andersen, M.D., Sara Corya, M.D., Holland Detke, Ph.D., Richard Rosser, M.S., Mauricio Tohen, M.D., Terrance Ketter, M.D., Joseph Calabrese, M.D., Eli Lilly and Company, Indianapolis, IN; (2)Stanford University, Stanford, CA; (3)Case Western Reserve University; University Hospitals of Cleveland, Cleveland, OH.

PURPOSE: Olanzapine/fluoxetine combination (OFC) has shown efficacy in treating bipolar depression. Present analyses examined 6-month maintenance data for subjects who achieved remission of depressive symptoms following acute treatment.

METHODS: 379 subjects with bipolar depression completed 8-weeks of randomized, double-blind treatment using olanzapine (OLZ, n=179), placebo (n=125), or OFC (n=75). Of these, 192 were in remission (MADRS ≤ 12) upon entering open-label treatment, at which time they were switched from their acute-phase treatment to 5–20mg/day open-label OLZ. After 1 week on OLZ, subjects could be switched to OFC as needed. Primary efficacy measure was the Montgomery-Åsberg Depression Rating Scale (MADRS). Manic symptoms were monitored using the Young Mania Rating Scale (YMRS). Time to relapse (MADRS >15) was estimated using Kaplan-Meier survival analysis.

RESULTS: Of the 192 remitters, 120 (62.5%) remained free from relapse over the 6-month open-label period. For the 72 subjects (37.5%) who relapsed, median time to relapse was 194 days. Mean MADRS total score at open-label endpoint was 7.93 (SD 9.24, n=192) using a last-observation-carried-forward (LOCF) methodology.

CONCLUSIONS: This study suggests that OLZ and OFC may represent treatment options in the long-term management of bipolar depression. Further studies are necessary to replicate these findings using appropriate controls and double-blind methodology.

299E. Analog classroom study of amphetamine extended-release and atomoxetine in youth with attention deficit hyperactivity disorder. Sharon B. Green, M.D., Ph.D., John J. McGough, M.D., James T. McCracken, M.D., Joseph Biederman, M.D., Thomas J. Spencer, M.D., Kelly L. Posner, Ph.D., Scott H. Kollins, Ph.D., Tanya M. Clark, B.S., David A. Mays, Pharm.D., M.B.A., Simon J. Tulloch, M.D., M. Alex Michaels, M.D., Sherry L. Andes, Pharm.D., B.S., Tim A. Brown, University of California, Irvine, Irvine, CA; (2)David Geffen School of Medicine at UCLA, Los Angeles, CA; (3)Harvard University and Massachusetts General Hospital, Boston, MA; (4)Columbia University Medical Center, New York, NY; (5)Shire Pharmaceutical Development Inc., Rockville, M.D.; (7)Shire, Medical Information Services, Newport, KY.


300E. Dose-response efficacy of mixed amphetamine salts extended-release in adults with attention deficit hyperactivity disorder. Stephen V. Farlane, Ph.D., Joseph Biederman, M.D., Thomas J. Spencer, M.D., Timothy E. Wilens, M.D., Richard H. Weisler, M.D., Stephanie C. Read, M.S., Yuxin Zhang, Ph.D., Simon J. Tulloch, M.D., David A. Mays, Pharm.D., M.B.A.; (1)Massachusetts General Hospital, Harvard Medical School, and Harvard School of Public Health, Boston, MA; (2)Massachusetts General Hospital and Harvard Medical School, Boston, MA; (3)Duke University Medical School and University of North Carolina College of Medicine, Durham and Chapel Hill, NC; (4)Shire Pharmaceutical Development, Inc., Rockville, M.D.; (5)Shire, Medical Information Services, Newport, KY.

PURPOSE: There are few controlled studies of long-term insomnia therapy. In a pivotal six-month placebo-controlled study, eszopiclone demonstrated efficacy in improving measures of sleep and patient-reported daytime function. To evaluate continued effectiveness and safety, a 6-month open-label extension study in actual practice was conducted; results presented here.

METHODS: Following the 6-month, double-blind phase, 471 patients (111 placebo, 360 eszopiclone) entered the extension and received open-label eszopiclone 3 mg nightly (months 7–12). Endpoints were patient reported measures of sleep efficacy (onset, maintenance, duration, quality) and daytime parameters (alertness, physical well-being, and ability to function [concentrate]), captured weekly using an interactive voice response system. Data from double-blind treatment month 6 was used as “baseline” for this analysis.

RESULTS: Patients previously treated with placebo reported immediate and significant improvements in sleep and daytime functioning (all p values <0.0005 versus baseline). Patients who previously received eszopiclone continued to improve (eg, p<0.02 for total sleep time for months 7–12). These improvements were sustained for the entire 6-month extension period. At the end of the extension, 86/111 patients (77%) had received eszopiclone for 6 months, and 206/360 patients (82%), for 12 months. There were no significant withdrawal adverse events upon discontinuation; eszopiclone was well-tolerated for up to 12 months of nightly use.

CONCLUSIONS: In this study, patients with chronic primary insomnia who were treated with eszopiclone reported sustained improvement in measures of sleep efficacy and next day functioning over 12 months of therapy.

307E. Safety of intramuscular olanzapine in comorbidly ill, acutely agitated patients with dementia. Vicki P Hoffmann, Pharm.D., John Houston, M.D., Christopher Kaiser, Ph.D., Joana Ahl, Ph.D., Paula Trezpac, M.D.; Eli Lilly and Company, Indianapolis, IN.


306E. Use of anticonvulsant drugs in bipolar disorder: results of a 2003 survey. Aj Cutler, M.D.1, Sherry L. Andes, Pharm.D., BSpPharm2; (1)University of South Florida, Winter Park, FL; (2)Shire, Medical Information Services, Newport, KY.


307. The use of eszopiclone in the treatment of sleep maintenance insomnia: a subset analysis of efficacy by baseline wake time after sleep onset (WASO). Andrew Krystal, M.D., M.S.1, James Roach, M.D.2, Judy Caron, Ph.D.2, Robert Rubens, M.D., M.B.A.1, Andrea J. Anderson, Pharm.D.2; (1)Duke University Medical Center, Durham, NC; (2)Sepracor Inc., Marlborough, MA.

PURPOSE: A number of recent hypnotic trials have required baseline WASO as a stringent entry criterion. In a pivotal 6-month phase study of the drug, insomnia was shown to rapidly induce and maintain sleep and demonstrated statistically significant improvements in all measures of sleep (sleep latency, total sleep time, WASO) vs. placebo for up to 6 months. As WASO was not an initial entry criterion of this study, this subset analyses was done to determine whether WASO, as a selection criterion, would have affected study outcome.

METHODS: In the parent study, patients meeting DSM-IV criteria for primary insomnia were entered into a 6-month, randomized, double-blind, placebo-controlled, multi-center study to evaluate the efficacy of eszopiclone 3 mg. For the present analysis, patients from the parent study were grouped by baseline WASO into Low-WASO (<30 min; n=190) and High-WASO (>30min; n=319).

RESULTS: Over 6 months, statistically significant differences from placebo were noted in WASO in the Low- (p=0.0035) and High-WASO groups (p=0.0035). The magnitude of WASO reduction was directly related to the amount of baseline WASO impairment (p<0.001).

CONCLUSIONS: Had the original study required a WASO entry criterion of <30 min approximately 40% of subjects would have been excluded from the pivotal study. Based on this analysis, eszopiclone 3 mg was effective in reducing WASO regardless of WASO severity at baseline.

308. Racial disparity in depot antipsychotic prescribing patterns. Russell M. Blaylock; M.S., Pharm.D., Carol Tsao, M.D., Patty Gutledt, M.D., Angela Panagiou, Pharm.D.; Zahlochi VA Medical Center, Milwaukee, WI.

PURPOSE: This project was undertaken to determine if predictors of medication non-compliance could account for racial disparities in depot antipsychotic prescribing reported in previous research. The relationship between race, homelessness, and substance abuse co-morbidity and the prescription of depot antipsychotics was investigated.

METHODS: The study was a multi-center, retrospective chart review with blinded data collection. The subjects were schizophrenic and schizoaffective disorder patients. Homelessness and substance abuse co-morbidity were used as surrogate markers to predict a patient’s potential for medication non-compliance.

RESULTS: A total of 1316 black, non-hispanic and 1944 white, non-hispanic patients were included in the study:

1. A total of 164 black, non-hispanic and 42 white non-hispanic patients were homeless (X2 = 140, P<0.0001).
2. A total of 445 black, non-hispanic and 401 white non-hispanic patients had an substance-abuse co-morbidity (X2 = 114, p<0.0001).
3. A total of 78 black, non-hispanic and 141 white, non-hispanic patients were prescribed a depot antipsychotic (X2 = 2.20, P=0.1378 NS).
4. Logistic Regression revealed a significant interaction effect between homelessness, substance abuse and race (X2 = 6.69, p=0.01).

CONCLUSIONS: 1. Homelessness and substance abuse co-morbidity are better predictors of depot antipsychotic prescribing than race. 2. Black, non-hispanic schizophrenic patients are more likely to be prescribed a depot antipsychotic than White, non-hispanic patients with the same risk factors for non-compliance.

Pulmonary

309E. Relationship between asthma severity and endogenous cortisol excretion. Hengme H Raisry, Pharm.D.; Susan Scott, M.D., H. William Kelly, Pharm.D.; University of New Mexico, School of Medicine, Albuquerque, NM.


310. Community perception of smoking and its relationship to erectile dysfunction. Sunny A. Lainehe, Pharm.D.; University of Colorado School of Pharmacy, Denver, CO.

PURPOSE: Tobacco use in the U.S. continues to be a significant health concern. Most anti-tobacco education and advertising efforts focus on warnings of lung cancer and heart disease. Although smoking is a known risk factor for erectile dysfunction (ED), it is unknown if men are aware of this or if this knowledge may effect their decision to stop smoking. The purpose of this study was to investigate community knowledge of the relationship between ED, smoking, and smoking cessation.

METHODS: Male smokers aged ≥18 years were surveyed at a local health fair. Data collected included age range, race, smoking history, smoking cessation history, knowledge of smoking as a cause of ED, and likelihood of future smoking cessation.

RESULTS: Sixty-two surveys were completed. The majority of subjects was Caucasian and between 41–60 years old. Smoking status was evenly distributed between 6–10, 11–20, and 21–30 cigarettes smoked per day. Thirty-five percent had attempted to quit smoking 1–2 times and 27% had attempted more than 5 times. The majority (55%) stated they were aware that smoking cigarettes/cigars increases ED risk. Forty-one percent stated this knowledge had no effect and they would continue to smoke. 39% stated they were somewhat more likely to stop smoking and 20% stated they were much more likely to stop smoking.

CONCLUSIONS: Over one-half of surveyed men were aware that smoking increases ED risk; 59% indicated this knowledge would positively impact their decision to stop smoking, 41% indicated education efforts for tobacco cessation in men may be effective if focused around ED.

311. Evaluation of systemic corticosteroid use in the management of acute COPD exacerbations. Sherry L. Vondracek, Pharm.D., Linh Tran, Pharm.D.; University of Colorado Health Science Center, School of Pharmacy, Denver, CO.

PURPOSE: The Global Initiative for Chronic Obstructive Lung Disease Guideline recommends 30-40 mg oral prednisolone daily for 10–14 days for acute exacerbations of chronic obstructive pulmonary disease (AECOPD). The purpose of this descriptive study was to evaluate systemic corticosteroid use for the management of AECOPD.

METHODS: Retrospective chart review of patients >/= 45 years of age admitted to the University of Colorado Hospital with an ICD-9 Code #491.21 for AECOPD from 7/02–12/03 who received systemic corticosteroids.

RESULTS: There were 145 qualifying admissions. Average patient age was 65 ± 18 years. 52% were men, 67% were Caucasian and 17% were African American. The average length of stay (LOS) was 4.2 ± 3.6 days. An ICU stay occurred in 48% of admissions. Intravenous steroids were started in 96% of patients and 74% received high dose steroids (>80 mg prednisone equivalent [PE]/day). Average steroid use during hospitalization was 753 ± 969 mg PE (average/day = 189.5 ± 166.7 mg PE). Patients who initially received intravenous steroids had a longer LOS compared to patients who received oral steroids (5.1 ± 4.3 days vs. 3.0 ± 2.2 days; P<0.05). There was no statistically significant difference in LOS or 30-day relapse rate between patients who received intravenous steroids had a longer LOS compared to patients who received oral steroids.

CONCLUSIONS: Despite recommendations for lower oral doses, the majority of patients are receiving high intravenous doses of systemic corticosteroids for AECOPD.
3.12E. Reduced COPD exacerbations and associated health care utilization with once-daily tiotropium in the VA medical system. Steven Kesten, M.D.,1, Kathryn Rice, M.D.,2, Claudia Cote, M.D.,1, Daniel Paulson, M.D., J. Allen Cooper, M.D.,1, Lawrence Korducki, M.S.,1, Cara Cassino, M.D.,2, Dennis E. Niewoehner, M.D.,1, (1)Boehringer Ingelheim, Ridgefield, CT, (2)Veterans Affairs Medical Center, Minneapolis, MN, (3)Veterans Affairs Medical Center, Bay Pines, FL, (4)Hunter Holmes McGuire Medical Center, Richmond, VA, (5)Veterans Affairs Medical Center, Birmingham, AL.

Published in Am J Respir Crit Care Med 2004;169(7):A207.

3.13E. Improved daytime spirometric efficacy of tiotropium compared with salmeterol in COPD patients. Cara Cassino, M.D.,1, Dick Briggs Jr., M.D.,1, Henry Covelli, M.D.,2, Robert Lapidus, M.D.,2, Sudhipa Bhattacharyya, M.S.,1, Steven Kesten, M.D.,1, (1)Boehringer Ingelheim, Ridgefield, CT, (2)University of Alabama at Birmingham, Birmingham, AL, (3)Pulmonary Consultants of North Idaho, Couer d’Alene, ID; (4)Rocky Mountain Center for Clinical Research, Wheat Ridge, CO.

Published in Am J Respir Crit Care Med 2004;169(7):A518.

3.14E. Inspiratory flow through dry-powder inhalers (DPI) in asthmatic children 2 to 12 years old. Bengamah H Raissy, Pharm.D.,1 Deborah McNutt, Pharm.D.,2 Michael Monske, Pharm.D.,2 Patricia Marshik, Pharm.D.,2, H. William Kelly, Pharm.D.,1, (1)University of New Mexico, School of Medicine, Albuquerque, NM, (2)University of New Mexico, College of Pharmacy, Albuquerque, NM.


Substance Abuse/Toxicology

3.13. Nonclinical safety and immunogenicity evaluation of repeated subcutaneous administration of rtThrombin. Jane K. Heffernan, B.S.1, Margaret Wills, M.S.1, Rafael A. Ponce, Ph.D.1, Erika E. Giste, B.S.1, John P. Volpone, B.S.1, Nancy J. Jenkins, B.S.1, Linda A. Zuckerman, Ph.D.1, Mark C. Rogge, Ph.D.1, (1)ZymoGenetics Inc., Seattle, WA; (2)Charles River Laboratories, Sparks, NV.

PURPOSE: Recombinant human thrombin (rtThrombin) is being developed for use in a variety of surgical settings as an adjunct to hemostasis. Current thrombin products carry pathogen transmission risks, and in some patients are immunogenic, leading to autoantibody formation. Subsequent bleeding disorders can occur. A study was conducted in cynomolgus monkeys to assess the safety and immunogenicity from exposure to rtThrombin.

METHODS: Three male and three female cynomolgus monkeys each were assigned to one of three treatment groups (rtThrombin [1000 U/ml], bovine thrombin [1000 U/ml], or vehicle). Animals were treated subcutaneously once weekly for four weeks, then observed for an additional two weeks. Data collected included clinical observations, body weight, clinical pathology, measurements, and anatomical pathology findings. A three-tiered ELISA testing approach was used to detect antibodies specific to rtThrombin or to production impurities in rtThrombin- and vehicle-treated animals.

RESULTS: No treatment-related adverse effects were found on review of the clinical and anatomical pathology results. Specific anti-rtThrombin antibodies were not detected in study animals. One of six rtThrombin-treated monkeys had low circulating levels of specific antibodies to host cell proteins at two of nine non-consecutive timepoints.

CONCLUSIONS: Results from this study demonstrated that rtThrombin was well tolerated upon repeated subcutaneous dosing of cynomolgus monkeys. Animals did not develop specific anti-rtThrombin antibodies, but did develop occasional, low levels of antibodies to a host cell protein.

Transplant/Immunology

3.16. Limited sampling strategy for estimation of mycophenolic acid (MPA) area under the curve (AUC) in hematopoietic cell transplant (HCT) patients. Juki W. Ng, Pharm.D.1, John Rogosheske, Pharm.D.1, Pamala Jacobson, Pharm.D.1, (1)Department of Experimental and Clinical Pharmacology, College of Pharmacy, University of Minnesota, Minneapolis, MN; (2)Department of Pharmacy, Fairview University Medical Center, Minneapolis, MN.

PURPOSE: The purpose of this project was to develop a limited sampling model for the simultaneous estimation of total and unbound MPA AUC. Precedently, we demonstrated that subjects with low AUCs were at greater risk of developing graft versus host disease.

METHODS: Intensive pharmacokinetic steady-state sampling was performed between days 3-7 posttransplant in 73 adult subjects while receiving mycophenolate mofetil 1g q12H PO or IV. Total and unbound MPA plasma concentrations were measured, and true AUC was determined. Stepwise regression analysis was performed in the first 34 subjects to build IV and PO models of total and unbound AUC. The predictive performance of these models was tested in the remaining 39 subjects.

RESULTS: The best models for estimation of total and unbound AUCs are below. Trough concentrations were poorly correlated with AUC (r2<0.34).

<table>
<thead>
<tr>
<th>PO MPA (n=22)</th>
<th>AUC0–12 Models</th>
<th>IV MPA (n=12)</th>
<th>AUC0–12 Models</th>
</tr>
</thead>
</table>
| total AUC0–12 = 6.43 + 2.76 *C0hr + 0.31 *C1hr + 1.97 *C2hr + 4.27 *C6hr | 0.85 unbound AUC0–12 = 63.92 + 2.01 *C0hr + 0.67 *C1hr + 2.05 *C2hr + 4.26 *C6hr (r2<0.90)
| total AUC0–12 = -0.49 + 1.58 *C0hr + 0.47 *C1hr + 13.88 *C6hr (r2<0.99) unbound AUC0–12 = 7.99 + 1.60 *C0hr + 2.67 *C1hr + 9.54 *C2hr + 3.94 *C6hr (r2<0.99) |

Eighty-three percent of IV and 70% of oral AUC predictions fell within 20% of the true values. No significant bias of the models was observed.

CONCLUSIONS: MPA AUC can be estimated from 3 or 4 MPA concentrations. Trough concentrations are poorly correlated with AUC0–12.

3.17. Relationship of cyclosporine levels to rejection on transbronchial biopsies in lung transplant recipients. Marcus Haug III, B.Sc., M.Sc., Pharm.D., Omar Minai, M.D., Jennifer Jennings, M.D., Jeffrey Chapman, M.D., Sudish Murthy, M.D., Ph.D., Atul Mehta, M.D., Malcolm DeCamp, M.D., Cleveland Clinic Foundation, Cleveland, OH.

PURPOSE: Cyclosporine (CSA) levels of > 350 ng/ml (Cmin) were targeted for preventing lung transplant rejection. We describe the relationship of CSA levels, < Cmin and > Cmin on day of acute rejection on transbronchial biopsy (TBLB) in the first year, first 90 days and day 91 through the first year post transplant.

METHODS: All patients received CSA with TBLBs performed. We identified all TBLB results performed with CSA levels < Cmin and > Cmin (FMPIA assay) to observe rejection. (p<0.05).

RESULTS: 149 lung transplants received CSA with TBLBs. In the < 90 days post transplant group, 132 (42.3%) TBLBs were positive for rejection. 62 (19.9%) of the 312 TBLBs were associated with CSA levels less than Cmin. In the > 90 days to 1 year transplant post transplant, 52 (21.6%) TBLBs were positive for rejection. 78 (32.4%) of the 241 TBLBs were associated with CSA levels < Cmin. Less rejection was present on TBLBs in the first year with CSA levels > Cmin (p=0.0258). TBLBs rejection were also lower at day 91 to 1 year with CSA levels > Cmin (p=0.0389). TBLBs rejection rate was less for day 91 to 1 year compared to TBLBs in the first 90 days post transplant, when levels were > Cmin (p<0.0001).

CONCLUSIONS: We conclude that there is greater risk for lung rejection in the first year post transplant if the CSA is less than Cmin. This effect is most significant in the first 90 days post transplant. CSA levels > 350 ng/ml are important in preventing lung rejection in the first year.


PURPOSE: This study documented treatment outcomes of patients with recurrent hepatitis C virus (HCV) after orthotopic liver transplantation (OLT) treated with pegylated interferon/ribavirin. It has been proposed that patients previously failing therapy with standard interferon/ribavirin are less likely to respond to pegylated interferon/ribavirin.

METHODS: Single-center, retrospective review of medical records of 38 OLT recipients followed in a post transplant care center. Patients must demonstrate histological recurrence of HCV and been previously treated with α-interferon/ribavirin. Patients’ demographics, biochemical and virologic responses, and other outcomes such as hospitalizations, dropouts, deaths, and adverse events were documented.

RESULTS: Patients undergoing therapy for recurrent HCV (n=38) were predominately Caucasian (76%) males (66%) infected with genotype 1 (74%). Mean time to recurrence was 1063.3 ± 891.5 days. Ten (26%) patients have completed therapy. Biochemical response was achieved at 3 months as demonstrated by decrease in ALT (119.3 ± 99.2 vs. 73.2 ± 53.3; p=0.012). Virologic clearance at 3 and 6 months of treatment are 40% (n=12) and 43% (n=13) respectively. Five hospitalizations occurred resulting in thirty-seven days of hospitalization. Eight (21%) patients discontinued therapy due to side effects or progression of HCV. Acute rejection occurred in two (5.3%) patients, both of which were treated and went on to attain viral clearance. Mean cost of treatment including management of adverse effects is $39,000 (AWP). Two (5.3%) patients have died since discontinuing therapy.

CONCLUSIONS: Both biochemical and virologic response can be attained with the use of Pegylated interferon/ribavirin in patients with recurrent HCV previously failing therapy with standard interferon.

3.19. Comparison of cyclosporine trough levels measured by two different assays. Jennifer B. Lehmann, Pharm.D., Greg A. Smallwood, Pharm.D., Emory Healthcare, Atlanta, GA.

PURPOSE: Our institution changed cyclosporine assays from the TDX Monoclonal antibody test to a tandem mass spectrometry method which resulted in a noticeable decrease in cyclosporine trough levels being reported. This study was performed to determine the relationship between trough levels.
produced by the different tests.

METHODS: Cyclosporine trough levels were performed in parallel using both assays and were collected from kidney, heart, lung and stem cell transplant patients. Levels were plotted (TDX vs. LCMS) to determine the correlation between both assays and the equation for the line of "best fit" was calculated [y = mx + b where Y was the TDX (old method), M the slope of the line and b was the Y intercept].

RESULTS: A total Of 454 trough cyclosporine levels were evaluated. The equation for the line of best fit was calculated y = 0.95x + 37.9 with r2 = 0.824. The method was validated using 20 samples of the same level (1000ng/mL) into one determination. The percent coefficient of variation (CV) was within 10% for all samples.

CONCLUSIONS: The total drug exposure is an important determinant of graft survival; therefore, therapeutic drug monitoring will be necessary to maintain consistent exposure.

320. Review of patient outcomes of aspergillus prophylaxis with voriconazole after lung transplantation. Jennifer B. Lehman, Pharm.D., Gregory A. Smallwood, Pharm.D., Laurie Lesniak, R.N., Bethany Lane, R.N., Seth Force, M.D., E. Clinton Lawrence, M.D.; Emory Healthcare, Atlanta, GA.

PURPOSE: Mycophenolate mofetil (MMF) is a desirable immunosuppressant for islet cell transplantation due to its lack of glucose effects. Immunosuppression is an important determinant of graft survival; therefore, we examined MMF disposition in this patient population.

METHODS: We studied eight adults undergoing islet cell transplantation. Subjects received ATG, methylprednisolone, dacluzumab, and antithymocyte serum. Maintenance immunosuppression consisted of MMF (750–1000mg BID starting day 24), sirolimus and low-dose tacrolimus. MMF doses were modified in six patients prior to day 60, due to drug intolerance and/or toxicity. Intensive pharmacokinetics were obtained on days 28 and 42, with abbreviated profiles on days 60, 90, 180, 270 and 365.

RESULTS: Total and unbound MPA and total MPAG plasma concentrations were measured using HPLC and analyzed using noncompartamental methods. Early (day 28–42) MPA AUC0–t (mgl/Lh) were higher (65.0) than later (48.4) posttransplant, though not significantly (p>0.05). AUC0–t were highly variable (CVs 37–40%). Mean dose was 938 and 875 mg on days 28 and 365, respectively. Dose-adjusted AUC exhibited non-linear decline with increasing MMF dose. Median total trough concentrations were 1.10–2.80 mg/mL and highly variable (CVs 53–58.7%). Percent unbound MPA did not change over time (p=0.96). Unbound and total MPA concentrations were highly correlated (r=0.94), with a modest correlation between total MPA trough and AUC0–t (r=0.48) or AUC0–t (r=0.65).

CONCLUSIONS: MPA disposition is highly variable in the first year posttransplant. AUCs were higher early posttransplant. These data suggest that therapeutic drug monitoring will be necessary to maintain consistent exposure.

321. Risk factors affecting the graft and patient survival in kidney transplant recipients. Jung Mi Oh, Pharm.D., Joo Young Kim, M.S.; Graduate School of Clinical Pharmacy, Sookmyung Women's University, Seoul, South Korea.

PURPOSE: To determine the short (1 year of transplant) and long-term (>5 years of transplantation) risk factors affecting the graft and patient survival in kidney transplant recipients.

METHODS: Records of 152 patients who received kidney transplantation in 1996 from AMC were followed for 5 years retrospectively.

RESULTS: All patients initiated triple immunosuppressive therapy with cyclosporine, prednisone and azathioprine. One, two, three, four, and live year patient and graft survival rates were 98.7%, 98.0%, 98.0%, 97.3%, 97.3%, and 96.6%, 95.2%, 94.6%, 92.5%, 91.8%, respectively. There were 30 cases of acute rejection (AR) and 6 cases of chronic rejection (CR) within 2.1±5.2 months and 42.1±3.2 months of transplantation, respectively. The risk factors for AR were donor's age older than 30 years (p<0.02) and cardiovascular disease (p=0.05). The risk factors for CR were AR (p=0.0169) and episode of complications within 1 year (p=0.0330). Increasing period of dialysis (p<0.0001) and use of AR (p=0.0001) and complication (p=0.0337) within 1 year were significant factors for graft loss. Seven grafts were lost from noncompliance during 1–5 year period. The most common cause of the graft loss for both periods was the graft reaction. The graft survival rate was significantly lower in patients with than without rejection episodes (77.4% vs. 90.0%, p=0.002).

CONCLUSIONS: Survival rate of the graft with rejection was significantly lower. The risk factors affecting AR were donor's age older than 30 years and CR. AR and episode of complications within 1 year were the risk factors for CR and graft loss.

322. Mycophenolate pharmacokinetics in islet cell transplantation. Kathleen G Green, Pharm.D., Bernard J Hering, M.D., Pamela A Jacobson, Pharm.D., (1)Experimental and Clinical Pharmacology, College of Pharmacy, University of Minnesota, Minneapolis, MN; (2)Diabetes Institute for Immunology and Transplantation and Department of Surgery, University of Minnesota, Minneapolis, MN.

PURPOSE: Mycophenolate mofetil (MMF) is a desirable immunosuppressant for islet cell transplantation due to its lack of glucose effects. Immunosuppression is an important determinant of graft survival; therefore, we examined MMF disposition in this patient population.

METHODS: We studied eight adults undergoing islet cell transplantation. Subjects received ATG, methylprednisolone, dacluzumab, and antithymocyte serum. Maintenance immunosuppression consisted of MMF (750–1000mg BID starting day 24), sirolimus and low-dose tacrolimus. MMF doses were modified in six patients prior to day 60, due to drug intolerance and/or toxicity. Intensive pharmacokinetics were obtained on days 28 and 42, with abbreviated profiles on days 60, 90, 180, 270 and 365.

RESULTS: Total and unbound MPA and total MPAG plasma concentrations were measured using HPLC and analyzed using noncompartamental methods. Early (day 28–42) MPA AUC0–t (mgl/Lh) were higher (65.0) than later (48.4) posttransplant, though not significantly (p>0.05). AUC0–t were highly variable (CVs 37–40%). Mean dose was 938 and 875 mg on days 28 and 365, respectively. Dose-adjusted AUC exhibited non-linear decline with increasing MMF dose. Median total trough concentrations were 1.10–2.80 mg/mL and highly variable (CVs 53–58.7%). Percent unbound MPA did not change over time (p=0.96). Unbound and total MPA concentrations were highly correlated (r=0.94), with a modest correlation between total MPA trough and AUC0–t (r=0.48) or AUC0–t (r=0.65).

CONCLUSIONS: MPA disposition is highly variable in the first year posttransplant. AUCs were higher early posttransplant. These data suggest that therapeutic drug monitoring will be necessary to maintain consistent exposure.
calium at 12-hour incubation with stimulation except at the smallest dose (0.125mg/L).

CONCLUSIONS: Docetaxel inhibited T-cell proliferation. Percent of polarized cells was significantly reduced. Intracellular calcium levels were affected with higher concentration of drug and with longer incubation time.

326. Comparing renal transplant patients' adherence to free cyclosporine and free tacrolimus using immunosuppressant therapy. Marie A. Chisholm, Pharm.D.1, Herbert E. McCoy, BPharm2, Laura L. Mullot, DO.3, (1)University of Georgia College of Pharmacy and Medical College of Georgia School of Medicine, Augusta, GA; (2)University of Georgia College of Pharmacy, Augusta, GA; (3)Medical College of Georgia School of Medicine, Augusta, GA.

PURPOSE: To determine if there is a difference in renal transplant patients' (RTPs) adherence to cyclosporine compared to tacrolimus based immunosuppression therapy when medications are supplied free to the RTPs.

METHODS: Adherence was estimated by comparing tacrolimus or cyclosporine pharmacy refill records to the prescribed regimen for 12-months after transplant. RTPs in the study received their cyclosporine or tacrolimus free from the Medical College of Georgia outpatient pharmacy for their entire first-year after transplantation. Patients' cyclosporine and tacrolimus serum concentrations were used to validate adherence. Kaplan Meier analysis was used to estimate the fraction of RTPs remaining adherent every month and to compare the mean time RTPs were adherent in each group (cyclosporine vs. tacrolimus).

RESULTS: Thirty-three patients were included in the study, 25 (76%) received cyclosporine and 8 received tacrolimus. The mean time to the first non-adherent event for cyclosporine was 8 months post-transplant. At 12-months post-transplant, approximately 42% of the patients remained adherent. A greater percentage of the patients who received tacrolimus remained adherent compared to those patients who were taking cyclosporine (63% vs. 33%, p<0.05). Approximately 75% of non-adherent patients were found to have subtherapeutic drug concentrations, and only 24% of adherent patients had subtherapeutic levels (p<0.01).

CONCLUSIONS: Adherence to immunosuppressant therapy tends to decrease over time, the type of immunosuppressant therapy used affects adherence, and RTPs who are adherent are less associated with subtherapeutic concentrations than those who are non-adherent.

327. Pharmacokinetics of mycophenolate and its glucuronidated metabolites in stable lung transplant recipients. Mary H. H. Ensom, B.S.(Pharm), Pharm.D.1, Lillian S. L. Ting, BSc.(Chem)2, Nilufar Partovi, BSc(Pharm), Pharm.D.1, K. Wayne Rigs, BSc(Pharm), Ph.D.1, Robert D. Levy, M.D., M.F.C.C.P.1, (1)University of British Columbia and Children’s & Women’s Health Centre of British Columbia, Vancouver, BC, Canada; (2)University of British Columbia, Vancouver, BC, Canada; (3)University of British Columbia and Vancouver General Hospital, Vancouver, BC, Canada; (4)University of British Columbia, St. Paul’s Hospital and BC Transplant Society, Vancouver, BC, Canada.

PURPOSE: The purpose of this study was to characterize the pharmacokinetics of mycophenolic acid (MPA) and its glucuronidated metabolites, MPAG (phenolic-glucuronide) and AcMPAG (acyl-glucuronide), in stable lung transplant recipients.

METHODS: Eight patients were entered into this open-label study following written informed consent. Upon administration of a steady-state morning dose of mycophenolate mofetil (MMF), blood samples were collected at 0, 0.3, 6, 12, 18, 24, 36, 48, 72, 96 hours post-dose. Total MPA, MPAG, and AcMPAG concentrations were measured by a validated HPLC method with ultraviolet detection and pharmacokinetic parameters analyzed using non-compartmental modeling with WinNonlin 4.1.

RESULTS: Patient characteristics included: 3 males and 5 females, on average 5.2 years post-transplant (range 2.1–9.2 yr), mean±SD age of 46.9±14.4 yr and weight 69.8±22.2 kg. Mean albumin concentration was 3.7±0.6 g/dL and serum creatinine was 1.3±0.5 mg/dL. All patients also were on prednisone, with 6 on tacrolimus and 0 on cyclosporine. MPA dose ranged from 1.5 to 3 grams daily (34.2±10.5 mg/kg/day; range 18.3–54.0 mg/kg/day). Mean AUC(0-12h) for MPA were area-under-the-curve (AUCAUC0-12h) 42.3±33.49 µg*hr/mL dose-normalized AUCAUC0-12h 39.3±20.99 µg*hr/mL; maximum concentration (Cmax) 7.8±0.33 pg/mL; time to Cmax (Tmax) 2.25±2.13 hours; and minimum concentration (Cmin) 1.0±0.04 pg/mL. AUC ratios of MPAG:MPA and AcMPAG:MPA were 18.68±6.60 and 0.17±0.11, respectively.

CONCLUSIONS: This is the first study to determine the pharmacokinetics of MPA and its glucuronidated metabolites in the lung transplant population. Further studies should focus on determining if genetic variability in UDP-glucuronosyltransferase enzymes can explain wide interpatient variability and on identifying MFM dosing strategies that optimize immunosuppressive efficacy and minimize toxicity in lung allograft recipients.

328E. Pegfilgrastim after high-dose chemotherapy (HDC) and autologous peripheral blood stem cell transplantation (ASCT). Madan Jagasia, M.D., John Greer, M.D., Adetola Kassim, M.D., Shin Mineshi, M.D., David Morgan, M.D., Katherine Ruffner, M.D., Friedrich Schuening, M.D., Vanderbilt-Ingram Cancer Center, Division of Hematology-Oncology, Department of Internal Medicine, Vanderbilt U Medical Center, Nashville, TN.


330E. Cytomegalovirus and drug resistance mutations in liver transplantation. Greg A. Smallwood, Pharm.D., Emory Healthcare, Atlanta, GA.


331. Lamivudine resistant hepatitis B following liver transplantation. Greg A. Smallwood, Pharm.D., Kathleen Connor, PA, Carlos Fasola, M.D., Andrei Stieher, M.D., Thomas Heffron, M.D.; Emory Healthcare, Atlanta, GA.

PURPOSE: The aim of this review is to evaluate outcomes of patients with lamivudine resistant, recurrent hepatitis B following liver transplantation.

METHODS: All hepatitis B surface antigen positive patients received, after liver transplant, hepatitis B immune globulin (HBIG) and lamivudine. Of 5 patients, 4 have been maintained on lamivudine alone without resistance developing (1368 ± 402 days). The last five patients (each replication) developed resistant recurrence and was begun on valganciclovir 900mg daily prior to switching to adefovir. Patients taking valganciclovir, a reduction in viral load was noted (1,910 pg/ml to 103 pg/ml). Of the 5 patients, 4 have been maintained on Adefovir with a mean viral load drop of 2 log counts. One patient has been started on peginterferon-a-2a which produced an additional 2 log drop in his viral load.

CONCLUSIONS: Numerous options currently are available for recurrent HBV following liver transplantation which shows tremendous promise. Additional work should be done with peginterferons in combination with adefovir.

332. Impact of gender and race on posttransplant metabolic complications. Agnes Lo, Pharm.D., Lauren Webb, BSc, A. Osaka Gaber, M.D.; University of Tennessee Health Science Center, Memphis, TN.

PURPOSE: The purpose of this retrospective study is to determine if gender and race affects the incidence of metabolic complications post renal transplantation.

METHODS: Renal transplant recipients with functioning renal allograft for at least one year posttransplant and a minimal follow-up of 3 years were included. The subjects were divided into four groups: black female (BF), black male (BM), non-black female (NBF), and non-black male (NBM). Metabolic profiles were determined at baseline and at 12 months post-transplant: body mass index (BMI), lasting blood glucose (FBG), triglycerides (TG), total cholesterol (TC), systolic or diastolic blood pressure (SBP or DBP), and immunosuppression.

RESULTS: There were 28 BF; 11 NBF; 36 BM, and 27 NBM. There were no differences in age, transplant characteristics, and immunosuppressive regimens among the groups. Regardless of gender and race, BMI, FBG, TG, and TC significantly increased posttransplant, while SBP and DBP decreased posttransplant. BF had the most significant weight gain posttransplant compared to other groups, p<0.01. Majority of BF (68%) also developed metabolic syndrome at 1 year posttransplant compared to 46% NBF; 47% BM, and 33% NBM. Patient and graft survival, acute rejection rates, and incidence of posttransplant diabetes mellitus were similar among the groups. BM had the highest serum creatinine (1.9 mg/dL) compared to other groups (1.2 to 1.4 mg/dL), p<0.01.

CONCLUSIONS: BF may be at the highest risk for posttransplant metabolic complications due to the significant weight gain posttransplant. The long-term effects of these metabolic abnormalities on transplant outcomes remained to be determined.

Urology

333E. Efficacy of vardesafenil in a broad population of men with ED irrespective of prior sildenafil use: a retrospective analysis of a 2 year investigation. Gerald Brock, M.D.1, Hartmut Porst, M.D.2, Christian Stief, 1
334E. Long term efficacy of vardenafil provides rapid and consistent satisfaction with erection hardness and sexual experience in men with erectile dysfunction.—Gerald Brock, M.D. 1, Serge Carrier, M.D. 2, Ingo Saenz de Tejada, M.D. 1, Christian Stief, M.D., Ph.D. 1, Ernst Ulbrich, M.D. 1, Manfred Beneke, Ph.D. 1, Hartmut Port, M.D. 3, (1)St. Joseph's Medical Center, Lawson Research Institute, London, ON, Canada; (2)Private Practice, Hamburg, Germany; (3)Hannover Medical School, Hannover, Germany; (4)Bayer Vital GmbH, Leverkusen, Germany; (5)Fundacion para la Investigacion y el Desarrollo en Andrologia, Madrid, Spain.

Published in Journal of Andrology 2004;March/April Suppl:58.

338E. A randomized, open-label, cross-over study comparing the effects of transdermal vs. oral estrogen therapy with free testosterone levels in naturally menopausal women.—Jan L. Shifren, M.D. 1, Sophie Desindes, M.D. 2, James Cronin, M.D. 1, Martha E. Beneke, Ph.D. 5, Hartmut Porst, M.D. 6; (1)St. Joseph's Medical Center, Lawson Research Institute, London, ON, Canada; (2)Yamanouchi Pharma America, Inc., Paramus, NJ.


339. Pharmacokinetics of intravenous immunoglobulin (IVIG) before and during pregnancy.—Mary H. H. Ensom, B.S.(Pharm), Pharm.D. 1, Martina E. Kinnear, BSc(Pharm), student 1, Edwin Houlihan, R.N. 2, Mary D. Stephenson, M.D., M.S.e 3; (1)University of British Columbia and Children's & Women's Health Centre of British Columbia, Vancouver, BC, Canada; (2)Children's & Women's Health Care Centre of British Columbia, Vancouver, BC, Canada; (3)University of Chicago, University of British Columbia, and Children's & Women's Health Centre of British Columbia, Vancouver, BC.

Purpose: To characterize intravenous immunoglobulin (IVIG) pharmacokinetics in women with recurrent miscarriage.

Methods: Of 20 enrolled women (9 in an open-label pharmacokinetic study for treatment of antiphospholipid antibody syndrome and 11 in a randomized placebo-controlled trial for idiopathic secondary recurrent miscarriage, 14 received IVIG (Gamimmune N5%) 500–1000mg/kg and 6 placebo over a 2–10th period every 2–8 weeks gestation. Serum IgG concentrations were measured by rate nephelometry before and at 0.5, 1, 2, 3, and 4 weeks following the 1st dose, and a dose during each of the 1st and 2nd trimesters.

Results: Mean± SD age was 34.5±4.7yr (IVIG) and 34.5±4.8yr (placebo). AUC of spontaneous abortions was 4.8±2.2 (IVIG) and 3.5±0.8 (placebo). Pharmacokinetic parameters (mean±SD) were:

**IVIG**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cmax (g/L)</td>
<td>11.4±4.2</td>
</tr>
<tr>
<td>Cmin (g/L)</td>
<td>12.6±2.7</td>
</tr>
<tr>
<td>AUC (g*h/L)</td>
<td>11901.7±2546.6</td>
</tr>
</tbody>
</table>

**Placebo**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cmax (g/L)</td>
<td>11.4±4.2</td>
</tr>
<tr>
<td>Cmin (g/L)</td>
<td>12.6±2.7</td>
</tr>
<tr>
<td>AUC (g*h/L)</td>
<td>11901.7±2546.6</td>
</tr>
</tbody>
</table>

Conclusions: There was no significant difference between the IVIG and placebo groups. Dosages (mg/kg basis) and AUCs did not differ significantly within the IVIG group between the 3 sampling periods. Roughly estimated contributions of exogenously-administered IVIG to total AUC (calculated as mean AUC (IVIG group) minus mean AUC (placebo group)) were 5967.3g*h/L (pre-pregnancy), 3039.5g*h/L (1st trimester), and 4640.6g*h/L (2nd trimester). CONCLUSIONS: Pregnancy did not have a significant effect on exposure to the same mg/kg dosage of exogenously-administered IVIG. The estimated contribution of exogenous IVIG (i.e., ~5200g*h/L) to total AUC was similar to, albeit slightly lower than, that contributed by endogenous IgG (i.e., ~6300g*h/L). These preliminary data warrant further study in larger groups of patients.

**CLINICAL PHARMACY FORUM**

These abstracts describe the delivery, development, justification, or documentation of innovative clinical pharmacy services; they may be descriptive only and need not contain an evaluative component.

340. Pharmacist program to review new antipsychotic orders on hospitalized patients.—Dan Moellentin, Pharm.D., Jamie Cronin, Rph, Pharm.D., David Crabtree, M.S., Cpt; Eastern Maine Medical Center, Bangor, ME.

Several hospital regulatory boards recommend pharmacist review of patients' medications were new antipsychotics were ordered for in-patients. Evaluation prior to first dose is not always feasible, and in some cases the delay caused could cause harm to personnel or patients. At EMMC, a computer rule alerts a clinical pharmacist of a new order for typical and atypical antipsychotics. After reviewing the medication subnarcotic and medical history and pre-hospitalization medication regimen, recommendations are made if drug interaction is suspected. Using pharmacist documents of evaluated cases over a 6 month period, post-operative patients accounted for 61% of cases. Gases, sedatives, benzodiazepines, and fluid balance were most often identified. Hypotensive

Women's Health

337. Comparison of symptom scales for premenstrual symptoms in women taking oral contraceptives.—Andrea L. Colacino, Pharm.D., M.B.A., Patricia J. Sulak, M.D., Thomas J. Kuehl, Ph.D.; Scott & White Memorial Hospital and Clinic, Temple, TX.

Purpose: This study compared two daily symptom scales used in research to evaluate pharmacotherapy in women with premenstrual symptomatology. METHODS: Reproductive-age women participating in a prospective oral contraceptive study completed two scoring instruments—a daily menstrual calendar which included a mood score of 0–10 (a composite of anxiety, depression, and irritability) and the Penn State Daily Symptom Report (DSR17) that captured 21/7-day cycles for 109 subjects. The mood score was significantly correlated to the “mood swing” element. Using multiple regression analysis, all but three elements of the DSR17 were significantly related to the daily mood score. Daily mood scores and DSR17 also demonstrated the same pattern of increase immediately before and during the 7-day hormone-free interval.

Conclusions: A simple daily mood score scaled from 0 to 10 is concordant with the more complex 17-element symptom index and demonstrates the same pattern of change during cycles of oral contraceptive use. The simple scoring system represents an advantage for long duration oral contraceptive studies.

338. Reduced mood swings and premenstrual syndrome (PMS) symptoms are not significantly reduced during each of the 1st and 2nd trimesters.—Nancy A. Mazey, M.D., Ph.D. 1, (1)Harvard Medical School, Boston, MA; (2)University of Sherbrooke, Sherbrooke, QC, Canada; (3)Watson Laboratories, Inc., Salt Lake City, UT; (4)Watson Laboratories, Inc., Morristown, NJ.

Published in Journal of Andrology 2004;March/April Suppl:93.

**METHODS**: This was a retrospective analysis using claims data from a managed care organization of approximately 2.7 million lives. OAB patients <18 years old were identified between July and December 2001 and followed for 360 days. A random sample of controls was matched 1:1 on propensity score, which was estimated using patient demographics and diagnosis of osteoporosis, stroke, diabetes, or urethral structure during a 180-day pre-index period. Medical claims were examined for any diagnosis of the studied comorbidities. Unadjusted prevalence rates for depression, skin infections, and vulval vaginitis were compared between OAB cases and controls using chi square. Parities, UIs, and any comorbid condition were compared using logistic regression, adjusting for additional confounders.

Results: A total of 23,112 OAB cases and controls were identified. Mean age was approximately 69 years, and 67.6% were female. Prevalence of all additional comorbidities related to their disease. Thus, OAB is an important condition in need of greater focus and better management by clinicians.

**Conclusions**: OAB patients often have additional comorbidities related to their disease. Thus, OAB is an important condition in need of greater focus and better management by clinicians.
agents (18%) were identified as next leading cause. Drug-drug interactions were uncovered as the 3rd leading cause (12%) most frequently involving CYP2D6, 3A4, 1A1, p-gp, and to a lesser extent phase II reactions. While initial computer checks prevent dosage extremes at the time of order review, some doses may be extreme for individual patients and dosing was likely responsible for delirium in 9% of cases found (for example one patient began having hypnogogic hallucinations with metoclopramide but to normalized once dose was lowered. In 9% of patients, dosage reduction for age or creatinine clearance resolved the delirium. As a method to determine the need and on-going requirement of anti-psychotics in hospitalized patients, a computer summary of patients receiving target drugs provides clinical pharmacist with a tool for reviewing the patient’s medication and medical history for possible reversible drug-induced causes.

34.1. Drug-drug interaction screening and management process improvement. Kelly M. Smith, Pharm.D., Emily J. Young, Pharm.D., BCPS; Heather H. Cornett, Pharm.D.; Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, MD. PURPOSE: To streamline suspected adverse drug reaction (ADR) reports submitted to MedWatch, internal hospital criteria for MedWatch reporting evaluated the contributions of a hospital’s ADR reporting system to resident reviewed each ADR for potential MedWatch submission. This study had been utilized. Each month, a drug information specialist or pharmacy entity marketed for less than three years; not reported in the package insert; MedWatch criteria. Internal criteria included reactions: related to a molecular by a single investigator for reporting suitability via both internal and 

34.2. Effect of internal reporting criteria on suspected adverse drug reactions submitted to MedWatch. Kelly M. Smith, Pharm.D., Amber P. Lawson, Pharm.D., Heather H. Cornett, Pharm.D., Sony Tuteja, Pharm.D., BCPS; University of Kentucky, Lexington, KY. PURPOSE: The high volume of alerts triggered by drug-drug interaction (DDI) screening software may desensitize users to clinically important interactions. A program was undertaken to educate pharmacists about 29 DDIs of the highest clinical importance (as identified by Malone et al), assess drug interaction screening software, and make process improvements in both a hospital and outpatient pharmacy.

METHODS: Current vendor-supplied drug interaction screening software were tested for their ability to detect each of the 29 DDI pairs, with subsequent customization as needed. Monographs were developed for each DDI pair to educate pharmacists about their relevance. A report prompting pharmacists to intervene on target DDIs was also pursued.

RESULTS: The outpatient pharmacy computer system initially failed to capture 1 DDI but as those involving combination products and interactions were captured by the hospital system, yet had differing severity codes (38% contraindicated, 48% severe, 14% moderate). Because the severity codes cannot be readily altered, daily DDI reports are being created for dissemination to hospital pharmacists to prompt interventions, with subsequent documentation in the clinical intervention system. Structured monographs for each DDI pair are disseminated electronically to pharmacy staff and archived on the Drug Information Center website. Additionally, case discussions highlight the DDIs are presented at weekly staff meetings.

CONCLUSION: Pharmacy drug interaction screening software were successful in identifying a majority of clinically serious DDIs. Additional efforts, including customizing software, delivering routine educational programs, and providing daily prompts of potential DDIs, were necessary to heighten pharmacists’ awareness of serious drug-drug interactions.

34.3. Utilization of fentanyl patient-controlled analgesia in a large academic medical center. Angela Clark, Pharm.D.1, Suzanne A. Neshit, Pharm.D., BCPS1, Stuart Grossman, M.D.2; (1)The Johns Hopkins Hospital/Department of Pharmacy, Baltimore, M.D.; (2)Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, M.D. PURPOSE: Fentanyl has also been associated with medication errors, especially when used as patient-controlled administration (PCA). Fentanyl was also identified as the next leading cause of drug-drug interactions. The high volume of alerts triggered by drug-drug interaction (DDI) screening software may desensitize users to clinically important interactions. A program was undertaken to educate pharmacists about 29 DDIs of the highest clinical importance (as identified by Malone et al), assess drug interaction screening software, and make process improvements in both a hospital and outpatient pharmacy. Current vendor-supplied drug interaction screening software were tested for their ability to detect each of the 29 DDI pairs, with subsequent customization as needed. Monographs were developed for each DDI pair to educate pharmacists about their relevance. A report prompting pharmacists to intervene on target DDIs was also pursued.

RESULTS: The outpatient pharmacy computer system initially failed to capture 1 DDI but as those involving combination products and interactions were captured by the hospital system, yet had differing severity codes (38% contraindicated, 48% severe, 14% moderate). Because the severity codes cannot be readily altered, daily DDI reports are being created for dissemination to hospital pharmacists to prompt interventions, with subsequent documentation in the clinical intervention system. Structured monographs for each DDI pair are disseminated electronically to pharmacy staff and archived on the Drug Information Center website. Additionally, case discussions highlight the DDIs are presented at weekly staff meetings.

CONCLUSION: Pharmacy drug interaction screening software were successful in identifying a majority of clinically serious DDIs. Additional efforts, including customizing software, delivering routine educational programs, and providing daily prompts of potential DDIs, were necessary to heighten pharmacists’ awareness of serious drug-drug interactions.

34.4. Delay in dose titration of lipid-lowering therapy leads to adverse cardiovascular outcomes. Amy S. Friend, Pharm.D.1, Tamara S. Evans, Pharm.D., BCPS2, Ellen M. Shubin, Pharm.D.1, Masoor Kamalesh, M.D.1; (1)Richard L. Roudebush VA Medical Center, Indianapolis, IN; (2)Pfizer, Indianapolis, IN. PURPOSE: To incorporate pharmacist involvement in a continuous quality improvement initiative regarding evaluation of cardiac catheterization complications. Method: The study involved 123 patients following cardiac catheterization who had been followed from January 1, 2003 to December 31, 2003. The catheterization was undertaken for cardiac disease, and the data collected included demographics, medication history, and cardiovascular outcomes. Results: Of the 123 patients, 48% were women, and the mean age was 64 years. The most common indications for cardiac catheterization were chest pain (29%) and heart failure (29%). The most common cardiovascular outcomes were stroke (33%) and myocardial infarction (27%). The study population consisted of 58% females with a mean age of 64 years. Vascular complications occurred in 2% of patients. Of the vascular complications, 48% were associated with drug therapy including heparin (37%), enoxaparin (23%), and warfarin (17%). Renal complications occurred in 0.6% of patients. Lack of fluid administration prior to and following cardiac catheterization was identified in 92% of patients experiencing renal complications. Conclusion: A pharmacist was able to identify that 48% of vascular complications were associated with drug therapy adverse events and 92% of renal complications were associated with lack of fluid administration. Targets for improvement have been identified.

34.5. Evaluation of cardiac catheterization complications at an academic medical center. Emily J. Young, Pharm.D., Terry K. Pickworth, Pharm.D., The Ohio State University Medical Center, Columbus, OH. PURPOSE: To establish a multidisciplinary hemostasis monitoring service in hemostatic agents or blood products. However, determining which patients require antiplatelet agents, tight control of anticoagulation, and the administration of hemostatic agents or blood products in patients undergoing drug-drug interactions. A program was undertaken to educate pharmacists about 29 DDIs of the highest clinical importance (as identified by Malone et al), assess drug interaction screening software, and make process improvements in both a hospital and outpatient pharmacy. Current vendor-supplied drug interaction screening software were tested for their ability to detect each of the 29 DDI pairs, with subsequent customization as needed. Monographs were developed for each DDI pair to educate pharmacists about their relevance. A report prompting pharmacists to intervene on target DDIs was also pursued.

RESULTS: The outpatient pharmacy computer system initially failed to capture 1 DDI but as those involving combination products and interactions were captured by the hospital system, yet had differing severity codes (38% contraindicated, 48% severe, 14% moderate). Because the severity codes cannot be readily altered, daily DDI reports are being created for dissemination to hospital pharmacists to prompt interventions, with subsequent documentation in the clinical intervention system. Structured monographs for each DDI pair are disseminated electronically to pharmacy staff and archived on the Drug Information Center website. Additionally, case discussions highlight the DDIs are presented at weekly staff meetings.

CONCLUSION: Pharmacy drug interaction screening software were successful in identifying a majority of clinically serious DDIs. Additional efforts, including customizing software, delivering routine educational programs, and providing daily prompts of potential DDIs, were necessary to heighten pharmacists’ awareness of serious drug-drug interactions.
it into an electronic database to coincide with bleeding indices and utilization of hemostatic agents or blood products.

RESULTS: Currently, 84 patients are in the database. The average chest tube output was 103.6±89.0mL and the average change in hematocrit was -4±1. 88.3% of patients received antibiotics, 32.1% received at least one blood transfusion, and 3.6% went back for reexploration. The most common comorbidities were hypertension (77%), hyperlipidemia (77%), diabetes (31%), CHF (30%), and COPD (23%).

CONCLUSIONS: Information derived from this hemostasis monitoring service provides important data regarding institution-specific risk factors, clinical outcomes, and a platform to monitor new and existing treatment strategies to manage perioperative bleeding.

347. Use of a heart failure questionnaire to establish need for a novel clinic in community pharmacy. Jean S Cottrell, Pharm. D., 2, CGP, Barbara Rogler, RPh, M.S. 2; (1)Ecker Patient CARE Center, Latham, NY; (2) Pfizer, Delmar, NY.

Introduction The American College of Cardiology/American Heart Association (ACC/AHA) guidelines recommend frequent monitoring of heart failure patients and an ACE-Inhibitor for all patients. It is estimated that there is a significant gap between these guidelines and current practice. Community pharmacists are in position to assist with monitoring these patients, however, they frequently lack pertinent information such as diagnoses and medical histories. Objective To assess the level of ambulatory patients meeting a validated questionnaire for the purpose of establishing the need for a collaborative care heart failure clinic in two community pharmacies. Methods The Minnesota Living with Heart Failure Questionnaire, an ACC/AHA approved level of evidence assessment tool, was randomly mailed to patients from 2 community pharmacies. It included a section for the patient to add diagnoses of different types of heart disease as well as a section to provide their name for follow-up from the pharmacist. Patients received a survey if they were currently taking diuretics and a loop diuretic without warfarin. Responses from surveys will be compiled with post-MI data from local hospitals to demonstrate to outpatient clinics the need for intervention. An algorithm will be developed based on the ACC/AHA guidelines, including correspondence with prescribers to provide feedback on patient outcomes and ensure appropriate drug therapy. The following outcomes will be tracked; 1) Medication Adherence, 2) Blood Pressure to JNC VII goal, 3) Weight, 4) Level of Activity via the Minnesota HF Questionnaire, 5) Number of patients prescribed an ACE-Inhibitor.

348. Assessment of the VA Loma Linda Healthcare System Lipid Clinic. Raza Taheri, Pharm.D., 1 Kenneth Wong, Pharm.D., 1 Phillip Ng, Pharm.D., 1 George Tran, Pharm.D., 1 Geir Frivold, M.D. 2; (1) Loma Linda University, 11262 Campus Street, Loma Linda, CA; (2)VA Loma Linda Healthcare System, Loma Linda, CA.

PURPOSE: To assess the success rate of the Lipid Clinic in improving patients' lipid indices.

METHODS: A retrospective analysis of patients enrolled in the clinic was performed. Baseline, before enrollment, and most current lipid indices, Liver Function Tests (LFTs) and drug utilization data were collected. A paired T test was used to evaluate continuous variables and chi squared test for discrete variables.

RESULTS: A total of 104 patients (age 60±8.6, 99% male) had both baseline and follow-up data. Average total cholesterol and LDL-C decreased by 40mg/dL and 32mg/dL respectively (p<0.0001). Over 88% of the patients were already on a lipid-modifying agent before Lipid Clinic enrollment. Number of patients on combination therapy increased from 23 at baseline to 45 after the enrollment in the Clinic (p<0.0001).

TABLE: Cholesterol and LFT Changes

<table>
<thead>
<tr>
<th>Baseline Average (SD) mg/dL</th>
<th>Current Average (SD) mg/dL</th>
<th>Change (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cholesterol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>235 (77.7)</td>
<td>195 (57.3)</td>
<td>140 (17.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>LDL-C</td>
<td>125 (71.1)</td>
<td>110 (42.2)</td>
<td>32 (22.5)</td>
</tr>
<tr>
<td>HDL-C</td>
<td>36 (9.6)</td>
<td>36 (0.0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Trigs</td>
<td>389 (835.5)</td>
<td>285 (338.1)</td>
<td>104 (26.7)</td>
</tr>
<tr>
<td>ALT</td>
<td>20 (20.6)</td>
<td>33 (23.6)</td>
<td>8 (19.5)</td>
</tr>
<tr>
<td>AST</td>
<td>23 (12.3)</td>
<td>23 (12.3)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Even though the great majority of patients were already on a lipid-modifying agent before clinic enrollment, a significant drop in both LDL-C and total cholesterol was obtained with diligent and continuous follow-up in the Lipid Clinic. This aggressive approach did not result in increased LFTs or any cases of rhabdomyolysis.

349. Hypertension management in a family medicine residency training program. Telle Curran, Pharm. D., 1, Kayla Martin, Pharm.D., 1, Brian Pinto, Pharm.D., 1, Donald Harrison, Ph.D., 1 University of Oklahoma College of Pharmacy, Oklahoma City, OK.

PURPOSE: Implementation of a hypertension management in patients in a Family Medicine residency training program was done to evaluate success of achieving therapeutic goals defined in the medical literature and to assess the role for clinical pharmacy services.

METHODS: Medical records of 228 patients within the Family Medicine Center from 1/1/01 to 10/31/02 with a diagnosis of hypertension, diabetes, or renal disease were randomly identified. Results from the patients in the hypertension arm are reported. 70.6% of patients had hypertension. 36.6% of patients were on 1 drug, 37.9% were on 2 drugs. The most common were PPI drugs, 22% were on β-blockers, 31% were not treated with drug therapy. Heart rate was assessed in only 0.44% of sample; 15.5% were taking negative chronotropic medicines. Blood pressure goals, defined as <140/90 and <130/85, were not met in 56.5% and 83.4% of patients, respectively. Overall, the average blood pressure was 141.6/85.6. Patients were most likely to be controlled on one or two medicines. There were no differences in achieving control between males and females or Caucasian and African American patients. Medication management errors included duplicate therapies, inadequate/absent assessment of electrolytes and renal function, and suboptimal assessment of heart rate, suboptimal use of combination antihypertensives, and drug interactions.

Conclusion: Current management of hypertension is suboptimal based on Healthy People Goals, including lifestyle modifications and drug therapy management. We hypothesize that clinical pharmacists can help improve blood pressure control at this Family Medicine Center. Additional data from evaluation will be reported.

350E. Impact of a clinical pharmacist on costs associated with routine fluconazole prophylaxis in a surgical intensive care unit. Edward T Horn, Pharm. D., 1 Todd W Neshit, Pharm.D., 1 Edward T. Horn, Pharm.D., 1, Bittinger, M.B.A., Todd Dormans, M.D., Pamela Lipsset, M.D.; The Johns Hopkins Hospital, Baltimore, M.D.

Presented at the 33d Critical Care Congress of the Society for Critical Care Medicine, Orlando, FL, February 25, 2004.

351. Effect of pharmacist-run sedation rounds on clinical outcomes on intensive care units (MICU). John Marshall, Pharm.D., Christine A Gongleski, Pharm. D., Boston Medical Center, Boston, MA.

PURPOSE: The use of sedation/analgesia algorithms has demonstrated benefit in the Intensive Care Unit (ICU). One of the most challenging aspects of sedation algorithms is initial and ongoing adherence. We hypothesized that a formal, consistent intervention by pharmacists to promote adherence to the institution’s sedation algorithm would decrease the duration of mechanical ventilation and improve overall clinical outcomes.

METHODS: In February 2004, an intervention algorithm was instituted whereby an ICU pharmacist evaluated mechanically ventilated patients receiving continuous sedation and made recommendations based on established institutional sedation guidelines. Demographics, APACHE II scores, duration of mechanical ventilation, and ICU/hospital length of stay were collected. This data was compared to retrospective controls collected before February 2004. Nominal data was evaluated using the Fisher’s exact test and continuous data was evaluated using the Students t test.

RESULTS: Data was collected for 78 control and 57 intervention patients. The groups were well matched in terms of baseline demographics. The mean duration of mechanical ventilation was reduced from 338.4 hours in the controls to 176.5 hours in the intervention patients (P=0.0016). The mean ICU and hospital lengths of stay were significantly reduced in the intervention patients (P=0.0012 and P=0.0012, respectively). The total use of sedating agents trended downward in the intervention patients.

CONCLUSION: The institution of pharmacist-run sedation rounds improved adherence to an existing sedation algorithm and resulted in a significant decrease in the duration of mechanical ventilation in patients receiving continuous sedation.


PURPOSE: To describe a unique approach to pharmacy involvement in the implementation of a computerized provider order entry (CPOE) system.

METHODS: The Johns Hopkins Hospital is a 920 bed tertiary teaching facility that in October 2002 set out to implement an institution-wide CPOE system which would replace an existing system active on nine adult medicine units. The goal of the new CPOE system was to provide enhanced clinical functionality for all inpatient and outpatient ordering needs. A steering committee, with active pharmacy involvement, was formed to evaluate, review, and select a vendor. Subsequently, an aggressive timeline was developed to build the application infrastructure necessary to deploy the CPOE system. Several design teams, composed of steering committee and healthcare staff, were formed to address development and implementation issues for pharmacy; pathology; nutrition, and radiology services.

RESULTS: In June 2004, the new CPOE system was fully deployed and the new system was activated for approximately 200 adult medicine beds. Deployment of the system for all other functional units is ongoing. Due to extensive pharmacy involvement, the institution was able to meet an aggressive timeline while providing a high level of clinical medication order
functionality including customized dose range checks and guided orders. Based on user feedback and production reports, the design teams will continue to customize the system to address the needs of critical care, pediatric, and oncology patient populations.

CONCLUSION. Successful implementation of a CPOE system requires extensive collaboration between pharmacy and information systems throughout all phases of the project design and implementation.

353. Development of a rural medication access and service learning program. Carolyn C. Brackett, Pharm.D, BCP, Katherine A. Kelley, Ph.D., The Ohio State University College of Pharmacy, Columbus, OH.

Service learning is a priority at The Ohio State University College of Pharmacy and an increasing number of faculty are developing service-learning courses for Pharm.D. students in order to expand traditional teaching and learning roles. The University also emphasizes Outreach and Engagement; in keeping with these priorities, we developed a service-learning course designed to establish a medication access program in an underserved, rural community. We obtained a University grant to cover startup costs of the program, and established relationships with the county health department, the single local physician, the mayor, and the city council. We also constructed a focus group of local residents who are involved in community activities and solicited their input. All parties agreed that a medication access program is a major concern in the area because of high unemployment and underemployment. The service-learning student participated in all meetings and negotiations and was instrumental in establishing good relations with the community. The next step of the program will be a year in length and will involve a second service-learning student and will establish the program in conjunction with monthly public health preventative medicine clinics. The service-learning student will help construct and launch the program. The ultimate goal of the program is to recruit and train community-based volunteers to operate the program, thus making it an integral part of the community. The College of Pharmacy will continue to oversee the program, seek ongoing funding for its support, and offer service-learning students a non-traditional Pharm.D. rotation.


Institutional policies for the delivery of pain and palliative care are in place in their respective settings. Despite pharmacists’ crucial role in the appropriate interdisciplinary management of pain and associated symptoms, a paucity of structured curricula, modules, clerkships, and other postgraduate experiences continue to exist. Recently a National Pain and Palliative Medicine Summit was convened to discuss the need for training programs in pain and palliative care in the United States. Representatives from the professions of pharmacy, medicine, and nursing all provided current barriers and opportunities for improved education in the field of pain and palliative care in their respective professions. Pharmacists, and students of pharmacy, have numerous barriers to adequate education in the care of persons in need of pain and palliative medicine. Although recent research suggests a positive trend in the provision of this knowledge, much room for improvement still exists. Unfortunately, recent media attention has focused on several shortcomings in the attitude, skills, and knowledge of pharmacist with respect to pain and palliative care. To address these issues, and strategies for enacting change in the current pharmacy education of pharmacists it is recommended that pharmacist initiatives necessary to begin a structured approach to changing the ways in which our pharmacists and students of pharmacy are introduced to pain and palliative medicine. These initiatives, identified as crucial by the pharmacy task force at the 2003 Pain and Palliative Care Summit, will be presented.

355. Pharmaceutical care in Kenya: an elective course to prepare students for an international clerkship. Ellen M. Schellhaase, Pharm.D, Julie A. Everett, Pharm.D, James Fuller, Pharm.D., Purdue University, Indianapolis, IN.

BACKGROUND: Purdue University School of Pharmacy (PUSP) was invited to join an existing program established by Indiana University School of Medicine (IUSM), which provides medical care to the Kenyan population. PUSP will provide pharmaceutical care for this initiative. This partnership created an opportunity for the development of an international advanced clerkship rotation in Eldoret, Kenya. In Spring 2004, PUSP offered a two-credit elective course to prepare pharmacy students for this eight-week advance clerkship.

METHODS: The overall instructional format consisted of lecture and small group discussion. Disease states included: HIV/AIDS, opportunistic infections, malaria, malnutrition, typhoid, tuberculosis, and parasitic infection. Cultural activities included instruction in conversational and medical Swahili, reading and reflection on a Kenyan novel, and a guest lecture by medical faculty with practice experience in Kenyan. Student performance was assessed utilizing: written care plans, weekly quizzes, reflection papers, oral presentations, travel preparation assignments, and a formulary management exercise (in a setting with limited resources).

RESULTS/CONCLUSION: Fourteen students were enrolled in the course and will be participating in the advanced clerkship rotation in Eldoret, Kenya. Evaluations of the course were favorable but provided suggestions for improvement including reassessment of workload and incorporation of additional cultural awareness activities. This elective is a unique opportunity for students to learn about international pharmaceutical care and apply skills previously acquired to an international setting.

356E. The development and implementation of an advanced clerkship site in Eldoret, Kenya. Ellen M. Schellhaase, Pharm.D., Julie A. Everett, Pharm.D., Christopher M. Scott, Pharm.D., BCP, Steven R. Abel, Pharm.D., FASHIP, Purdue University, Indianapolis, IN.

357E. Impact of multidisciplinary diabetic group visits in a physician residency program. Jonathan D. Frenner, Pharm.D., Kara Lewis, M.D., Janice Setzeenzland, R.N., Frank D’Amico, Ph.D., Melissa A. Somma, Pharm.D., University of Pittsburgh Medical Center - St. Margaret, Pittsburgh, PA.


359. Evaluation of drug serum concentration monitoring at a large, tertiary care hospital, Justine G. Garvey, Pharm.D, BCP, Jeannine Thomas, Pharm.D, Marianna Abraham, Pharm.D., Mitra Daeyan, Pharm.D, Baylor University Medical Center, Dallas, TX.

PURPOSE: To evaluate the practices of hospital personnel in the ordering process, obtaining samples, and assessing drug serum concentrations (levels).

METHODS: Medical records of 100 patients were prospectively reviewed from 9/03 to 1/04. (Patients monitored by the kinetics service were excluded).

A total of 86 levels were evaluated. Fifty nurses were given a written quiz regarding drug level monitoring. Primary endpoints were 1) to determine if the ordering process for drug levels was correct and if blood was being drawn at designated times, and 2) to compare results of the monitoring process with a written quiz from nursing to determine knowledge of staff in regards to drug level monitoring. Secondary endpoints included actions taken in response to drug levels and clinical usefulness of ordered levels.

RESULTS: The ordering and evaluation of levels was performed accurately in 89.5% of cases, and no relationship existed between specific drugs and inappropriate blood draws by personnel. Knowledge of nursing staff demonstrated on the quiz correlated well to daily practice. Action was taken by the physicians 80% of the time in response to drug levels, however 41% of the total levels ordered were not clinically appropriate when evaluated by kinetic standards.

CONCLUSIONS: Nursing and laboratory staff are following physician orders for obtaining drug levels. Physicians need additional education regarding ordering in pharmacokinetic principles of narrow therapeutic index drugs. Actions to be taken include: participation in training of new medical residents, written article in physician newsletter, and specific education given to individual physician departments.


PURPOSE: Adequate information literacy skill training is necessary to impart life-long learning and effective professional pharmacy practice. The Medicines information Retrieval Project (MIR) is an ongoing collaborative teaching effort between the School of Pharmacy and the Library. MIR integrates didactic for the develop learner, small group teaching and individual, interactive web-based learning to teach transferable medicines information retrieval and assessment skills throughout the four year pharmacy course.

METHODS: Our approach is a blend of the two schools of training — library skills training for librarians, and traditional medicines information skills
training - and to infuse them with our own ideas for using information sources and manipulating today's information technology rich environment.

For this to be successful it was necessary to transform the generalized literacy skills training methods into methods targeted at the individual user's needs. 

RESULTS: Challenges observed and the lessons learned are presented: 1) the need for epistemological revision of information literacy training, 2) the ease of access to electronic sources, 3) the increasing variety of information sources and 4) the preferred orientation of many students towards electronic rather than hardcopy sources.

CONCLUSION: Ongoing close collaboration between the School of Pharmacy and the Library is essential for medicines information training. Collaboration has resulted in a clearer understanding of what pharmacy students require from the library and what they can expect from library services, while fostering effective information literacy skills and the confident utilization of information resources within the undergraduate course.

361. Enhancement of an ambulatory care practice experience using Blackboard® as a course management tool. Mary A. Hallow, Pharm.D., BCPS, John R. Walker, Pharm.D.; University of Oklahoma Health Sciences Center, College of Pharmacy, Oklahoma City, OK.

PURPOSE: The development of online courses in higher education has increased dramatically in the last decade, with many pharmacy schools utilizing internet access extensively in traditional and distance education environments. Extending this application beyond the classroom presented a unique opportunity to enhance the Ambulatory Care practice experience through integration of various procedural and educational components of the practicum into a user-friendly, easily accessible, WEB-based course.

METHODS: The password-restricted course was administered through the University of Oklahoma Health Sciences Center using Blackboard® as an application service provider. Using the Blackboard® template, a faculty preceptor and a class of pharmacy students used the technology to concept develop, content posting, and site maintenance. Practicum students enrolled in the course were provided with instructions for access and site navigation prior to beginning the rotation. Procedural responsibilities and interactive sessions requiring utilization of posted materials were conducted throughout the month. Accession of posted materials to complete requirements and prepare for these sessions was assessed.

RESULTS: Feedback from the students indicated a very favorable response to the online course. Students were pleased with the comprehensiveness of the material content, read accessibility of required course materials, logical flow and ease of use of the site, and ease of access to the website from any location with internet access. Students also appreciated the self-paced learning environment provided by this venue.

CONCLUSIONS: Web-based availability of course materials complemented the practice experience, improved student access to required content, and facilitated learning and communication between students and faculty outside of the traditional practice environment.

362. “Silver Scripts”: First-year students develop pharmaceutical care skills through community outreach to underserved seniors. Melissa A. Sommers, Pharm.D.; Mount Sinai Hospital, Toronto, ON, Canada.

METHOD: Pharmacy students participated for a half a day each week in refill clinics as a starting point in a primary care clinic provides a good foundation for further direct patient care activities for students. A half day session was set up once a week to provide this experience for students. 

PURPOSE: Refill clinics as a starting point in a primary care clinic provides a good foundation for further direct patient care activities for students. A half day session was set up once a week to provide this experience for students.

METHOD: Pharmacy students participated for a half a day each week in refill clinic activities. Each student prepared a SOAP note outlining the prescription and medication history. The document was then reviewed and documented by the pharmacist to ensure accuracy and completeness. The pharmacist then reviewed the document and provided feedback to the student. 

RESULTS: Challenges observed and the lessons learned are presented: they are: 1) the need for epistemological revision of information literacy training, 2) the ease of access to electronic sources, 3) the increasing variety of information sources and 4) the preferred orientation of many students towards electronic rather than hardcopy sources.

CONCLUSION: The unprecedented increase of the Latino population in Arkansas and the fact that a substantial majority of Latinos has various forms of communication between pharmacists and patients is oral, and comprised the study of the Latino American language and culture, as well as elements of the Latin American health care system. 

363. Development of an evidence-based internal guideline for emergent rapid-sequence intubation. Christine K Howe, BSc, BSc, Pharm D, FCCP, Vagia T Campbell, RRCP, RRT, David Dushenski, M.D. CCPh, EM, H Brian Goldman, M.D., MCPP, EM, FACEP, Mary Dawson, RRCP, RRT, Mount Sinai Hospital, Toronto, ON, Canada.

BACKGROUND: During the local SARS outbreak the need for a clear readily accessible rapid sequence intubation (RSI) guideline has emerged.

PURPOSE: Our objective was to develop a safe internal guideline that used evidence to direct appropriate use of equipment, techniques and medications related to emergent RSI.

METHODS: An extensive literature search regarding equipment, techniques and medications related to emergent RSI was conducted by 2 respiratory therapists and 2 pharmacists. From the published literature, data was extracted and collated to determine the most appropriate methods for RSI as well as agents for sedation and paralysis.

RESULTS: Based upon the best available evidence, an algorithm was developed and reviewed by other respiratory therapists and pharmacists as well as by physicians from Anesthesiology, Critical Care and Emergency departments. The document outlined criteria for use, contraindications and complications, as well as the procedure for performing emergent RSI (including medication selection and dosing). The document was abbreviated into a laminated pocket card with one side outlining the procedure and the other providing a flow diagram for medication selection and dosing.

CONCLUSIONS: An easy to use evidence-based emergent RSI document can be developed and successfully used through the collaboration of a multi-disciplinary team.

364. Evaluation of outcomes following cardiac resuscitation secondary to ventricular fibrillation or pulseless ventricular tachycardia. Rhonda D. Cobb, Pharm.D, Mary Ann Pebedy, M.D., Patricia Pecora Fulco, Pharm.D.; Virginia Commonwealth University Medical Center, Richmond, VA.

PURPOSE: Ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT) are the most frequent etiologies of sudden cardiac arrest. Adequate healthcare provider education, advanced cardiac life support (ACLS) experience, and algorithm familiarization are all necessary components to improve cardiac survival outcomes in the hospitalized patient. Cardiac multidisciplinary resuscitation teams within the hospital may enhance patient survival.

METHODS: The objective of this study was to evaluate patient survival in hospitalized cardiac arrests when treated by an emergency cardiac resuscitation team. A retrospective review of all cardiac arrests occurred in events with documented VF/VT from July 1, 2001, until June 30, 2003 was reviewed.

RESULTS: A total of 207 in-hospital resuscitation events were identified during the two-year period. Twenty-one cardiac arrests were documented VF and pulseless VT events. Thirty-three events were excluded secondary to insufficient rhythm documentation. A return of spontaneous circulation (ROSC) occurred in seven patients. Five patients survived to hospital discharge. In the ROSC group, 71% received defibrillations and 60% of these
were optimally sequenced. Epinephrine and amiodarone were administered optimally in 29% and 49% of the ROSC cases, respectively.

CONCLUSION: The results demonstrated a diminished survival in patients with documented VF/VT cardiac arrests. Optimal rhythm documentation, defibrillation timing and adequately administered pharmacotherapy were identified areas of improvement. Based on these data, continued ACLS education is necessary for quality improvement of the cardiac teams' response to VF/VT arrests.

367. The role of the clinical pharmacist in a diabetes disease management model. Andrea K. Hornaday, Pharm.D., Teri A. Wooton, Pharm.D., CDE, Suzanne H. Trautman, Pharm.D., CDE; Jeff Patchett, Rhp, M.B.A.; NorthEast Medical Center, Cochranville, NC.

PURPOSE: To assess and improve adherence to therapeutic goals recommended by the American Diabetes Association (ADA) for aspirin and ACE-inhibitor use, A1c, blood pressure and LDL in ambulatory patients with diabetes using pharmacist-directed interventions.

METHODS: Patients with new-onset diabetes or A1c > 8% were identified and referred to the pharmacy program. During routine clinic visits with a pharmacist, patients with opportunities to optimize care were identified and recommendations were made to the referring physician. Data were collected between September 2001 and May 2004. A voluntary patient satisfaction survey was conducted during the third year of the research. The disease management database was queried for assessment of and change in selected indicators and compared to patients enrolled in the pharmacy program.

RESULTS: A total of 614 patients were referred to the pharmacy program. Assessment of indicators increased as follows: A1c 28.81%, LDL 28.7%, SBP 36.8%, DBP 15.03%, asprin use 29.11%, ACE-inhibitor use 18.61%. Baseline vs. end of study values for enrolled patients achieving ADA goals were as follows: A1c 39.34% vs. 40.72%, LDL 37.91% vs. 42.02%, SBP 51.0% vs. 54.4%, DBP 29.2% vs. 68.08%. Patient satisfaction was high; 92% of respondents stating the service was beneficial.

CONCLUSION: A pharmacist-based intervention improves adherence to national recommendations for assessment and improves clinical indicators. The majority of patients felt that these services had a positive impact on their diabetic care. These results demonstrate that future opportunities exist for pharmacists to optimize care of diabetic patients.

368. Evaluation of pharmacist impact on providing comprehensive diabetes care recommended by the American Diabetes Association. Inezic P Chang, Pharm.D.1, Liling Tang, Pharm.D.2; (1)Western University of Health Sciences, College of Pharmacy; Pomona, CA; (2)Huntington Memorial Hospital, Pasadena, CA.

PURPOSE: To assess the baseline level of compliance with the American Diabetes Association (ADA) standard of care recommendations and to increase the compliance rate through specific recommendations at a community hospital ambulatory care clinic.

METHOD: A review was conducted to assess the baseline compliance rate to 10 selected ADA standard of care recommendations for diabetic patients coming to the medicine clinic between January and March 2004. For noncompliant areas, specific recommendations were made. Data was then reanalyzed to determine the impact of pharmacist interventions in increasing the adherence to the ADA standard of care recommendations.

RESULTS: At baseline, the average compliance rate was 58%, varying from 36% to 81%, pneumococcal vaccination and ACE inhibitor or ARB therapy respectively. Areas identified as most noncompliant were routine A1c and urinalysis monitoring, pneumococcal and flu vaccination, tight blood pressure and lipid control. A total of 231 recommendations were made by the pharmacist, of which 68% were accepted. Pharmacist interventions increased the compliance rate on average 23% for the 8 immediately measurable outcomes. The highest impact was seen in increasing the rate of pneumococcal vaccination and updating A1c and urinalysis data. Results of tighter blood pressure and lipid control recommendations could not be evaluated at the time of the analysis.

CONCLUSION: Diabetes care requires a comprehensive management beyond simple blood sugar control. Our results indicate that there is a significant room for improvement in providing comprehensive care to diabetic patients, and pharmacists can play a vital role in providing this.

369. A multidisciplinary educational program to reduce insulin medication errors. KarenBeth H. Bohan, Pharm.D., BCPS1, Mary Jo Cannon, R.N., M.S.N., WOCN2, Joan DeRocco-Delessio, M.S., R.N., CNA1, Thomas Mecca, B.S., R.P.H.2, Elizabeth Trzciinski, R.N., B.S.N.3, Michael L. Adler, M.D., FACE2, 1,Neshi School of Pharmacy at Wilkes University, Wilkes-Barre, PA; 2/Wyoming Valley Health System, Wilkes-Barre, PA.

PURPOSE: Insulin administration errors were the most third common type of medication misadventure at the Wyoming Valley HealthCare System in 2003. Potential contributing factors include a change in the insulin products on formulary, the availability of new types of insulin, as well as errors involving the use of the abbreviation “U” for “units”.

METHODS: A multidisciplinary Insulin Education Task Force was convened and charged to develop a mandatory comprehensive and ongoing educational program for all nurses. The task force included nurses, pharmacists, and a physician. Our chief of endocrinology presented information about insulin administration via a videotape and we offered the program during all nursing shifts at multiple times over a one-month period. Outcomes were assessed using a pre- and post-test. The participants completed a program evaluation that included their opinion of their own new knowledge.

RESULTS: 393 nurses attended the program. A score 280% on the pre- and post-tests were achieved by 36% and 81% of nurses respectively. 61% stated that the most important factor contributing to insulin errors was lack of knowledge about the different types of insulin and when to appropriately administer them.

CONCLUSIONS: A knowledge deficit appears to be a factor that contributes to insulin errors. Our program demonstrated that education can improve short term knowledge. Future plans include a 3-month refresher of these principles and administering the post-test again in 6 months. This program has already been incorporated into the newly hired nurses orientation program and will become part of yearly competencies.

370. Evaluation of the effectiveness of pharmacist-administered diabetes education and management services. Kelly R. Ragucci, Pharm.D, BCPS, CDE, Andrea Wessell, Pharm.D., BCPS, Stacy M. Prutting, Pharm.D., BCPS, CDE, Joli D. Ferino, Pharm.D., BCPS, CDE, Jennifer N. Mazur, Pharm.D., CDE, Melissa M. Blair, Pharm.D., BCPS, CDE, Medical University of South Carolina, Charleston, SC.

PURPOSE: To evaluate the effectiveness of pharmacist-administered diabetes education services on select diabetes performance measures, compare these to the National Committee for Quality Assurance (NCQA) report and identify areas where improvement is warranted.

METHODS: Patients were referred to clinical pharmacists at three university-based primary care clinics for diabetes management services. Glycosylated hemoglobin (A1C), blood pressure (BP), low density lipoprotein (LDL) and aspirin use were compared at baseline and one year after patient enrollment as well as to published NCQA guidelines. Paired-statistical tests were utilized to compare endpoints and cost avoidance comparators were calculated for those patients with a 1% reduction in A1C.

RESULTS: Between April and December 2002, clinical pharmacists enrolled 191 patients. The average A1C at one year was 7.8%, compared to 9.5% at baseline (change -1.7%; p<0.05). Overall, 72 patients (38%) experienced a 1% or greater reduction in A1C. The average BP decreased from 141/79 to 139/75 mmHg (0.007) and average LDL decreased from 114 to 112 mg/dL (p<0.05). Aspirin use increased from 34% at baseline to 73% at one year (p<0.0001). Except for the lipid profile, all measurements exceeded the NCQA goals for diabetes recognition programs. Based on an estimated savings of $820 for a 1% decrease in A1C, total cost avoidance was calculated as $593,000.

CONCLUSION: The performance of diabetes management services by clinical pharmacists resulted in significant improvements in A1C, BP and aspirin use. Continued efforts in diabetes education should be made to further improve clinical, economic and humanistic outcomes.

371. Impact of a diabetes collaborative care pilot program on patient outcomes. Nicole M. Stack, Pharm.D.1, Kathleen M. Melbourne, Pharm.D, CDE2, 1, (1)Western University of Health Sciences, College of Pharmacy, Pomona, CA; 2/University of Rhode Island, Kingston, RI.

PURPOSE: To examine the impact of the interventions of clinical pharmacists over a six-month period on the clinical and humanistic outcomes of patients with type 2 diabetes compared to standard medical care alone.

METHODS: Outcomes in a group of patients receiving individualized counseling and education from pharmacists with specialized diabetes training in addition to standard medical care (Intervention group, N= 38) were compared to those of patients receiving standard medical care alone (Control group, N= 78). The primary outcomes of the study included changes from baseline in mean A1c and low density lipoprotein cholesterol (LDL-C) levels. Patient satisfaction with care and patient diabetes knowledge in addition to several secondary outcomes including microalbumin, aspirin and ACE inhibitor use, eye exams, vaccinations, and smoking status were also examined.

RESULTS: Mean baseline A1c of the Intervention Group was 8.8% compared to 7.8% in the Control Group (p=0.033). At 3 and 6 months, the mean Intervention Group A1c was 7.1% and 6.6%, respectively while the average Control Group A1c was 7.9% at three months (p=0.007) and at 6 months (p>0.05). There were no significant differences in LDL-C levels. Certain secondary outcomes showed statistically significant increases in the intervention group at 3 and 6 months.

CONCLUSION: There were clinically and statistically significant reductions in A1c in patients with diabetes who received the diabetes collaborative care intervention. Collaboration efforts between pharmacists and physicians can lead to beneficial effects on the glycemic control and care of patients with type 2 diabetes.

372. Pharmacist impact on clinical outcomes in a diabetes disease management program. Patrick Kiel, Pharm.D, candidate, Amie D. McCord,
PURPOSE: To evaluate changes in clinical outcomes for patients enrolled in a pharmacist-coordinated diabetes disease management program

METHODS: Medical records of 157 patients enrolled in the diabetes management program between June 2003 through April 2004 were retrospectively reviewed. Data collection included baseline and follow-up values for A1c and lipids as well as frequency of adherence to preventive care including annual foot and eye examinations, and daily aspirin therapy.

RESULTS: For patients with both baseline and follow-up data, the mean A1c reduction was 1.6% (n=109). For patients with an initial A1c of > 8.5% the mean A1c reduction was 2.6% (n=57). The percentage of patients with A1c < 7% increased from 19% at baseline to 50% at follow-up. The mean LDL reduction observed was 16mg/dl (n=73) and the percent of patients < 100mg/dl increased from 30% at baseline to 56% at follow-up. The frequency of baseline microalbumin screening increased by 20% and the number of patients with annual eye and foot exams increased by 27% and 15%, respectively. The percentage of patients on daily aspirin increased from 42% at baseline to 80% at follow-up.

CONCLUSION: The pharmacist-coordinated diabetes disease management program was effective in improving clinical outcomes for enrolled patients. Significant improvements were observed in HbA1c and LDL values as well as the frequency of adherence to preventive care. Improvement in these areas is important to reducing the risk of microvascular and macrovascular complications associated with diabetes.

373. Pharmacy based activity to reverse and manage disease (PHARMID): the hypertension project. Catherine A. Harrington, Pharm.D., Ph.D.1, Jacintha S. Caufield, Pharm.D., BCP5, Ceresa T. Ward, Pharm.D.1, Deborah H. Kennedy, Pharm.D., BCP5, Paula Anderson-Worts, D.O., M.P.H.2, (1)Nova Southeastern University, Palm Beach Gardens, FL; (2)Southwest Washington Medical Center, Vancouver, WA; (3)Nova Southeastern University, Ft. Lauderdale, FL.

PURPOSE: To: 1) increase access to hypertension screening, referral, and follow-up to minority populations, specifically African-Americans; 2) produce individualized cardiovascular risk assessments based on personal and family history; 3) educate consumers on the warning signs of heart attack and stroke; and 4) identify the effectiveness of a screening program in a community pharmacy.

METHODS: Pharmacist screening was conducted in two pharmacies serving large minority populations. Subjects were recruited by an in-store promotional campaign. Screening included assessment of blood pressure (BP), body mass index (BMI), and cardiac risks. Subjects with elevated BP were invited to return for further assessment of cholesterol and glucose. Recommendations and referral for physician treatment were based upon JNC VII. All subjects received education on cardiac risk management.

RESULTS: In eight months, 569 subjects were seen in 735 encounters. Screening services reached 1.5% of adults within study zip codes. African Americans comprised 50% of subjects screened. The average overall BMI was 29. Stage I BP was present in 30% of the screened population, with an average BP of 135/88. An additional 21% of subjects were taking antihypertensive medication and had an average BP of 141/85. The remaining 31% not taking antihypertensive medication had an average BP of 138/86. An additional 9% of subjects without a hypertension diagnosis had BPs averaging 132/86.

CONCLUSIONS: Access to blood pressure screening, referral, and follow-up for minority populations was increased. Diagnosis and treatment of hypertension continues to be suboptimal. Alterations to program execution could enhance its effectiveness.

374E. Assessment of a community pharmacy-based disease-state manage ment program. Denise Cauller, RPh, M.B.A., Melanie Dodd, RPh, Pharm.D., BCP5, University of New Mexico College of Pharmacy, Albuquerque, NM.

Published in J Am Pharm Assoc 2004;44:236.

375. Post-discharge follow-up phone call by a pharmacist and impact on patient care. Gail M. Burnske, Pharm.D., Allison E. Burnett, Pharm.D., Toby Trujillo, Pharm.D., BCP5, Jeffrey Greenwall, M.D., M.B.A, Boston Medical Center, Boston, MA.

PURPOSE: There is a time between hospital discharge and patient follow-up that has been deemed by many healthcare workers as a “black hole.” Continuity of care is of utmost importance, yet there is no effective uniform system in place to ensure this vital continuity. The literature suggests that discharge counseling and care in the post-discharge period is in need of improvement and is an excellent opportunity for intervention by a pharmacist.

METHODS: A prospective, randomized trial using two similar inpatient general medicine firms was conducted to determine if a post-discharge phone call from a pharmacist reduces 30-day readmission rates. The primary endpoint was a comparison of the number of hospital readmissions (any cause) during the 30-day post-discharge period between groups. Secondary outcomes include the number of patients for whom interventions were made pertaining to primary discharge diagnosis, medications and follow-up appointments.

RESULTS: Interim data analysis will be presented. To date, 50 telephone interviews have been completed (goal = 100). Interim data reveals that patients receiving a post-discharge phone call are 23% less likely to be readmitted to the hospital within 30 days (total of emergency room visits and inpatient hospitalizations). The interviewing pharmacist performed interventions on 72% of patients. Types of interventions included calling the physician, patient education and resolving missing prescriptions.

CONCLUSIONS: If this project yields positive results, the pharmacy department will attempt to implement a full-time formal discharge and follow-up service.

376. Physician survey of outpatient clinical pharmacy services. Melissa M. Blais, Pharm.D., BCP5, CDE, Joseph Mazur, Pharm.D., BCP5, University of South Carolina, PO Box 250384, Charleston, SC.

PURPOSE: A pharmacy-run Pharmacotherapy Clinic was developed to serve as a referral source for physicians without access to an ambulatory clinical pharmacist. In order to prioritize development and initiation of services, it was felt that knowledge of physician attitudes and previous experience concerning clinical pharmacy services would be beneficial.

METHODS: One hundred and fifty-seven attending physicians were identified as a potential referral base for the Pharmacotherapy Clinic. A questionnaire questionnaire survey was developed and distributed via campus mail to all identified physicians.

RESULTS: Sixty-one out of 157 surveyed physicians responded (39%), most of whom (82%) had previously worked with a clinical pharmacist. Patient education and disease teaching were the most common roles that physicians thought clinical pharmacists should provide (84% and 80% respectively). Initiating drug therapy was the least accepted role of a clinical pharmacist in the prescribing process (23%). Physicians commonly felt that patients would benefit from the Pharmacotherapy Clinic providing: education (62%), smoking cessation (59%), and financial assistance (51%) services. More specifically, surveyed physicians stated they would most likely refer patients for: anticoagulation (31%), financial assistance (26%), therapeutic drug monitoring (25%), and pain management (25%).

Conclusion: Surveyed physicians had a wide range of opinions concerning the role of clinical pharmacists in the prescribing process, but identified several services that could be beneficial to themselves and their patients. The results of this survey will be used to prioritize development of services in the Pharmacotherapy Clinic.

377. Provision of pharmacotherapy services in a rural nurse practitioner clinic. Mirinda R. Andrus, Pharm.D., BCP5, Deidre B. Clark, Pharm.D.1, Katherine C. Herndon, Pharm.D., BCP5, (1)Auburn University Harrison School of Pharmacy, Auburn, AL; (2)Pfizer Inc., Birmingham, AL.

PURPOSE: To describe the interventions and services provided by a clinical pharmacist in a medically indigent rural nurse practitioner clinic.

METHODS: A retrospective review of patients referred to a pharmacotherapy clinic in a small nurse practitioner practice was performed. The primary reason for referral, duration of follow-up, educational interventions, clinical interventions (initiation or discontinuation of pharmacotherapy, dosage adjustments, preventative care recommendations), and clinical outcomes were documented.

RESULTS: Nurse practitioners referred 126 patients to the clinic over a 2 year period. Twenty-five patients (19.8%) referred to the clinic failed to keep their initial appointment. The mean age of the patients (53.3% female) with one or more clinic visits was 53 ± 13 years. Medication assistance programs were utilized by 44% of patients. The most common reason for patient referral was hyperlipidemia (80.2%), followed by anticoagulation (12.9%). The pharmacist documented 732 clinical interventions during 708 patient visits (mean = 7.0 visits per patient) with a mean follow-up duration of 9.1 months per patient. Initiation of new drug therapy or dosage adjustment accounted for 52.2% of the clinical interventions. Comprehensive educational services were provided to patients at every visit (mean = 5.6 educational interventions per visit). Among patients referred for hypothyroidism with one or more follow-up visits (n = 70), the mean LDL cholesterol decreased from 140 ± 35 mg/dl to 104 ± 38 mg/dl (p<0.001).

CONCLUSION: A pharmacotherapy service in a rural nurse practitioner practice can provide many opportunities for pharmacist intervention and can improve patient outcomes.

378. Improvement in quantity and quality of venous thromboembolism prophylaxis for medically ill patients: impact of a clinical pharmacy education program. Paul P. Dobesh, Pharm.D., Zachary A. Stacy, Pharm.D.; St. Louis College of Pharmacy, St. Louis, MO.

PURPOSE: The American College of Chest Physicians recommends unfractionated heparin or low-molecular-weight heparin for prevention of venous thromboembolism (VTE) in medically ill patients. Despite these recommendations, a previous analysis at our institution revealed a low utilization of VTE prophylaxis. Our objective was to evaluate the effectiveness of a pharmacist education program on improving the quantity and quality of VTE prophylaxis in medically ill patients.

ACCP 2004 ANNUAL MEETING ABSTRACTS 1475
381. An innovative role for the pharmacy technicians in promoting influenza vaccination at Eastern Maine Medical Center. Shewan Aziz, Ph.D., Marybeth Boudreau, Pharm.D., Libby Karen, R.N., Angela Hollis-Dumas, CPht, James Raczek, M.D., Jamie Cronin, Pharm.D., David Crabtree, CPht, Eastern Maine Medical Center, Bangor, ME.

PURPOSE: To show that utilizing decentralized pharmacy technicians is an effective approach to improve the rate of flu immunization at a health system.

METHODS: The pharmacy computer system was programmed to screen for patients at high risk for developing influenza based on CDC criteria. The pharmacy technicians (PT) used the computer-generated reports and triplicate influenza vaccine consent/order forms to interview eligible patients and to screen for allergic reaction to influenza vaccine or eggs and for contraindications, such as pregnancy and Guillain-Barre Syndrome. The PT also handed patients a 2003–2004 CDC copy of influenza vaccine information. Patients then had the option to accept or decline the influenza vaccination through signing the consent/order form. If the patient declined the vaccine the PT left the white copy of the order sheet in the chart, a pink copy was handed to the patient and a yellow copy was sent to the Pharmacy. If the patient accepted the vaccine the white and pink copies posted into the chart and the yellow copy was sent to the Pharmacy. After the vaccine is administered the white and pink copies were signed off and the patient was given the pink sheet with the date.

RESULTS:

<table>
<thead>
<tr>
<th>Action/Reason</th>
<th>Patient #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Influenza</td>
<td>467</td>
</tr>
<tr>
<td>Declined/Already Received</td>
<td>355</td>
</tr>
<tr>
<td>Patient's Decision</td>
<td>203</td>
</tr>
<tr>
<td>Medical Reason</td>
<td>48</td>
</tr>
<tr>
<td>Allergy</td>
<td>15</td>
</tr>
<tr>
<td>Reason Not Given</td>
<td>1271</td>
</tr>
</tbody>
</table>

CONCLUSION: The number of high-risk patients immunized from October 2003–February 2004 was 3 times that of recorded for year 2002–2003.


PURPOSE: This study is designed to determine whether a clinical pharmacist’s recommendations to physicians regarding optimal medication therapy in outpatients ultimately decreases overall health care utilization costs in capitated patients in an internal medicine practice.

METHODS: A prospective, concurrent, controlled study comparing two internal medicine practices. The pharmacist made suggestions to optimize medication therapy in the active practice, and proposed suggestions but did not communicate with the control practice for 12 months. Total health care utilization costs were compared 12 months before and 12 months after the study period for each practice.

RESULTS: There were 127 and 216 adult patients (29–92 years old) in the active and control practice, respectively. The mean total per member per month (PMPM) costs decreased 16% in the active practice (p=0.12) and increased 40% in the control practice (p=0.003). PMPM was paired-t test on the log-transformed data. A subgroup analysis of patients over 65 years old revealed the mean total PMPM increased 30% (p=0.277) in the active practice (N=44) and increased 66% (p=0.001) in the control practice (N=146).

CONCLUSION: A clinical pharmacist can promote optimal medication therapy in outpatients by working with primary care physicians within their office practice. Improving medication therapy can result in limiting total health care utilization costs.

383. Medication cost avoidance and savings associated with pharmacist involvement in an indigent Columbus Neighborhood Health Center (CNHC) system. Laura E. Hall, Pharm.D., BCPs, Ruth E. Empiague, Pharm.D., Milap C. Nahata, Pharm.D., FCP, The Ohio State University College of Pharmacy, Columbus, OH.

PURPOSE: To determine the medication cost avoidance and savings associated with pharmacist activities including formulary management, Pharmacy Benefits Manager (PBM) interaction, and implementation of various programs (Federal 340B health center pricing program, manufacturer patient assistance programs (MAPs), and Pfizer Sharing the Care (STC) program) for an indigent patient population.

METHODS: Financial and medication use data compiled from PBM and internal pharmacy program reports reviewed quarterly at Pharmacy and Therapeutics Committee meetings were evaluated. Patient population demographics were obtained from CNHC’s internal billing and tracking system.

RESULTS: Medication cost avoidance and savings have increased since the initiation of the partnership between CNHC and OSU in 1991. In 2003, the...
medication needs of 11,872 uninsured patients were met. Drugs were most frequently used for cardiovascular disease, diabetes, and neurological/psychiatric illnesses. With 63% uninsured, most below federal poverty level, patient co-pay has remained <$10 per monthly prescription. Using a negative formulary with pharmacist managed prior-authorization, retail (non-340B) cost to CNHGC was estimated $524/patient/month. Greater drug utilization has increased, ranging from 51–72% of prescriptions. For year 2003, the drug cost avoidance/savings of $1.95 million (41.6% 340 B pricing, 35.6% STC program, 22.8% MAFs) were achieved, and the cost of pharmacy services was $130,000. This occurred while maintaining standards of care and staying within the $1.2 million drug budget for 2003.

CONCLUSIONS: Active participation of pharmacists can markedly increase medication cost avoidance and savings for low-income patients, while meeting their medication needs.

384E. Medication error reduction in a pediatric emergency center. Brenda E. Darling, Pharm.D., Paula J. Maalon, Pharm.D.; Children's Medical Center, Dallas, TX.

Published in Hospital Pharmacy 2004;32(2):121-4.

385. Planning and implementation of a multimodal medication error tracking, reporting and prevention program. Tracy Stillwell, Pharm.D. 1, Carolyn Robbins, B.S. Pharm. 2, Ann Riley, Pharm.D. 1, Mahboud Ahmadi, B.S. 1, Brenda D. Jamerson, Pharm.D. 2, 1.(1)Lincoln Community Health Center Pharmacy, Durham, NC; (2)Campbell University Department of Clinical Research, Morrisville, NC.

PURPOSE: Lincoln Community Health Center (LCHC) is a primary care health facility that served a total of 35,168 patients in 2003. 87% minorities, 82% below the poverty level. On recommendations from the IOM report “To err is human”, pharmacy administration began to examine systems and processes in order to prevent medication errors.

METHODS: During 2001, a performance improvement goal was initiated. The activities were: 1) Plan- identified pharmacy resources for the project and identified medication error data; 2) Do- mapped prescription workflow, collected data and categorized as to type, severity and point of detection; 3) Study- analyzed data to determine performance gaps/improvement opportunities and conducted a root cause analysis; 4) Act- implemented education sessions, initiated staff competency training, installed robotic dispensing system, and conducted a failure mode analysis.

RESULTS: There were 7/36,931 medication errors (0.02%) in 4Q 2001 and 2/42,151 medication errors (0.005%) in 4Q2002 that reached the patient. Pharmacy staff processed 6.2% more prescriptions in 2002 compared to 2001 and 25.6% more prescriptions in 2003 compared to 2002. During this time, there was no increase in pharmacist headcount and an increase of 1.5 FTE in technician headcount. Pharmacy staff increased their efficiency by 20% over the years 2001 to 2003.

CONCLUSIONS: Medication errors decreased and pharmacy staff efficiency improved to a meaningful and measurable degree following implementation of performance improvement initiatives. These results suggest that pharmacy led, team-based medication error improvement programs can be successfully implemented in health care facilities similar to LCHC.

386. Ambulatory care pharmacists' role in the care of patients with chronic kidney disease. Robin E. Bennett, Pharm.D. 1, Renee M. DeHart, Pharm.D. 2, 1.(1)Methodist Healthcare, Memphis, TN, (2)Samford University McWhorter School of Pharmacy, Birmingham, AL.

PURPOSE: Between 1992 and 2001, the size of the Medicare population with CKD increased by 53% in diabetics and by 140% in non-diabetics. Pharmacists' involvement in the care of patients with CKD has historically focused on patients with ESRD. The involvement of pharmacists in the care of earlier stages of CKD has yet to be well established. A survey was created for ACCP's ambulatory care PRN pharmacists to address their current role in the care of patients in this population.

METHODS: A survey letter, and stamped addressed return envelope were sent to 1028 potential respondents. Survey questions addressed use of and frequency of monitoring for CKD complications in at risk patients. Other information collected included respondent demographics, participation in nephrology referrals, and familiarity with National Kidney Foundation guidelines. Pharmacists indicating routine provision of care to patients at risk for or with CKD were included in the analyses.

RESULTS: Five hundred and thirty five of the 1028 completed and returned the survey (response rate of 52%). Survey data demonstrated that 85% of respondents routinely monitor for kidney dysfunction in at risk populations. In relation to anemia secondary to CKD, only 24% reported routinely monitoring Hgb/Hct concentrations. In addressing renal osteodystrophy, 16% routinely monitor Ca++/PO4 concentrations and 3.6% routinely monitor intact PTH. 41% of respondents identify the following micronutrients for routine monitoring, vitamin D. 85% of respondents report patient refusal to a nephrologist.

CONCLUSION: Surveyed ambulatory care pharmacists are routinely assessing for kidney dysfunction, but are not incorporating other recommended CKD guidelines into routine practice.

387. Pharmacist managed anemia program in an outpatient hemodialysis population. Tod Walton, Pharm.D., Michael D. Knauz, Pharm.D., Katherine P. Holloway, Pharm.D.; Grady Health System, Atlanta, GA.

Erythropoietin alpha is the standard of care for anemia treatment in stage 5 chronic kidney disease patients. A pharmacist-managed anemia program was developed giving a clinical pharmacist authority to initiate, monitor, and change erythropoietin and iron therapy in the outpatient hemodialysis unit. All erythropoietin doses were administered subcutaneously. Data was collected from May 2002 to May 2004 totalling 228 patients and 1379 patient-months of pharmacist monitoring. Demographic data show the study population to be 67% male, 88% African-American and have an average age of 56 +/- 13 years. The most common etiology of renal failure was hypertension (50.4 %), diabetes mellitus (23.4 %) and human immunodeficiency virus (HIV) (10.5 %). The average initial hemoglobin was 9.5 gm/dl and was 11.8 gm/dl at six months. Iron parameters show an initial average ferritin of 187 ng/ml with an iron saturation of 22 %. These parameters improved to a ferritin of 495 ng/ml and iron saturation of 32 % at six months. At six months, 80 % of patients had a hemoglobin > 11 gm/dl compared to the national average of 75 % and 93 % of patients had a hemoglobin > 10 gm/dl. The average erythropoietin dose in the study group was 121 units/kg/week (8,420 units) compared to the national average of 229 units/kg/week (16,000 units). This difference results in an annual cost avoidance of $53,000 per patient. Pharmacist-management of anemia can provide a cost-effective method in the chronic kidney disease population.

388. Implementation and evaluation of rasburicase guidelines for prevention and treatment of tumor lysis syndrome in a large academic medical center. Amy J. Hatfield, Pharm.D., Alis A. Butler, Pharm.D.; The Johns Hopkins Hospital, Baltimore, M.D.

PURPOSE: Limited recommendations exist for the use of rasburicase. FDA-approved labeling recommends 0.15–0.2mg/kg/day for 5 days in pediatric patients receiving chemotherapy at risk for hyperuricemia. This evaluation describes the implementation of rasburicase guidelines and evaluates outcomes following guideline institution.

METHODS: Guidelines were developed from literature review and manufacturer recommended indications. Oncology pharmacy clinical specialists (OPCS) were contacted for each potential use to review criteria and recommend a dose. Pharmacists administered the rasburicase dose based upon patient parameters. OPCS followed patients for response and need for subsequent doses.

RESULTS: 16 patients (8 pediatric, 8 adult) have been administered 18 doses of rasburicase since implementation in January 2004. OPCS were contacted for 100% of doses administered and recommendations were accepted. Mean uric acid level on presentation was 13.7 mg/dl (7-24.7 mg/dl) vs. 2mg/dl (0.2-4.4 mg/dl) post-rasburicase in 14 patients who required one dose. Two patients who required two doses had levels of 9.3 and 10.2 mg/dl after one dose and both 0.5 mg/dl after the second dose. Total drug acquisition cost for these 16 patients was $24,951 for the dosing strategy based on implemented guidelines vs. $170,753 based on package insert recommendations. Utilization of these guidelines resulted in a potential cost savings of $145,802.

CONCLUSIONS: The implemented guidelines target patients at highest risk for tumor lysis syndrome. Clinical outcomes of normal uric acid levels was achieved in all patients, most with only one dose. Implementation of guidelines with concurrent review and intervention minimizes costs and unnecessary use of rasburicase.

389. Therapeutic interchange of darbepoetin alfa for epoetin alfa for chemotherapy-induced anemia. Deborah A. Blambele, Pharm.D., Kenneth M. Shermock, Pharm.D., Todd W. Nesbit, Pharm.D., Brian Pinto, Pharm.D., John Fetting, M.D.; The Johns Hopkins Hospital, Baltimore, M.D.

PURPOSE: To determine the success of implementation and the economic impact of a therapeutic interchange program of darbepoetin alfa for epoetin alfa for chemotherapy-induced anemia in a large academic medical center.

METHODS: An economic forecast model was developed to determine the impact of increased use of darbepoetin. Based on that model, and an assumption of equal safety and efficacy to epoetin, the interchange program was implemented. The therapeutic interchange began on July 1, 2003, following approval by the Pharmacy and Therapeutics Committee. When the pharmacy receives an order for epoetin, a pharmacist evaluates the patient for eligibility to participate in the interchange. Providers are allowed to write “Do Not Substitute” on orders for epoetin to avoid the therapeutic interchange. An analysis implementing the program to determine the level of compliance and the economic impact of the interchange program.

RESULTS: The economic forecast model estimated a potential for between $490K and $640K in annual cost savings by instituting a therapeutic interchange program from epoetin to darbepoetin. The following months of data from August 2003 through October 2003 showed that nearly 90% of erythropoietic growth factor doses dispensed were darbepoetin, compared to 100% epoetin in the previous year. The estimated annual cost savings associated with the program was $560K in FY2004.
CONCLUSION: A therapeutic interchange program of darbepeoin for epoetin was successfully implemented in a large academic medical center. The program resulted in significant economic benefit to the institution that was consistent with forecasted savings.


PURPOSE: Clinical trials offer the best treatment for patients with cancer, yet less than 5 percent of adults and less than 60 percent of children are enrolled on clinical trials. To assess areas for potential trial development we designed a ‘non-protocol’ form for use at our center. Our goal was to assess deficiencies in our menu of options and indirectly increase awareness of trials.

METHODS: We captured all chemotherapy orders for ambulatory patients at The Cancer Institute of New Jersey who were not enrolled on a clinical trial. Completion of a ‘non-protocol’ form was required by the pharmacy with the first set of chemotherapy orders for any regimen new for that patient. The form required completion of one of three areas: trial availability, reason for ineligibility or other reason for not enrolling the patient.

RESULTS: From June 2003 through June 2004, 270 forms were collected which account for approximately 70 percent of all new chemotherapy orders. The most prominent opportunities identified for trial development include second line therapies for many tumors and the full data will be presented. Surprisingly, about 10 percent of patients refused protocol therapy despite seeking care at a comprehensive cancer center.

CONCLUSION: The data generated from the implementation of this novel pharmacy service is of significant importance to the cancer center. It is reviewed quarterly with the tumor-focused groups of the cancer center to identify areas for developing new trials. Psychosocial evaluation of the reasons for refusal may also yield important insights for clinical trials education.

391. A retrospective drug use evaluation of epoetin-α and darbepeoin-α within the Cleveland Clinic Health System. Jodie M Fink, Pharm.D., BCPS,1, Mandy C Leonard, Pharm.D., BCPS,1, Jennifer Shamp, Pharm.D.,2, Sandra S Axtell, Pharm.D.,3, Marcia J Wyman, Pharm.D.,1, Morton P Goldman, Pharm.D., BCPS,3, David A Kravets, M.S., FASHP,1, (1)The Cleveland Clinic Foundation, Cleveland, OH, (2)The Ohio State University, Columbus, OH; (3)Hillcrest Hospital, Mayfield Hts., OH.

PURPOSE: The Cleveland Clinic Health System (CCHS) conducted a retrospective drug use evaluation (DUE) of epoetin-α (Procrit®, EPO) and darbepeoin-α (Aranesp®, DARB) for chemotherapy-induced anemia (CIA). The objective was to trend usage patterns in the ambulatory setting.

METHODS: Data was collected for patients initiated on EPO or DARB for 23 weeks between July 2002–July 2003. Information collected included demographics, doses, frequency and duration of therapy, hemoglobin (Hgb) and hematocrit (Hct) levels, iron studies, and age. RESULTS: Data from 114 patients were collected (40% male); 55 EPO and 59 DARB patients. Mean baseline Hgb levels were 9.9±0.7g/dl and 8.9±0.8g/dl in the EPO and DARB patients, respectively. Hgb levels were similar over the course of therapy for both groups. The average duration of therapy was 12.2±4.8wks in the EPO group and 13.6wks in the DARB group. Forty-seven patients reached Hgb levels of ≥12g/dl (EPO n=23; DARB n=24). The most frequent doses were EPO 40,000Units weekly and DARB 200µg every other week. The number of patients with transfusions was similar between the groups (EPO n=11; DARB n=7), and had no effect on the average Hgb levels. Only 10% of patients had iron studies drawn prior to therapy.

CONCLUSION: Based on these data, EPO and DARB produce similar Hgb levels in patients with CIA within CCHS; 42% and 41% with Hgb ≥12g/dl, respectively. The most common regimens were EPO 40,000Units weekly and DARB 200µg every other week. Recommendations for a therapeutic interchange program and routine iron studies will be forth-coming.

392. Development of a Web-based, computerized and patient-specific pediatric emergency drug card for hospitalized patients. Michael A Veltri, Pharm.D., Carol Matlin, R.N., M.S., Christoph U. Lehmann, M.D., The Johns Hopkins Hospital, 600 North Wolfe Street, Baltimore, MD

PURPOSE: Due to the large variation in pediatric patient sizes, nearly all medication doses need to be individually calculated based on patient weight or body surface area. This step takes additional time and introduces an opportunity for error. In addition, the chance of a dose-calculation error is magnified during the stress of an arrest or emergency situation. The purpose of this project was to develop a computer-generated pediatric emergency drug card (PEDC) that contains precalculated patient-specific doses, and could be used in code situations throughout a large academic medical center.

METHODS: Content for the PEDC was developed by a multidisciplinary team that included pharmacy, nursing, and pediatric advanced life support (PALS) and institution-specific guidelines were used to develop the dose calculation logic.

RESULTS: A user friendly, web-based computer program was successfully developed using Cold Fusion®, that generates patient specific PEDCs. The PEDC content includes precalculated PALS drug doses, continuous infusion medication calculations (concentrations and rates), and defibrillator doses. It is printed upon admission and is used institution-wide for all pediatric patients. It is kept at the ready in all pediatric patient’s bedside charts, which accompany patients wherever they are in the institution.

CONCLUSION: Computers are uniquely suited to perform mathematical calculations repeatedly, with 100% accuracy. Utilizing this strength, a web-based computer program that generates a patient specific PEDC can be successfully developed. The use of these computer-generated PEDCs can be incorporated into the care of pediatric patients in a large academic medical center.

393. Pediatric pharmacology research and development center. Richard D Lefl, Pharm.D.1, Trey Putnam, Ph.D.1, Reza Mehrvar, Ph.D.1, George McCracken, M.D.2, Beverly Rogers, M.D.1, Hassan Jafri, M.D.2, John Tourville, Pharm.D.1, Harvey Jones, M.S.1, (1)Texas Tech University Health Sciences Center, and Children’s Medical Center, Dallas, TX; (2)University of Texas Southwestern Medical Center, Dallas, TX; (3)Children’s Medical Center, Dallas, TX.

Clinical and practical testing are an essential part of the approval process of the U.S. Food and Drug Administration. We have previously collaborated to support the establishment of a NICHD-sponsored Pediatric Pharmacology Research Unit (PPRU). The PPRU will focus on conducting pediatric clinical trials. We have recently completed funding and are in the process of establishing an early-stage analytical laboratory to support a broad range of preclinical pediatric drug studies. Capabilities of the PPRU and the Pediatric Pharmacology Research & Development Center (PPRDC) will be synergistic and promises to enhance the knowledge of drug development in the pediatric patient population.

METHODS: A therapeutically useful, flexible computer program was successfully designed and implemented to support the PPRU. The PPRC will be the core LC-MS/MS system to deliver the desired analytical sensitivity, specificity, and ruggedness for drug development. The PPRU will support the development of new drug formulations, drug metabolism, pharmacokinetics/dynamics, etc. in accordance with regulatory guidelines (i.e., GLP). The PPRDC represents a unique collaboration between the University of Texas Southwestern Medical Center, Texas Tech University Health Sciences Center, and Children’s Medical Center of Dallas. Unique to the collaboration is the capability of both preclinical and clinical studies in infants and children. The collaboration provides an unique training opportunity for health professionals. Pediatric pharmacology fellowships are planned to begin July, 2005.

394. Pharmacy interventions for computerized neonatal parenteral nutrition orders. Sheila A. Vegio, Pharm.D., Gary R. Geyrich, M.D., Carol Matson, R.Ph., Erika Delph, R.Ph., Virginia Commonwealth University Medical Center, Richmond, VA.

PURPOSE: This report documented pharmacy interventions on computerized neonatal parenteral nutrition (PN) orders to identify medication errors and to quantitatively extraneous dispensing issues.

METHODS: Parenteral nutrition related medication prescriptions were prospectively evaluated by pharmacists for accuracy. Orders were screened for 1) correct patient and weight 2) dosages as standard range 3) and dispensing issues. Four evaluation periods after PN computer enhancements. Interventions were considered prescribing errors or dispensing issues and classified as high, moderate, or minimal clinical significance.

RESULTS: A total of 4857 parenteral solutions were evaluated. The control phase indicated high to moderate error rates of 13 and 36 per 100 orders respectively while minimal errors and pharmacy issues were 43 and 8.1 per 100 prescriptions. System changes to the ordering process resulted in error decrement then escalated to 7.6–21.8 per 100 orders for high, moderate errors. Drug dispensing errors increased to 76.9 per 100 orders (NS). The PN high, moderate error rate did not change in the final evaluation period after computer advancements yet minimal errors and pharmacy dispensing issues were three to six times higher. (NS).

CONCLUSION: Pharmacists must continue to evaluate computerized neonatal PN orders to prevent high, moderate medication errors. The pharmacy dispensing issues should be assessed for production and clinical relevance.

395. Pharmacists in rehabilitation unit. Dan Moellentin, Pharm.D., Renee Ford, Pharm.D.; Eastern Maine Medical Center, Bangor, ME.

Rehabilitative Medicine Units have taken on higher acuity patients than in the recent past in part due to changes in Skilled Facility acceptance policies of hospital discharged patients who require care or drugs that would surpass insurance limits that have external Medicine training with emphasis on Neurology can play a valuable role in the contemporary Rehabilitation Unit. Patients in one unit were studied for 6 months after a clinical pharmacist was introduced to multidisciplinary rounds and patient care was a 70-bed unit. Unit pharmacists were compared to pharmacy cost-transfer prior to pharmacist installation and after and adjusted for censure. There were no significant differences in case mix prior to or post pharmacist implementation. Intervention types by volume were as follows: ADR assessment and prevention, CNS changes, drug-drug interactions, nausea and
vomiting, depression, antibiotic choice and duration, agitation, anticoagulation, diabetes, anemia, HIT management and transition to warfarin, IgG utilization, hemodynamics, pain, and miscellaneous. Quality of patient care and LOS were positively impacted (cost avoidance), impact was also made on drug costs incurred. Drug expenses reduced an average of $145.37 per intervention. Interventions averaged 4 per day 5 days a week. Time expended was 2.3 hours per day. Drugs providing the largest financial impact were 1) IgG 2) erythropoietin 3) direct-thrombin inhibitors 4) intravenous anti-zeisure medications 5) antibiotics 6) prompts ADR recognition and management, and 6) Interferons. Placement of a clinical pharmacist on a Rehabilitation Unit provides significant opportunities to reduce suffering, Length of Stay, and decrease drug expenses.

396E. Impact of a pharmacist on a patient-focused community-based outreach program. Darshana S. Rathod, Pharm.D.; Baylor Specialty Health Centers, Dallas, TX. Presented at the ALCALDE Southwest Leadership Conference, Galveston, TX, May 2002

397. Assessment of medication therapy management services in a pharmaceutical care asthma clinic. Leigh Ann Ramsey, Pharm.D., BCPS, CDE, Lisa M. Murphey, Pharm.D., BCPS, Margaret B. Pittcock, Pharm.D., Carol Hope, Pharm.D.; University of Mississippi Medical Center, Jackson, MS.

PURPOSE: To determine whether medication therapy management by pharmacists decreases emergency care for asthma and improves compliance.

METHODS: Retrospective study of patients followed for 12 months. The enrolled cohort acted as its own historical control. The primary outcome was utilization of Emergency Department (ED) services and hospitalizations for asthma; secondary outcomes evaluated compliance. Data retrieved from disease modules completed at each visit. The study interval constituted one year prior to referral for asthma management (year 1) compared to one year after (year 2).

RESULTS: Thirty-one patients enrolled. In year 1, 14 patients had >2 ED visits for asthma; in year 2, 7 patients had >2 ED visits for asthma. Average ED visits in year 1 was 1.548 compared to 0.645 in year 2. In year 1, 8 patients had 1-3 hospitalizations for asthma; in year 2, 4 patients had 1-3 hospitalizations; in year 1 was 0.354 compared to 0.129 in year 2. On initial visit, 52% patients had compliance score of ≤50, with 32% of patients scoring >90. On final visit, 38% patients had compliance score of ≥90, with 53% scoring >90.

CONCLUSION: Preliminary analysis revealed a decrease in utilization and cost of emergency services for asthma after pharmacist intervention. This assessment ratifies the benefit previously observed, a decrease in emergency services; it also demonstrates an increase in patient compliance with pharmacist involvement. Study limitations include estimates of ED and hospitalizations from patient-reported data. These results will support implementation of a prospective evaluation of this service.

398. Outcomes of a pharmacotherapy clinic in a community health center associated with an indigent care urban health system. Santhi Musilumami, B.S., Pharm, Pharm.D., CDE; Harris County Hospital District, Houston, TX.

PURPOSE: A pharmacotherapy clinic was established in a primary care providing community health program (CHP) associated with an indigent care health system in Houston, TX.

METHODS: Adult patients identified with high-risk chronic disease parameters were referred to the Clinical Pharmacy Specialist for management until goal. Physician progress notes described reasons for referral and nursing personnel made the appointments at specified time periods. All visits, new and follow-up were set at 20 minute intervals due to lack of scheduling software sophistication. Each visit included medication review, polypharmacy screening, focused physical assessment, medication adjustment, patient education, and refill authorization.

RESULTS: Over 300 patients are actively enrolled in this clinic. Referrals were primarily for diabetes, followed by hypertension, lipid management, asthma, and pain management. Outcomes data was tracked with an access database. One year outcomes for AIC were 2% average reduction for those with a baseline > 9% and 1% average reduction for those with a baseline between 7-9%. Lipid outcomes showed a 14 mg/dl reduction in LDL. 90% of patients with a baseline > 9% and 1% average reduction for those with a baseline < 9%.

CONCLUSION: Pharmacotherapy clinic has been extremely successful with metabolic syndrome referrals added to the referral criteria recently. The clinic has reached maximum capacity. Pharmacy administration has taken steps to expand the program to the remaining ten community health centers.


1)Massachusetts College of Pharmacy and Health Sciences, Worcester, MA; (2)Massachusetts College of Pharmacy and Health Sciences, Boston, MA; (3)UMass Memorial Medical Center, Worcester, MA.

PURPOSE: We sought to determine if there were differences in the appropriate dosing of renally-excreted medications between areas of the hospital traditionally followed by a decentralized pharmacist to those areas of the hospital not followed by a decentralized pharmacist.

METHODS: All patients with renal dysfunction (serum creatinine greater than 1.4 mg/dL) were prospectively identified and were included if they were greater than 18 years of age and prescribed a medication requiring renal dose adjustment. Group 1 included patients traditionally followed by a decentralized pharmacist, group 2 consisted of patients not covered by a decentralized pharmacist. The primary endpoint was to compare the incidence of inappropriate medication dosing between the two groups. Cost avoidance and the number of accepted recommendations were secondary endpoints.

RESULTS: There were a total of 240 renally dosed drugs in group 1 versus 245 in group 2. Approximately 1.3% (n=3) of the medications in group 1 were inappropriately dosed compared to 22% (n=53) in group 2 (p=0.001). The estimated cost avoidance associated with these interventions were $4,500 over a three-month period or about $18,000 annually.

CONCLUSION: Active monitoring of and intervention for hospitalized patients with renal dysfunction can decrease the number of inappropriately dosed renally-excreted medications in patients with renal dysfunction. This, in turn, may decrease hospital costs associated with excessive dosing in this population.

400. Development of a focused pharmacotherapy module education program for medical residents and critical care/pulmonary fellows in a medical intensive care unit (MICU). Joseph E. Mazur, Pharm.D., BCPS, Brian Zeno, M.D. 1, Alice M. Boylan, M.D. 1, John E. Helfnner, M.D., FCCP 1.

1)Medical University of South Carolina, PO Box 250584, Charleston, SC; (2)Medical University of South Carolina - Department of Pulmonary & Critical Care Medicine, PO Box 250630, Charleston, SC. (3)Medical University of South Carolina - Executive Medical Director, PO Box 230332, Charleston, SC.

PURPOSE: The American College of Critical Care Medicine has outlined guidelines for residency training involving clinical pharmacists as part of the healthcare team. We developed for later outcomes testing a modular critical care educational program for MICU housestaff at an academic teaching university hospital to meet these guidelines.

METHODS: The MICU director in collaboration with a clinical pharmacy specialist identified safe medication practice guidelines as an improvement initiative. A series of Intranet-based and live case discussions/lectures to housestaff were developed for presentation bi-weekly over a one month time period. Examples of areas covered in the core curriculum comprise: antimicrobial/antifungal management, vasopressors/inotropes in shock states, hypertensive urgencies and emergencies, status epilepticus, and sedative-neuromuscular blockers. Content and formatting were revised based on attendee feedback. To assess medication use competency, residents will be provided pre- and post-test questions before lectures. The lectures will be made available on the hospital Intranet via PowerPoint slide format with case discussions. A satisfaction survey is planned to be distributed after their one month blocks to determine the quality of education provided in them.

RESULTS: To date, 84 PGY 1-6 have attended 12 months of pilot lectures providing feedback to refine the lecture modules. Residents have responded positively, and a final series of PowerPoint slides are being developed.

CONCLUSION: Sufficient evidence-based studies exist to allow the development of short PGY 1-6 resident educational modules, which are well received and attended. Future outcomes studies are needed to determine the effect on knowledge and skills of this program.

401. Implementation of after hours remote pharmacy services within a health system. Susan Trop-Haideen, R.P.H., Shewon Aziz, Ph.D., Rph, William Boynton, R.P.H., James Racecz, M.D., Eastern Maine Medical Center, Bangor, ME.

PURPOSE: Maine hospitals without twenty four-hour pharmacy services need to comply with the JCAHO first dose review requirement and the new State regulation, which requires a pharmacist to review a medication order within 24 hours of initiation. This study describes an innovative and a cost-effective means of providing concurrent review service to these hospitals.

METHODS: Eastern Maine Health System consists of 4 acute care facilities, one critical access hospital, one rehabilitation facility and one psychiatric facility. Eastern Maine Medical Center (EMMC) is a 425-bed community based teaching hospital and is the only facility providing 24/7 pharmacy services. In 2003, EMMC pharmacists initiated the practice of providing remote order verification during weekends and holidays to three out of the four acute care facilities.

RESULTS: EMMC Pharmacists provide drug order review and entry services via facsimile and electronic technology during the hours the client hospital pharmacy is closed. In addition, EMMC pharmacists have access to patient profiles, laboratory data and policies to clarify and clinically intervene on inappropriate medication orders. The pharmacist is also able to provide drug information to nurses and physicians and to alert the hospital pharmacy
staff about patients or issues that required follow up the hospital pharmacists in the morning.

CONCLUSIONS: The shortage of pharmacists, limited hospital pharmacy budgets, and increasing pharmacists’ salaries have made it difficult to comply with the concurrent medication review requirement. This abstract demonstrates that the use of a pharmacist driven remote verification is the most effective and economical option for compliance.

402. Reimbursement for psychiatric services and development of a medication database: two examples of psychiatric clinical pharmacy services at a large outpatient community mental health center. Christopher M. Gillette, Pharm.D., BCPS1; Joshua A. Bellamy, Pharm.D., BCPS2; (1)Human Service Center, Peoria, IL; (2)Pfizer Inc., New York, NY.

The Human Service Center (HSC) is a comprehensive Community Mental Health Center located in Peoria, Illinois. A clinical pharmacist was hired and tasked with supporting the multi-disciplinary outpatient clinical treatment teams by providing clinical pharmacy services and administrative duties. Clinical pharmacy services include consulting on pharmacotherapy-related issues with staff and patients and monitoring medication utilization trends. Administrative services include monitoring the procurement and distribution of medications, managing the medication budget, and actively participating in administrative systems development.

Critical elements vital to the success of the clinical pharmacy service include the ability to be reimbursed for these services and the development of a medication database. Clinical pharmacy services provided to consumers with Mental Health conditions were reimbursed by Illinois State Medicaid through the Illinois Department of Human Services. Demonstration of Mental Health services with an exemption was granted for the clinical pharmacist to become a Qualified Mental Health Professional (QMHP) based on academic education and experience. As a QMHP, the clinical pharmacist can bill Illinois Medicaid for services including medication monitoring and training. A medication database was created using Microsoft Access® and is updated daily with changes to treatment regimens. These data provide information essential to identify prescribing trends, opportunities to control cost, and improve client care. This innovative clinical pharmacy practice site serves as a model for community mental health clinics to replicate. Clinical pharmacy services have enabled the clinic to increase utilization of industry-sponsored medication programs, manage costs and associated administrative duties while improving client education related to pharmacotherapy.

403. Pharmacist-initiated comprehensive bone health protocol improves the identification, prevention, and treatment of bone disease in an outpatient kidney and pancreas post-transplant clinic. David J. Taber, Pharm.D., BCPS1; Elizabeth Ashcraft, B.S.2; G. Mark Bailie, Pharm.D., M.H.A.1; Bart Lawrence, Pharm.D., BCPS1; (1)Wingate University School of Pharmacy, Wingate, NC; (2)MUSC, Charleston, SC. (5)Pfizer Global Pharmaceueticals, 173 Beresford Creek St, Charleston, SC.

PURPOSE: The aim of this study was to determine the impact on patient outcomes with the implementation of a pharmacist initiated comprehensive bone health protocol.

METHODS: This was a retrospective chart review which consisted of two groups. Patients transplanted up to one-year prior to the implementation of the protocol (group 1), compared with patients transplanted after the protocol implementation with at least 3 months of follow-up (group 2). The protocol was developed to provide a comprehensive set of guidelines on how to diagnose, prevent, treat, and monitor bone disease within the post-transplant population. Pharmacists saw patients prior to providers and used the protocol to guide and support recommendations made to the providers.

RESULTS: A total of 610 patients were included in this study, of which, 334 patients were in group 1 and 276 patients were in group 2. Patients in the two groups were well matched for both demographic features (age, race, gender, and known risk factors for dyslipidemias), as well as transplant characteristics. Group 2 had a higher percentage of patients at goal for LDB (64% vs 52%) and triglycerides at goal (81% vs 78%), although this did not reach statistical significance (p<0.02). However, patients in group 2 were more likely to have a follow-up FLP (91% vs. 67%; p<0.0001), and were more likely to have both their triglycerides and LDL at goal (44% vs. 28%; p=0.01).

CONCLUSIONS: The implementation of a pharmacist initiated post-transplant dyslipidemia protocol improved the identification and treatment of lipid diseases.


PURPOSE: The purpose of this project is to describe the development and implementation of a wellness clinic managed by pharmacy faculty and students within a university. The project had three goals: (1) develop pharmaceutical care & wellness programs for the university and surrounding communities (2) develop programs with intent of educating students. (3) develop and trial resources that may be used by our preceptors, specifically ambulatory preceptors in their own practice site.

METHODS: The project was conducted in three phases: (1) needs assessment of employees through health education lectures and health resources data; (2) implementation of health screenings and disease management initiatives; and (3) development of a clinical rotation and expansion of services through preceptors. The project, known as the Center for Pharmacy Care was launched in 2002. The center provides on and off campus preventative health screenings, patient education, medication and lifestyle counseling, educational seminars, tobacco cessation groups and outcome reporting for common health conditions. Preventive screenings include blood pressure, cholesterol, glucose, bone density, body composition, and facial skin analysis. The center now serves a clinical practice site, teaching site and resources for preceptors.

RESULTS: To date, the center has provided over 50 screening events, 16 health education seminars and served over 1000 individuals recently. The center adopted an office-style practice that allows for individual appointments and greater opportunity for continuity of care.

CONCLUSIONS: The center has evolved to be dynamic practice and service model and teaching site. Future plans include expansion of services and types of populations served.

406E. Number needed-to-treat and cost of recombinant human erythropoetin to avoid one transfusion-related adverse event in critically ill patients. Edward T. Horn, Pharm.D., Karen M. Shermock, Pharm.D. , Pamela A. Lipssett, M.D., Peter J. Pronovost, M.D., Ph.D., Todd Dorman, M.D., The Johns Hopkins Hospital, Baltimore, M.D.


STUDENT, RESIDENT, FELLOW RESEARCH IN PROGRESS

These papers describe original research by students, residents, and fellows in therapeutics, pharmacokinetics, pharmacodynamics, pharmacoeconomics, and pharmacopoeidiology in which the research effort is still on-going. The abstract title and authors are published in Pharmacotherapy, the full abstract will be published in the meeting program book.

407. Utilization of fenoldopam to preserve renal function in coronary artery bypass graft patients. Matthew M. Rude, B.S., Pharm.D., candidate, Jim Curtis, Pharm.D., Borgess Medical Center, Kalamaazoo, MI.


409. A comparison of pharmacist-obtained medication history and Usual Care Model in the emergency department. Katharine A Critch, Pharm.D.
410. Impact of group education on metabolic syndrome. Daniel S. Longhore, Pharm.D.1, Terry L. Seaton, Pharm.D.,2 Gloria Rizkallah, Pharm.D.1, Thomas A. Johnson Jr., Pharm.D.1, Alvin Goo, Pharm.D.,1 Mark Doeckser, M.S., M.P.H.; Harborside Medical Center, Seattle, WA.

411. Duration of venous thromboembolism prophylaxis on orthopedic patients. Sanjeev Bala, B.Pharma, M.B.A.1, F. Randy Vogenberg, RPh, Ph.D.2, Leo Lichtig, Ph.D.2, Paul J. O’Connor, RPh, M.B.A.2; (1)Purdue University, West Lafayette, IN; (2)Aon Consulting Life Sciences Practice, Wellesley, MA.


413. Evaluation of gabapentin dosing and toxicity in patients with renal impairment. Hollie A. Winters, Pharm.D., Ph.D.; (1)The Ohio State University Medical Center, Columbus, OH.

414. Assessment of an encapsulated dosage form for oral administration of 18F-2D2-Buloxycteurolycol (FDG) and biodistribution of FDG administered by gavage in a rat model. Tyler M. Smith-Stratz, Pharm.D., Candidate, Edward M. Bednarczyk, Pharm.D., Asit Paul, Pharm.D., Lisa Martin, DVM; University at Buffalo, Buffalo, NY.

415. Itraconazole prophylaxis in adult acute leukemic patients. Jeffrey J. Bruno, Pharm.D.1, Jennifer K. Long, Pharm.D., B.C.P.S.2, Christopher Lowe, Pharm.D.1, Jennifer Shamp, Pharm.D.2, Robin K. Avery, M.D.3; (1)The Cleveland Clinic Foundation, Cleveland, OH; (2)The Ohio State University, Columbus, OH.

416. Comparison of front loading dosages of darbeorpetin alla and eptopetin alla on clinical efficacy and fatigue measurements at Howard University Cancer Center. Tifan X. Gox, Pharm.D.3, D. Ti Chai, Colangelo M.D., Chart Health Sciences Center San Antonio, San Antonio, TX; (2)Anticoagulation Clinics of North America, San Antonio, TX.

417. Medication adherence and obstructive sleep apnea. Cynthia A. Weber, Pharm.D.1, Candidate1, Rachel Gruel, Pharm.D.2, Karen Farris, Pharm.D.3, Beth Bryan, Pharm.D.2, Mark E. Dyken, M.D.3, John M. Dopp, Pharm.D.3; Bradley G. Phillips, Pharm.D.1,2; (1)University of Iowa, Iowa City, IA; (2)University of Wisconsin, Madison, WI.


419. Impact of group education on metabolic syndrome. Rachel J. Bennett, B.A., Thomas R. Easterling, M.D., Danny S. Shen, Ph.D.1, Darcy B. Carr, M.D.2, Mary F. Hebert, Pharm.D., F.C.C.P.1; (1)University of Washington, Box 357630, Seattle, WA; (2)University of Washington, Box 355640, Seattle, WA.


ACCP 2004 ANNUAL MEETING ABSTRACTS

RESEARCH INSTITUTE

The following papers, based on Fellowships and Research Awards provided by the ACCP Research Institute, will be presented. Full titles and authors are listed, although a complete abstract may not be available for all papers at the time of this printing.


424. Bayer Critical Care Fellowship: Longitudinal solute clearance in an in vitro continuous venovenous hemofiltration model. Deborah A. Pasko, Pharm.D., Bruce A. Mueller, Pharm.D., FCCP, BCPS, University of Michigan College of Pharmacy, Ann Arbor, MI.

425. Merck Cardiovascular Fellowship: Evaluation of peak exercise tolerance, cardiac hemodynamics, and quality of life assessment from ribose versus placebo in subjects with left ventricular systolic or without diastolic dysfunction. Orly Carter, Pharm.D.; Kirk Volkman, N.P.; Edward Michael Gilbert, B.S., Gregory Stoddard, M.P.H., Mark A. Munger, Pharm.D., FCCP, University of Utah, Salt Lake City, UT.

426. Merck Infectious Diseases Fellowship: Evaluation of the in vitro activities of arzobekacin, daptomycin, linezolid, quinupristin-dalfopristin, and tigecycline alone and in combination against two clinical strains of vancomycin-resistant Staphylococcus aureus (VRSA) in an in vitro pharmacodynamic infection model. Vanhida Huang, Pharm.D., Michael J. Rybak, Pharm.D., Anti-Infective Research Laboratory, Eugene Applebaum College of Pharmacy & Health Sciences, Wayne State University, Detroit, MI.


428. Ortho-Neinell Infectious Diseases Fellowship: Detection of gliotoxin, a mycotoxin produced by Aspergillus fumigatus, in experimental and human Aspergillus. Nathan P. Wiederhold, Pharm.D.1, Russell E. Lewis, Pharm., D.; Jinying Chi, Ph.D.2, Xiang Y. Han, M.D.3, Krishna V. Komanduri, M.D.3, Dimitrios P. Kontoyiannis, M.D., D.Sc.1, Randall A. Prince, Pharm.D.1; (1)University of Texas M.D. Anderson Cancer Center, Houston, TX; (2)University of Minnesota, Minneapolis, MN.

429. Roche Laboratories Transplantation Research Fellowship: Lack of effect of oral iron administration on mycophenolate mofetil pharmacokinetics in stable renal transplant recipients. Darielle K. Gelone, Pharm.D., Jeong M. Park, M.S., Pharm.D., Kathleen D. Lake, Pharm.D., FCCP, BCPS, University of Michigan, Ann Arbor, MI.

430. Roche Laboratories Transplantation Research Fellowship: A single-center pilot study to determine the pharmacokinetics of various immunosuppressants in transplant recipients who have undergone gastric bypass surgery. Christin Rogers, Pharm.D.1, J. Wesley Alexander, M.D.2, Rima R. Allaway, Pharm.D.1, Joseph Austin, M.D.1, Robyn Boardman, Pharm.D.1, Michael Cardi, M.D.1, Sharad Goel, M.D.1, Hope Goodman, M.P.T.2, Shaoming Huang, M.D.1, Shahzad Saffar, M.D.1, Jennifer Trofe, Pharm.D.1, Sander Vinken, Pharm.D.1, Ph.D.1; (1)University of Cincinnati, Cincinnati, OH; (2)Kidney and Hypertension Center, Cincinnati, OH; (3)Children’s Hospital, Cincinnati, OH.

431. ACCP Career Development Research Award: Tcl cell subset responses to hepatitis A vaccine. Mary S. Hayney, Pharm.D., FCCP, BCPS1, Nicholas A. Wiegert, B.S.1, Frances L. Pelsue, B.S.2,3; (1)University of Wisconsin, Madison, WI; (2)University of Minnesota, Minneapolis, MN.

432. ACCP Pharmacotherapy Investigator Development Research Award: In vitro evaluation of antiviral agents for the treatment of cervical cancer expressing human papillomavirus (HPV) genotype. Judith A. Smith, Pharm.D., B.C.C.P.1, William Figg Jr., Pharm.D.1,3, Melinda M. Neuhauer, Pharm.D.1; Diane C. Bodurka, M.D.1, Charles F. Levenback, M.D.1; (1)The University of Texas, M.D. Anderson Cancer Center, Houston, TX; (2)National Cancer Institute/National Institutes of Health, Bethesda, MD; (3)National Institute of Health, Bethesda, MD.

433. Amgen Biotechnology Investigator Development Research Award: Development of a controlled-release injectable gel system for epoetin alfa. Joanna B. Hudson, Pharm.D., Yichun Sun, Ph.D., S. Casey Laizure, Pharm.D., BCPS, Atul Shukla, Ph.D., Shipeng Yu, B.S.; University of Tennessee, Memphis, TN.

434. AstraZeneca Cardiovascular Investigator Development Research Award: Optimal ren angiotensin system inhibition and CAD markers.
437. Aventis Asthma/Allergy Investigator Development Research Award: Histamine N-methyltransferase (HNMT) C314T gene polymorphism is associated with atopic dermatitis (AD) in Caucasian children. Mary Jayne Kennedy, Pharm.D., Jennifer A. Loehle, M.S., Janice E. Sullivan, M.D., Mark A. Doll, M.S., David W. Hein, Ph.D.; (1)University of Louisville, Louisville, KY; (2)Kosair Charities Pediatric Clinical Research Unit, Louisville, KY.


PURPOSE: Previous research has suggested that ibuprofen (IBU) may interfere with the ability of aspirin (ASA) to inhibit platelet aggregation (PA). Less is known regarding whether occasional use of over-the-counter IBU would interfere with the antiplatelet effect of ASA during chronic ASA treatment. The purpose of this study was to investigate whether single doses of over-the-counter IBU would affect the ability of chronic ASA to inhibit PA.

METHODS: 12 healthy volunteers participated in this prospective, randomized, crossover study. Each subject received once-daily ASA (81 or 325 mg) for 2–4 weeks, with PA assessed at the beginning (baseline) and end of this treatment period. This was followed by an additional 2–4 weeks of the same dosage of ASA. After this time, 2 single 400 mg doses of IBU were administered 4 hours apart: 20 and 24 hours, respectively, after the last dose of ASA. PA was assessed following each dose of IBU and compared to the results obtained with ASA alone at the same times post-dose. Following a 2-week washout period, each subject received the remaining dosage of ASA and the process repeated. PA was assessed using whole-blood aggregometry with collagen and arachidonic acid as pro-aggregants.

RESULTS: PA was significantly inhibited in all subjects following administration of both dosages of chronic ASA and remained inhibited to a similar extent after administration of both doses of IBU.

CONCLUSIONS: Occasional over-the-counter doses of IBU do not interfere with the ability of ASA to inhibit PA in individuals taking chronic daily ASA.

439. Aventis Infectious Diseases Investigator Development Research Award: Novel mechanisms of axole antifungal resistance. P. David Rogers, Pharm.D., Ph.D., Katherine S. Barker, Ph.D., Massoumeh Z. Hooshdaran, Ph.D., George M. Hilliard, Ph.D.; University of Tennessee, Memphis, TN.


441. Pharmacia Health Outcomes Investigator Development Research Award: Evaluation of two Hoehl and Yahr scales modified for patient or caregiver assessment. Gary L. Cochran, Pharm.D., Ekaterini M. Markopoulou, M.D., Ph.D., Susan E. Paumala, M.S., Anthony Ranno, Pharm.D.; University of Nebraska Medical Center, Omaha, NE.

442. Roche Transplantation Investigator Development Research Award: Immunosuppressant effects on P-glycoprotein function in human kidney (HK-2) cells. Thomas C. Dowling, Pharm.D., Ph.D., Minori Kinjo, M.S., Tahira Iqbal, Ph.D.; University of Maryland, Baltimore, M.D.
2004 ACCP Annual Meeting Abstracts

Index of Corresponding Authors

-A-
Adcock Kim G: Pentoxifylline pharmacokinetics following two novel delivery techniques. 219
Ahmed Nabil A: Adherence to recommendations for low-density lipoprotein lowering in patients with type 2 diabetes mellitus. 41
Akins Ronda L: Analysis of daptomycin (D) population susceptibility profiles and killing activity against two clinical strains of vancomycin-resistant Staphylococcus aureus in an in vitro simulated endocardial vegetation infection model (SVVM). 130E
Alavela Jeanette L: Clinical pharmacist optimizing medication therapy limits overall health care spending in a capitated outpatient adult population. 382
Andersen Scott: Maintenance treatment for bipolar depression using olanzapine or olanzapine/fluoxetine combination. 298
Anderson Andrea J: Evaluation of a pharmacokinetic interaction between eszopiclone and digoxin. 1
Andes Sherry L: Analog classroom study of amphetamine extended-release and atomoxetine in youth with attention deficit hyperactivity disorder 299E
Arnold Renee J G: Temporal effect of argatroban on budgetary impact of heparin-induced thrombocytopenia. 228
Askew Jennifer P: Hormone replacement therapy subsequent to the Women's Health Initiative. 422
Aziz Shewan: An innovative role for the pharmacy technicians in promoting influenza vaccination at Eastern Maine Medical Center. 381
-B-
Baker Sharyn D: Population pharmacokinetics of trioxacitabine. 274E
Balbu Sanjeev: Duration of venous thromboembolism prescribing on orthopedic patients. 412
Barbeau David M: A single-center, observational study comparing neutrophic event rates for patients receiving pegfilgrastim on the same day or the day after chemotherapy administration. 198
Barnes Brian J: Development of an updated risk model to predict post-cardiac surgery atrial fibrillation in patients receiving amiodarone prophylaxis. 27
Beall Jennifer W: Assessment of third year pharmacy students' attitudes and abilities in evidence-based medicine (EBM). 78
Bednarzyk Edward M: Double blind crossover study of topiramate for the treatment of inimins. 139
Beitelshees Amber L: SNP discovery using denaturing HPLC for the CACNA1C gene. 254
Bennett Robin E: Ambulatory care pharmacists' role in the care of patients with chronic kidney disease. 386
Blair Melissa M: Physician survey of outpatient clinical pharmacy services. 376
Blaylock Russell M: Racial disparity in depot antipsychotic prescribing patterns. 308
Bohan KarenBeth H: A multidisciplinary educational program to reduce insulin medication errors. 369
Bollinger Jessica: Glycemic control in critically ill patients via implementation of an "insulin drip" protocol. 49
Bosso John A: Effects of formulaiy addition of celepime on susceptibility of select Gram-negative pathogens to cefazidime and imipenemen: analysis by interrupted time series analysis. 137
Bosso John A: Potential effects on methicillin-resistant Staphylococcus aureus (MRSA) isolation rate assessed by time series analysis. 138
Boudreau Marybeth: Cardiac critical care post-operative blood glucose control: a revised intensive inravenous insulin protocol. 51
Boyle Alex V: Optimal sampling for international normalized ratios in hemodialysis patients with central venous catheters. 181E
Broek Carolee: Development of a rural medication access and service learning program. 333
Brewer Jeffrey M: Effects on clinical outcomes of diabetic patients seen by a pharmacist working in collaboration with other primary care providers. 83E
Brock Gerald: Efficacy of vardenafil in a broad population and men with ED irrespective of prior sildenafil use: a retrospective analysis of a 2 year investigation. 333E
Brock Gerald: Long term efficacy of vardenafil provides rapid and consistent satisfaction with erection hardness and sexual experience in men with erectile dysfunction. 334E
Brundage Diann E: Preliminary evaluation of the impact of clinical pharmacist entry on medication errors in an inpatient oncology unit in a community teaching hospital. 164
Brundage Richard C: Variability in efavirenz concentrations predicts virologic outcome in HIV-infected children. 272E
Buck Marcia L: Clinical experience with spironolactone in infants and children. 224
Buckley Mitchell S: Amiodarone dose response for preventing atrial fibrillation following cardiac surgery: a meta-analysis. 39
Buckley Mitchell S: Prophylactic amiodarone decreases atrial fibrillation and hospital length of stay following cardiac surgery: a meta-analysis. 40
Bui LanChi L: Control of hyperlipidemia in renal transplant patients as defined by the National Cholesterol Education Program (NCEP). 324
Bui LanChi L: Effect of docetaxel on T-cell activation: a role in immunosuppression? 325
Bui LanChi L: Utilization of cyclosporine C2 monitoring in stable Asian transplant patients. 267E
Burgess David: Pharmacodynamics of b-lactams against 2,584 Gram-negative pulmonary isolates from ICU patients. 130
Burgess David: Antimicrobial activity of tigecycline against clinical isolates of Gram-negative bacteria from a single academic medical center. 131
Burgess David: Fluoroquinolone pharmacodynamics in serum and epithelial lining against S. pneumoniae. 131E
Burgess David: Gram-negative resistance in outpatients at an academic medical center. 132E
Burgess David S: Impact of ESBL enzyme and inoculum size on antimicrobial activity as measured by time-kill methodology. 133
Burkhardt R Todd: Ortho Biotech Pharmacogenomics Fellowship: Discordance of slow acetylator phenotype and genotype for N-acetytransferase (NAT-2) in a Hmong population. 429
Burkiewicz Jill S: Pre- and post-rotation assessment of pharmacy student learning: development and implementation. 358E
Burniske Gail M: Post-discharge follow-up phone call by a pharmacist and impact on patient care. 375
Caballero Joshua: Atypical antipsychotic treatment in the elderly: effect on cognition. 285
Caballero Joshua: Effect of antidepressants on cognition in Alzheimer's disease. 97
Cahana Ryan M: A longitudinal study of atypical antipsychotic prescribing patterns in the Iowa Medicaid population. 295E
Carr Roxane E: Pamidronate therapy in children with osteogenesis imperfecta and idiopathic juvenile osteoporosis. 225
Cardwell Douglas N: Evaluation of serum digoxin concentrations in patients treated for heart failure. 31
Carter Orly: Merck Cardiovascular Fellowship: Evaluation of peak exercise tolerance, cardiac hemodynamics, and quality of life assessment from ribose versus placebo in subjects with left ventricular systolic with or without diastolic dysfunction. 427
Cassino Cara: Improved daytime spirometric efficacy of isorotopium compared with salmeterol in COPD patients. 313E
Castfield Jacinta S: Pharmacy based activity to reverse and manage disease (PHARMED): the hypertension project. 373
Cavallari Larisa H: Racial differences in spironolactone response. 24
Chan Holly: Implementation of a therapeutic substitution program for erythropoietic agents. 220
Chen A I: A pharmacokinetic (PK) model for nelfinavir (NFV) and M8 when coadministered with amprenavir (APV) and efavirenz (EFV). 277
Chen Jack J: Fluoxetine-induced orbuculous lingual dyskinesia and persistent mandibular dystonia treated with botulinum toxin type-A. 182E
Chen Jack J: Rasagiline, a selective, irreversible inhibitor of monoamine oxidase-B (MAO-B), improves freezing of gait (FOG) in advanced Parkinson's disease (PD) patients receiving levodopa/carbidopa (LD/CD). 186
Chen Jack J: Rasagiline, a selective, second-generation, irreversible inhibitor of monoamine oxidase type-B, is effective in patients older and younger than 65 years of age with early-to-advanced Parkinsonism's disease (PD). 183
Chisholm Marie A: Comparing renal transplant patients' adherence to free cyclosporine and free tacrolimus immunosuppressant therapy. 326
Choudhuri Shurjeel: Lack of clinically significant hepatotoxicity following moxifloxacin therapy. 129
Chung Eunice P: The effectiveness of using a worksheet to screen pneumococcal vaccine candidates and increase the rate of vaccination. 380
Chung Karen C: Cost-effectiveness of FEIBA vs NovoSeven as initial therapy for mild-to-moderate bleeds in hemophilia patients with inhibitors. 114E
Churchwell Marriann D: Comparison of diffusive and convective transmembrane clearance with AN69 and polysulfone hemodialytrirs in CVVH and CVVHD. 173E
with attention deficit hyperactivity disorder.
300E
Mazer Norman A: A randomized, open-label, cross-over study comparing the effects of transdermal vs. oral estrogen therapy on free testosterone levels in naturally menopausal women 338E
Mazer Norman A: Opioid induced androgen deficiency in men (OPIAD): an estimate of the potential patient population in the U.S. and Canada. 18E
Mazer Norman A: Testosterone patch therapy increases sex hormone levels with associated improvements in sexual function, mood and hematocrit in men with opioid induced androgen deficiency (OPIAD). 15E
Mazur Joseph E: Development of a focused pharmacotherapy module education program for medical residents and critical care/pulmonary fellows in a medical intensive care unit (MICU). 400
Mazzola Jennifer L: Pharmacist assisted renal medication dosing (PHARMD) trial. 399
McCollam Patrick L: Healthcare and drug utilization patterns in patients receiving long-term thienopyridine therapy. 117
McKenzie R Scott: Better early and overall hematologic outcomes and lower drug cost with epoetin alfa (EPO) compared with darbeepoetin alfa (DARB) in patients with chemotherapy-related anemia. 211E
McPherson-Baker Shawn: The efficacy of protease inhibitors in patients co-infected with HIV and hepatitis B or C. 121E
Miller Amy E: Herbal/dietary supplements marketed for recreational use on the Internet. 116
Miller Christopher D: Inaccurate susceptibility results with VITEK 1 may impair proper empiric antimicrobial selection for Pseudomonas aeruginosa infection. 124
Mock Anna: A pharmacist’s impact on medication safety through infusions. 245
Mody Samir: A cost analytic model to determine the least costly inpatient erythropoiesis stimulating therapy (EST) regimen. 243
Moellentin Dan: Pharmacist intervention in rehabilitation unit. 395
Moellentin Dan: Pharmacist program to review new antipsychotic orders on hospitalized patients. 340
Moellentin Dan: Teaching students to diagnose drug-induced etiology where formal consult requested by prescriber. 64
Moffett Braddy S: Evaluation of gentamicin pharmacokinetics in neonates greater than seven days post partum. 226
Momary Kathryn M: Demographic and environmental influences of warfarin response in African Americans. 23
Moore Thea R: Research experience gained during ACCP CNC PRN mismatch. 303
Moll Susannah E: Evaluation of the accuracy of health studies presented in the written media. 61
Murphy Lisa: Evaluating preceptors’ perceptions of student preparedness for clinical rotations: a pilot study 67
Musgrove Jeff: A comparison of depression remission rates using treatment algorithms: venlafaxine XR vs SSRI. 234E
Musgrove Jeff: Short-term treatment of depressed and anxious primary care patients with multiple, unexplained somatic symptoms using venlafaxine XR. 235E
Musgrove Jeff: Short-term treatment of post-traumatic stress disorder: venlafaxine XR vs sertraline or placebo. 230E

Nash James D: Assessment of physician satisfaction with services provided by a clinical pharmacist managed cardiac risk reduction service. 21
Nave Marisa A: Evaluation of the in vitro metabolism of complementary and alternative medications (CAM) commonly used in oncology patients. 421
Nawarskas James J: Aventis Cardiovascular Investigator Development Research Award: Characterization of an asparin-ibuprofen interaction. 438
Nexbit Todd W: Therapeutic interchange of darbeepoetin alfa for epoetin alfa for chemotherapy-induced anemia. 389
Neudeck Brian L: Paradoxical effect of berberine on listeria monocytogenes invasion in Caco-2 cells. 90
Neudeck Brian L: Protective effect of the pluronic block copolymer P85 against listeria monocytogenes infections. 95
Ng Tien M: Utility of a QTc monitoring algorithm in the adult intensive care unit. 50
Nguyen Nancy N: Outcomes of dual-boosted protease inhibitor therapy following consultation with a national HIV/AIDS telephone consultation service. 414
Niewochner John: Pharmacokinetic and pharmacodynamic interaction of eszopiclone and lorazepam in healthy subjects. 8
Nie David E: Estimation of creatinine clearance in moderate to severe liver impairment. 264
Noreddin Ayman M: Aventis Infectious Diseases Fellowship: Designing pharmacodynamic target attainment indices for fluoroquinolones using genetically driven break points for S. pneumoniae. 423
Noreddin Ayman M: Monte Carlo simulation of bactericidal activity versus urinary tract infection E. coli of ciprofloxacin 500 mg every 12 Hours, gatifloxacin 200 mg and 400 mg once daily and levofloxacin 500 mg, 750 mg and 1000 mg once daily administered to hospital. 157
Novisky John: A multidisciplinary approach to decrease post-cardiac surgical infections through antibiotic timing. 139
Novisky John: Necessity in the outpatient setting in a small community hospital. 33
Nuzum Donald S: Evaluating sample medication use in primary care: a sub-study of applied strategies for improving patient safety. 163
O’Connell Mary Beth: Ethnicity and calcium absorption and vitamin D seasonal changes. 100
O’Neill Christine K: Development of a pharmacist-managed, university-based wellness center. 405
Odegard Peggy: Barriers to medication adherence in poorly-controlled diabetes mellitus. 83
Oh Jung Mi: Cost-effectiveness analysis of amifostine in combination with paclitaxel or cisplatin in Korean gynecologic cancer patients. 213
Oh Jung Mi: Low-dose butulinum toxin type A in the treatment of piriformis syndrome unresponsive to the conventional therapy. 16
Oh Jung Mi: Pattern of medications used and potentially inappropriate medication usage among Korean ambulatory elderly patients based on explicit criteria. 10
Oh Jung Mi: Risk factors affecting the graft and patient survival in kidney transplant recipients. 321
Ohnonen Michael J: Impact of glycophosphate use on clinical and economic outcomes in PCI stented patients in academic health centers. 237
Okusanya Olanrewaju O: Compartmental analysis of ammaprevar pharmacokinetics including secondary peaks. 269E
Olson Kari L: A comparison of the triglyceride-lowering effects of pure docosahexaenoic acid versus combination docosahexaenoic plus eicosapentaenoic acid in patients with coronary artery disease and elevated triglycerides. 424
Ota Laura T: Perioperative use of nesiritide in patients with extended-release carbamazepine. 293E
Parker Robert B: Altered aldosteron disposition in P-glycoprotein knockout mice. 44E
Pasko Deborah A: Bayer Critical Care Fellowship: An overview of an in-depth two continuous venovenous hemofiltration model. 426
Pasko Deborah A: Influence of ultrafiltrate protein depletion rate on sieving coefficient (SC) in continuous venovenous hemofiltration (CVVH). 168E
Pass Steven E: Use of the Multiple Disease Risk Assessment Database© to identify patients at risk for fungal infections in a surgical intensive care unit. 52
Patel Dipti: Development and implementation of an automated thromboelastographic prothrombin screening tool in hospitalized patients. 108
Patel Mona K: A global view of thiophene methylinthrasferase pharmacogenetics. 257
Pedigo Sheila A: Pharmacy interventions for computerized neonatal parenteral nutrition orders. 394
Peeters Michael J: Evaluating the risk of Torsades de pointes with fluoroquinolones: an analysis of QT-interval and QT-dispersion. 26
Penazk Scott R: Ortho Biotech Pharmacogenomics Investigator Development Research Award: Influence of MDR1 genotypes on saquinavir pharmacokinetics in health human subjects. 440
Peretra Chrystian R: Helicobacter pylori eradication therapy in decreasing long-term acid suppression therapy. 411
Peterman Carla M: Survey of prophylaxis against venous thromboembolism prophylaxis screening program in patients with extended-release carbamazepine. 293E
Phillips J Theodore: Study design and baseline characteristics of patients in the AFFIRM study, an efficacy and safety study of natalizumab in patients with multiple sclerosis. 184E
Pinto Brian A: Implementation of a computerized provider order entry system: lessons learned. 332
Pirker Robert: A phase II study of pegfilgrastim to support AICE 14 chemotherapy for the treatment of patients with small cell lung cancer (SCLC; extensive disease). 207E
Pototski Brian A: Evaluation of levofloxacin 750 mg pharmacodynamic target attainment rates in organisms causing nosocomial pneumonia at an academic medical center with comparisons to surveillance data for Pseudomonas aeruginosa. 146
Prosser Theresa R: Comparison of two methods to identify elderly patients at risk for medication related problems in a primary care setting. 98
Puscalu Georgieta: Preparation of spiguelone vincristine is a reliable procedure at clinical pharmacies. 60

P.-

Radwan Mahasen A: HPLC assay of fluconazole and its application to patients with early septic shock. 268
Raech Cynthia: Fundamental reading process decline in community dwelling elders. 96
Ragucci Kelly R: Evaluation of the effectiveness of pharmacist-administered diabetes education and management services. 370
Raissy Hengameh B: Inspiratory flow through dry-powder inhalers ( DPI) in asthmatic children 2 to 12 years old. 314E
Raissy Hengameh H: Relationship between asthma severity and endogenous cortisol excretion. 309E
Ramsay Lisa: A comparison of medication therapy management services in a pharmaceutical care asthma clinic. 397
Rathod Darshana S: Influence of ultrafiltrate protein depletion rate on sieving coefficient (SC) in continuous venovenous hemofiltration (CVVH). 168E
Ray James B: Pharmacologist in a clinical hospital setting. 379
Ray Kenneth: Defining the opportunity for pharmacogenetic intervention in primary care. 258
Relfe Benjamin: A comparison of two methods to identify elderly patients at risk for medication related problems in a primary care setting. 98
Rheony Denise H: National survey of high-dose steroid prescribing practices following spinal cord injury (SCI). 188E
Riley Toni L: Hypertension management in a family medicine residency training program. 349
Rivera Jose O: Health care utilization across the United States/Mexico border. 106
Rivkin Anastasia M: Hepatic panel abnormalities associated with medications in the intensive care unit. 354
Rizkallah Gloria S: Relationship between QT-interval and QT-dispersion. 26
Roach Albert: Effects of esomeprazole and placebo on relief of moderate to severe nighttime heartburn, sleep disturbance, and sleep quality in patients with GERD: a multicenter, randomized, controlled trial. 240E
Rogers Christin: Roche Laboratories Transplantation Research Fellowship: A single-center pilot study to determine the pharmacokinetics of various immunosuppressants in transplant recipients who have undergone gastric bypass surgery. 432
Rogers Patricia A: A review of the pharmacokinetics and use of parenteral nutrition. 146
Roth Thomas: Twelve months of nightly eszopiclone treatment in patients with chronic insomnia: assessment of long-term efficacy and safety. 304
Rowden Annette M: Use of drotrecogin alfa activated in septic AIDS patients. 36
Rutledge David R: Comparative observed healing rates of gastric ulcers with esomeprazole versus ranitidine in patients taking either continuous COX-2-selective or nonselective NSAIDs. 498
Rutledge David R: Safety and tolerability of double-dose esomeprazole (40 mg twice daily). 9E
Rybak Michael J: Community-associated MRSA displaying glycopeptide heteroresistance. 156
Rybak Michael J: Comparing phenotypic expression of community and hospital associated methicillin-resistant Staphylococcus aureus (MRSA) on the basis of SCCmec type. 144
Rybak Michael J: Heterogeneous glycoprotein resistance in Staphylococcus aureus associated with accessory gene regulator (agr) group II. 123

S.-

Sacks Gordon S: Adverse events associated with parental nutrition systems. 144
Sacks Gordon S: Intestinal and hepatic P-glycoprotein expression is preserved in mice receiving parental nutrition. 88
Sader Helio S: Activity of tigecycline (GAR-936) tested against clinical isolates of Haemophilus influenzae, Moraxella catarrhalis and Neisseria meningitidis, a worldwide perspective. 133E
Sanoski Cynthia A: Cardiovascular risk factor control in an inpatient population. 175E
Santos-Dasavoy Roseane M: Dynamic effects of interferon-? (IFN-?) on multiple sclerosis patients suffering in anti-IFN-? neutralizing antibody status. 262
Sass Cathleen M: Field based medical liaison job satisfaction. 279
Schellhase Ellen M: Pharmaceutical care in Kenya: an elective course to prepare students for an international clerkship. 355
Schwartzberg Lee: Darbepoetin-? (DA) 200 mcg every 2 weeks (Q2W) vs epoetin-? (Epo) 40,000 IU weekly (QW) in anemic patients receiving chemotherapy (cxr). 203E
Schwenk Michael H: The safety and efficacy of an accelerated iron sucrose dosing regimen in patients with chronic kidney disease. 175E
Seaborn Deatra: Adherence to HMG coenzyme-A reductase inhibitor therapy in a north Dallas suburban area. 65
Segars Larry: Lanthanum carbonate, the new non-aluminum, non-calcium phosphate binder, is not genotoxic. 177E
Segars Larry W: Geographic variation in the prescription of stimulants for attention deficit hyperactivity disorder in primary care physicians. 249
Seifert Charles F: A comparison between ICU and LTCF nurses in delivering medications through enteral feeding catheters. 193
Shah Sachin R: An evaluation of clinical pharmacy services in hematology/oncology outpatient setting. 103E
Shah Sachin R: Assessment of intravenous immunoglobulin drug utilization and the incidence of acute renal failure. 179E
Shepherd Greene: Adverse effects associated with extra doses of bupropion. 6
Shermock Kenneth M: Differences in time within the target INR range between patients randomized to five fingersuck INR devices. 110
She Li Zheng: Clinical characteristics and medication regimens of patients treated for schizophrenia with conventional depot antipsychotics. 289
Shewd McCollam Jill: Prompt administration of drotrecogin-? (activated) is associated with improved survival. 378
Siddique Reshmi M: Population differences are significant prior to initiating therapy on atypical or conventional antipsychotics. 105
Simpson J K: Re-bleding in patients admitted for gastrointestinal bleeding from peptic ulcer. 91
Sievers Theodore M: Pharmacokinetics of
mycopHENolic acid and clinical outcomes in liver transplant recipients with hepatitis C. 329E
Sims J Jason: Oral retreator increases expression of myocardial P-glycoprotein. 32
Sklar Grant E: Characterization and economic impact of drug-related hospital admissions to a general medicine service in Singapore. 5
Skolly Susan M: Pharmacokinetic and pharmacodynamic interaction of esopropine and paroxetine in healthy subjects. 12
Smallwood Greg A: Cytomegalovirus and drug resistance mutations in liver transplantation. 330E
Smallwood Greg A: Lamivudine resistant hepatitis B following liver transplantation. 331
Smith Judith A: Evaluation of the variability in clinical and physiologic parameters obtained in oncology phase I clinical trials. 201
Smith Kie Ho: Efficacy and safety of cyclosporine therapy in children with nephrotic syndrome. 221
Taber David J: Pharmacist-initiated comprehensive bone health protocol improves the identification, prevention, and treatment of bone disease in an outpatient kidney and pancreas post-transplant clinical setting. 403
Taber David J: Pharmacist-initiated comprehensive dyslipidemia protocol improves the identification and treatment of lipid disorders in an outpatient kidney and pancreas post-transplant clinic. 404
Taheri Reza: Assessment of the VA Loma Linda Healthcare System Lipid Clinic. 348
Taheri Reza: Evaluation of the accuracy of multiple-choice questions in testing students' understanding of complex concepts. 74
Tammarra Brinda K: Safety and tolerability of the reformulated pantoprazole for injection compared with the original formulation in healthy adult subjects. 86
Temple Mary E: Effectiveness of a chronolithiasis pathway on length of stay in a community hospital. 220
Theobald Kristi: Evaluation of empiric treatment and patient outcomes in patients with Candida blood isolates at John Cochran VA Medical Center. 145
Thompson Suzanne T: Management of acute coronary syndrome within a veteran population: a six-month review. 458
Timpe Erin M: Increased availability of information resources and the effects on the complexity of drug information requests asked to an academic center. 59
Tornatore Kathleen: Race-related differences in patient and pharmacist perceptions of warfarin in the inpatient setting. 102
Tsikouris James P: AstraZeneca Cardiovascular Investigator Development Research Award: In vitro evaluation of antiviral agents for the treatment of cervical cancer expressing human papillomavirus (HPV) genotype. 434
Wang Meng-Ting: Evaluation of 25 clinically important drug-drug interactions using a managed care database. 420
Wang Fei: Using multiple-choice test questions as a means of assessing the influence of the pharmaceutical industry on the selection of medications by medical residents. 66E
Wang Fei: Evaluation of systemic corticosteroid use in the management of acute COPD exacerbations. 311
Wang Fei: Evaluation of systemic corticosteroid use in the management of acute COPD exacerbations. 311
Winston Teri A: The role of the clinical pharmacist in a diabetes disease management program. 367
Wright IV Curis: Albuterol drug-related behaviors in opioid clinical trials. 250E
Yin Hongjun: Use of venous thromboembolism prophylaxis on medical at-risk patients. 20
Young Emily J: Evaluation of cardiac catheterization complications at an academic medical center. 345

Zeilmann Carla A: Teaching sixth year pharmacy students to provide feedback. 80
Zineh Issam: Availability of pharmacogenomics-based prescribing information in drug package inserts for currently approved drugs. 259E
Zineh Issam: Th1- and Th2-related cytokine and chemokine balance in blood pressure responders and non-responders to metoprolol monotherapy. 47