ABSTRACTS

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Program Book

1. The clinical effect of atovaquone/proguanil on warfarin therapy in adults. Erica Chen, Pharm.D.*, Maribeth Tecson, Pharm.D., Richard Phan, Pharm.D. Candidate; Kaiser Permanente, San Jose, CA

INTRODUCTION: Warfarin is notorious for its many drug-drug interactions. Warfarin and atovaquone/proguanil is one of these drug interactions. Tertiary references suggest an interaction but there is no specific literature regarding atovaquone/proguanil in combination or in doses used for malaria prophylaxis.

OBJECTIVES: Evaluate if there is a clinically significant interaction between atovaquone/proguanil at doses used for malaria prophylaxis with warfarin.

STUDY DESIGN: This study was a retrospective descriptive analysis of all patients from March 2009 to October 2014 who picked up an atovaquone/proguanil prescription from the pharmacy while on warfarin.

METHODS: The following data were included in the analysis: warfarin and atovaquone/proguanil indication, atovaquone/proguanil dose and duration, Time in Therapeutic Range for 1 year prior to patient's atovaquone/proguanil presecription or since date of warfarin initiation, and the INRs prior, during and after completion of atovaquone/proguanil therapy. Also, cases were evaluated for any warfarin adverse events including any minor or major bleeding. Other possible confounding factors such as other drug interactions, drug disease interactions were also included.

RESULTS: A total of 27 cases were reviewed. In 17 of 27 patient cases, warfarin dose was not adjusted prior to travel. Of those 17 cases, there were no supratherapeutic INRs upon return from patient travel. For the 10 patients who did have their warfarin doses reduced prior to travel, there was only one patient who had a supratherapeutic INR upon return from travel. All patients post travel remained on the same weekly dose they were on immediately prior to travel. Only three patients had a supratherapeutic INR after completion of atovaquone/proguanil.

CONCLUSIONS: Based on this limited data we recommend against empirically reducing a patient's weekly dose of warfarin due to this possible drug-drug interaction.

2. Cardiac risk of concomitant levofloxacin with amiodarone. Benjamin Miao, PharmD Candidate[1,*], Luigi Brunetti, PharmD, MPH[2]; (1) Ernest Mario School of Pharmacy, Rutgers, The State University of New Jersey, Piscataway, NJ; (2) Robert Wood Johnson University Hospital Somerset, Somerville, NJ

INTRODUCTION: Levofloxacin, a commonly used quinolone antibiotic, and amiodarone, an antiarrhythmic agent, are both known to prolong the QT interval. Several case reports have been published describing the reality of the dangerous pro-arrhythmic characteristics due to the drug combination but no studies have been completed in a real-world, clinical setting.

OBJECTIVES: The purpose of this study was to investigate the impact of the concomitant usage of levofloxacin and amiodarone on QT interval prolongation and the occurrence rate of cardiac events.

STUDY DESIGN: A restrospective cohort study of all patients treated with levofloxacin and amiodarone when admitted to the medical center from January 1, 2012 to August 31, 2015. Only patients with available electrocardiograms before and after treatment were eligible for inclusion. Inclusion was limited to adult patients (≥18 years of age). Patients on acute amiodarone therapy immediately upon admission were excluded from the study. Patients were stratified into two groups: concomitant usage of levofloxacin plus amiodarone and non-concomitant usage of levofloxacin and amiodarone.

METHODS: The primary outcome was change in QTc interval from baseline to post-treatment. The change in QTc interval was compared between groups. All data were summarized using descriptive and inferential statistics.

RESULTS: A total of 107 patients were included in the preliminary analysis, 76 of which received concomitant levofloxacin and amiodarone. A mean change from baseline in QTc interval of 30.60 milliseconds (ms) for the concomitant group and −0.50 ms for the non-concomitant group. The mean difference between the two groups was 31.10 milliseconds ($p<0.001$; 95% confidence interval, 18.52 ms, 43.69 ms).There were no deaths in the study.

CONCLUSIONS: The results from the analysis indicate that there is a statistically significant increase in QTc interval in patients given concomitant amiodarone and levofloxacin in comparison to patients given either medication alone.

3. Rate and associated factors of novel oral anticoagulant-induced bleeding in patients with non-valvular atrial fibrillation in a university affiliated hospital in Kuala Lumpur, Malaysia. Semira Beshir, Masters in Clinical Pharmacy[1,*], Szyuin Sim, BPHARM[1], Kok-Han Chee, MMED MBBS[2], Yoke-Lin Lo, PhD[1]; (1) Department of Pharmacy, University of Malaya, Malaysia; (2) Department of Medcine, University of Malaya, Kuala Lumpur, Malaysia

INTRODUCTION: Novel oral anticoagulants (NOACs) are used to for stroke prevention among patients with non-valvular atrial fibrillation (NVAF). Bleeding events, however, complicate their use. There is sparse information on the rate and the factors associated with NOAC-induced bleeding events in Malaysian patients with NVAF.

OBJECTIVES: This study aims to determine the rate and factors associated with bleeding events among patients with NVAF receiving dabigatran or rivaroxaban therapy for stroke prevention.

STUDY DESIGN: This is an observational study where data were collected retrospectively.

METHODS: The demographic and clinical data of patients with NVAF, aged 18 years or older, receiving dabigatran or rivaroxaban from 2010 to 2013 at the University of Malaya Medical Centre in Malaysia were extracted from electronic medical records. The main outcome measure is the occurrence of a bleeding event which was extracted from documented patient self-reports during routine outpatient visits, records of ward or Department of Emergency admissions at UMMC or referral letters from other healthcare centers to UMMC. Bleeding events were classified as major, clinically relevant non major bleeding and minor bleeding according to the International Society on Thrombosis and Haemostasis (ISTH) criteria. Data were analyzed using Mann Whitney, Chi-square or binary logistic regression tests where applicable.

RESULTS: During a median follow-up period of 23 months (range 3 and 45 months), 45 (20%) from a total of 220 patients recruited experienced bleeding complications. Among these patients, 19 (9%) patients had major bleeding events including four fatal cases. The associated factors of any bleeding events include advanced age of 75 years or above, congestive heart failure and concomitant use of angiotensin converting enzyme inhibitors (ACEIs).

CONCLUSIONS: NOAC-induced major bleeding episodes were infrequent but carried a high fatality risk. Interventional programs for bleeding prevention should target older patients, patients with congestive heart failure and those receiving ACEIs.

4. A comparison of efficacy, safety, and adherence profiles of bowel regimens in pregnancy-related constipation. Yen Dang, Pharm.D., CTTS-M*; Department of Pharmacy Practice, University of Maryland Eastern Shore, Princess Anne, MD

INTRODUCTION: Constipation is a common complaint in 40% of all pregnant women but data on bowel regimens used in this population is very limited.

OBJECTIVES: The purpose of this study was to determine efficacy, safety, and adherence profiles of commonly prescribed bowel regimens in pregnancy-related constipation.
STUDY DESIGN: This study was a prospective, single-centered, clinical trial.
METHODS: Eligible subjects included pregnant women of all trimesters who were diagnosed with constipation and were prescribed lactulose or docusate. Excluded subjects included pregnant women greater than 18 years old and those who do not speak English. The primary endpoint was the difference in the total Patient Assessment of Constipation Symptoms (PAC-SYM) score between docusate and lactulose after two weeks of therapy. Secondary endpoints included the differences between the rectal symptoms, stool symptoms, and abdominal symptoms of the PAC-SYM questionnaire and adherence profiles using the Medication Adherence Questionnaire (Morisky 4). The Mann-Whitney U Test was used to calculate nonparametric data. P-values were 2-sided at a 95% confidence interval.
RESULTS: Of the 89 subjects were assessed, 50 were initiated on docusate and 39 were started on lactulose. Overall, there were no differences for the total PAC-SYM questionnaire scores between docusate and lactulose (2±0.73 vs. 3±1.24 respectively; p-value=0.07). While there were also no difference between stool and abdominal symptoms (p=0.25 and p=0.13 respectively), those taking docusate had less rectal symptoms on the PAC-SYM (0±0.20 vs. 1±0.28; p=0.04). Adherence and side effect profiles were not different between the two laxatives (p>0.05).
CONCLUSIONS: Overall, the safety, efficacy, and adherence profile between docusate and lactulose were similar. Pregnant women with constipation may use either therapy for constipation, although those using docusate may have less rectal symptoms from constipation.

5. Comparison of decentralized versus centralized pharmacist management of patients with atrial fibrillation treated with direct oral anticoagulants (DOACs). Cristina Elgin, Pharm.D.*, Veldana Nuhi, Pharm.D.; Department of Pharmacy, Ralph H. Johnson VA Medical Center, Charleston, SC
INTRODUCTION: Patients prescribed dabigatran from the Ralph H. Johnson VA Medical Center (RHJ VAMC) were originally managed by 12 primary care pharmacists by telephone visits to closely monitor adherence, safety and efficacy, but then were transitioned to a centralized clinic with three clinical pharmacy specialists.
OBJECTIVES: The purpose of this study was to investigate how this centralization of DOAC management affected patient adherence, safety outcomes and pharmacotherapy visits.
STUDY DESIGN: This single-center, retrospective medication use evaluation included two study periods between November 1, 2011 and October 31, 2013. Eligible patients received anticoagulation therapy with dabigatran from RHJ VAMC's outpatient pharmacy. Outcomes were compared between two time periods around centralization of DOAC management.
METHODS: The primary outcome was adherence to the DOAC, as measured by medication possession ratio (MPR). Secondary outcomes included safety and change in amount of visits by primary care pharmacists. The study was approved by expedited IRB and VA R&D committees.
RESULTS: Sixty-five unique patients prescribed dabigatran were included in the analysis. The primary outcome of MPR was similar between the two groups: 1.01 (range 0.59–1.41) and 0.96 (0.33–1.36) for pre-centralization and post-centralization study periods, respectively (p=0.91). The secondary analysis showed no statistically significant difference between the incidences of bleeding events. There were no thromboembolisms in the pre-centralization group and one in the post-centralization study group. The tertiary endpoint revealed a 108% increase in primary care pharmacist visits from pre- to post-centralization.
CONCLUSIONS: This study revealed a high rate of dabigatran adherence was retained through centralization of DOAC management by pharmacists. This centralization also resulted in a 108% increase in primary care pharmacist visits without addition of more staff. Overall, this study supports the safe and effective use of centralized pharmacist services for DOAC management in an outpatient setting to retain high rates of patient adherence.

6. A literacy-sensitive approach to improving antibiotic understanding in a community-based setting. Crystal David, Pharm.D.[1,*], Katherine O'Neal, Pharm.D., MBA[2], Michael Miller, RPh, DrPH[3], Jeremy Johnson, Pharm.D.[4], Ann Lloyd, Pharm.D.[2]; (1) Infectious Disease Section, University of Oklahoma Health Sciences Center, Oklahoma City, OK; (2) College of Pharmacy, University of Oklahoma, Tulsa, OK; (3) Department of Medical Informatics, University of Oklahoma College of Medicine, Tulsa, OK; (4) Department of Pharmacy Practice, Southwestern Oklahoma State University, Tulsa, OK
INTRODUCTION: Misuse of antibiotics contributes to the rise in antibiotic-resistant bacterial infections. Patient beliefs and knowledge about antibiotics may contribute to the misuse of antibiotics. Health literacy may affect understanding of antibiotic use.
OBJECTIVES: This study (1) developed and deployed a program to enhance patient knowledge about antibiotic use; (2) evaluated whether providing patient education is associated with improvements in antibiotic knowledge; and (3) explored the association between antibiotic knowledge and health literacy.
STUDY DESIGN: Using a prospective pretest-posttest study design, educational seminars were provided to groups of community members. Participant sociodemographic characteristics including a measurement of health literacy were collected at baseline. Antibiotic knowledge was collected before and after the educational seminar.
METHODS: Participants were required to be ≥18 years old and English-speaking. Participant knowledge of antibiotic use was measured using a 14-item questionnaire. A knowledge index was constructed by summing the correct answers for a range of 0–14. Pre- and post-program knowledge were compared using a paired t-test. Participants were offered a $10 gift card after completing the seminar.
RESULTS: For the 19 participants who took both the pre- and post-test, the antibiotic knowledge index significantly increased by two points (p=0.0011) after completing the educational seminar. Although the participants' Newest Vital Sign (NVS) scores were positively correlated to their pre-test antibiotic knowledge scores; this correlation was not significantly different than zero (p=0.22). However, a positive correlation between NVS scores and post-test antibiotic knowledge scores was found to be statistically significant (p=0.0004).
CONCLUSIONS: This study demonstrated: (1) patients have limited understanding of bacteria vs. viruses and treatment; (2) educational programs can improve antibiotic use knowledge; and (3) the educational program may be more effective for those with higher literacy levels.

7. Zolpidem prescribing practices before and after FDA required product labeling changes. Jessica L. Norman, Pharm.D.*, Danielle N. Rhyne, Pharm.D., Joseph J. Saseen, Pharm.D., Laura M. Saba, PhD, Sunny A. Linnebur, Pharm.D.; Department of Clinical Pharmacy, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences
INTRODUCTION: Data indicate women have higher serum zolpidem concentrations than men the morning after taking an evening dose, potentially leading to increased risk of automobile accidents, falls, and injuries. On April 19, 2013, zolpidem product labeling was changed to recommend women be prescribed initial doses of no greater than 5 mg (immediate-release [IR]) or 6.25 mg (controlled-release [CR]) of zolpidem per night.
OBJECTIVES: The objectives of this study were to determine how the product labeling change affected prescribing practices in

men, women, young, and elderly patients newly starting zolpidem.
STUDY DESIGN: Retrospective, pre-post study.
METHODS: A list of patients (n=288) who newly started zolpidem between 4/1/11–6/1/15 was stratified equally into groups based on gender (male and female), age (<65 years and ≥65 years), and prescription index date (prior to labeling change and after labeling change). Demographic data and zolpidem prescription data for each patient were retrospectively collected from the electronic medical record. "Low-dose" zolpidem was defined as 5 mg IR or 6.25 mg CR daily or less; any doses above 5 mg IR or 6.25 mg CR were considered "high-dose." Chi-square analysis was utilized to analyze the data.
RESULTS: A greater proportion of men (26% vs. 50%; p=0.00355), women (51% vs. 69%; p=0.0267), and young (35% vs. 61%; p=0.00153) patients were prescribed initial low-doses of zolpidem after the product labeling change as compared to prior to the labeling change. Although the proportion of elderly patients prescribed low-dose zolpidem increased after the change, it was not statistically significant (43% vs. 58%; p=0.0667).
CONCLUSIONS: While the 2013 zolpidem labeling change focused on women only, more men were initiated on low-dose zolpidem after the labeling change. The lack of change detected in zolpidem prescribing practices in elderly patients is likely due to previous labeling changes suggesting elderly patients take a maximum of 5 mg IR or 6.25 mg CR daily.

8. Vitamin D prescribing and monitoring trends within the Durham VA medical center. Juliana Lipetzky, PharmD, Sara Britnell, PharmD*, Haley Parker, PharmD; Department of Pharmacy, Durham VA Medical Center
INTRODUCTION: Vitamin D is essential in the body's maintenance of normal levels of calcium to promote bone health and prevent fractures, falls, and cardiovascular events. Appropriate screening, treatment, and monitoring of vitamin D deficiency are necessary to improve outcomes in high risk populations.
OBJECTIVES: The primary objective was to determine if patients with vitamin D deficiency at the Durham VA Medical Center were receiving repletion therapy and monitoring in accordance with guidelines and local expert opinion. The review also sought to determine the incidence of vitamin D repletion within 1 year, the appropriateness of screening, and the incidence of vitamin D toxicity.
STUDY DESIGN: Retrospective chart review.
METHODS: Patients with a vitamin D level indicating vitamin D deficiency between July 1, 2013 and June 30, 2014 were identified for screening. Patients were excluded if they had a non-VA primary care provider or received the majority of medications from outside of the VA. Patients with past medical history that would contraindicate vitamin D therapy or significantly alter vitamin D absorption were also excluded.
RESULTS: A total of 301 patients were included, 91 (30.2%) had no identifiable risk factor to warrant screening. The patients were majority male with mean age of 55.4 years. Overall, 186 (61.8%) patients received some form of vitamin D therapy. Only 26 (8.6%) patients received both guideline recommended repletion and maintenance therapy. Ultimately, 43 (14.3%) patients achieved at least one sufficient vitamin D level in the year after screening. The majority of patients (52.5%) did not have a follow-up level in the year after screening. Four patients had a vitamin D level considered to be toxic.
CONCLUSIONS: The majority of included patients did not receive guideline-directed vitamin D therapy nor monitoring. Efforts are needed to guarantee that patients are receiving guideline-directed therapy and monitoring to ensure achievement of sufficient vitamin D levels.

9. Impact of a cardiovascular pharmacist early review in a multidisciplinary clinic for patients after Percutaneous coronary intervention. Yee May Wong, BSc (Pharmacy)[1,*], Rachel Tan, BSc (Pharmacy)[1], Cliff Wong, MBBS[2], Hee Hwa Ho, MBBS (HK), MRCP (UK), FRCP (Edin), FACC[3], Paul Ong, MB BChir (University of Cambridge, UK), FRCP (UK), FESC, MRCP (UK)[3]; (1) Department of Pharmacy, Tan Tock Seng Hospital; (2) Department of Cardiology, Khoo Teck Puat Hospital; (3) Department of Cardiology, Tan Tock Seng Hospital
INTRODUCTION: Percutaneous coronary intervention (PCI) is the predominant method of revascularization for patients with ischemic heart disease. Our tertiary hospital in Singapore perform approximately 1300 cases annually. These patients were routinely reviewed by a cardiologist in a post-PCI clinic within 8 weeks. A multi-disciplinary clinic was formed in October 2011, with the cardiovascular (CVS) pharmacist review within 4 weeks as the first visit.
OBJECTIVES: This study evaluated the impact of having a CVS pharmacist early review compared to standard care.
STUDY DESIGN: This was a retrospective cohort study with one-year follow up.
METHODS: Patients with recent PCI, reviewed by the CVS pharmacist from October 2011 to June 2012 were studied. Patients in the preceding months from April to August 2011 (matched by baseline clinical characteristics) formed the control group. End-points analyzed included hospital readmission rates, initiation of essential medications, Low-Density Lipoprotein (LDL) and Glycated hemoglobin (HbA1c) levels.
RESULTS: Of the 193 patients in each group, 30-day readmission was 4.7% in the pharmacist group and 9.3% in the control group (p=0.072). One-year CVS readmission was significantly lower (10.9% vs 19.2%, p=0.023) in the pharmacist group. Patients enrolled in the pharmacist group were more likely to be initiated on a beta-blocker (64.7% vs 20%, p<0.01), and an ACE-inhibitor (68.8% vs 26.1%, p<0.01) during the first clinic visit. The pharmacist group had a greater reduction in LDL (1.33±1.21 mmol/dL vs 0.89±1.12 mmol/dL, p<0.01) and HbA1c (2.19±2.26% vs 1.25±0.92%, p=0.038) levels.
CONCLUSIONS: This study suggests that having a CVS pharmacist early review post-PCI can potentially reduce CVS readmission rates, result in higher rate of initiation of beta-blocker and ACE-inhibitor, and improve control of dyslipidemia and diabetes mellitus.

10. Clinical pharmacist-managed anticoagulation service in atrial fibrillation patients: an Egyptian experience. Lamia Mohamed El Wakeel, PhD.[1,*], Sara Sabry, Bsc Pharm[2], Mohamed Ayman Saleh, MD, PhD[3]; (1) Clinical Pharmacy Department, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt; (2) Pharmacy Department, The Cardiovascular Hospital, Ain Shams University, Cairo, Egypt; (3) Cardiology Department, Faculty of medicine, Ain Shams University, Cairo, Egypt
INTRODUCTION: Managing warfarin administration is challenging due to its narrow therapeutic index, multiple food and drug interactions and frequent INR monitoring.
OBJECTIVES: This study evaluated the impact of clinical pharmacist-provided anticoagulation management on; anticoagulation management, incidence of bleeding and thromboembolic events, incidence of warfarin drug and food interactions and subjective anticoagulation knowledge assessment.
STUDY DESIGN: Prospective, randomized controlled study.
METHODS: All newly diagnosed non-valvular AF patients receiving warfarin were assessed for eligibility. Eligible patients were randomly assigned to either group A (intervention group, n=30); AF patients received clinical pharmacist-managed anticoagulation service, or group B (Control group, n=30); patients received routine medical care. Informed consents were obtained from all patients. At baseline, all collected data (demographics, INR and subjective anticoagulation knowledge assessment questionnaire (AKA score) were comparable between both groups. After 6 months of evaluation, the principal outcomes were percentage time spent in therapeutic INR range (TTR %), bleeding

or thromboembolic events incidence, warfarin-drug and warfarin-food interactions incidence and AKA score.
RESULTS: At the end of study, the intervention group versus control group, showed a significantly higher TTR% (68 ± 8 vs. 38 ± 11, p<0.001), a lower incidence of bleeding events (p<0.001), a lower incidence of warfarin-drug interactions (p<0.001) and a higher AKA score (21 ± 2.4 vs. 10.4 ± 3, p<0.001).
CONCLUSIONS: Clinical pharmacist-provided anticoagulation management of Egyptian AF patients improved patients' percentage TTR, levels of anticoagulation knowledge and practice and provided a lesser frequency of bleeding events and warfarin-drug interactions.

11. Predictors of potential clinically significant drug-drug interactions in patients with heart failure. Milena Kovacevic, M.Pharm.[1,*], Sandra Vezmar Kovacevic, Ph.D.[2], Branislava Miljkovic, Ph.D.[2], Slavica Radovanovic, Ph.D., M.D.[3]; (1) Department of Pharmacokinetics and Clinical Pharmacy, University of Belgrade, Faculty of Pharmacy, Belgrade, Serbia; (2) Department of Pharmacokinetics and Clinical Pharmacy, Faculty of Pharmacy, University of Belgrade, Serbia; (3) University Clinical Hospital Center Bezanijska Kosa, Belgrade, Serbia
INTRODUCTION: Heart failure (HF) is a serious chronic condition related to frequent deterioration and hospitalization. Patients with moderate to severe HF have a poorer quality of life than individuals with some other chronic diseases. Polypharmacy is common in this population, which may increase the risk of occurrence of potential drug-drug interactions (pDDIs).
OBJECTIVES: The aim of this study was to evaluate the prevalence and predictors of clinically significant pDDIs in HF patients.
STUDY DESIGN: A retrospective observational study was performed at the Cardiology ward of the University Clinical Hospital Center Bezanijska Kosa in Belgrade, Serbia. A total of 173 patients with more than one prescription during hospital stay were enrolled in the study. Demographic and clinical data were obtained from medical records.
METHODS: Lexi-Interact® was used as the screening tool. Clinically significant pDDIs were considered of level X (avoid combination), D (modify regimen) and C (monitor therapy). Statistical analysis was performed with PASW 18.0 (SPSS Inc., Chicago, IL, USA).
RESULTS: In the population 54.9% were male and 75.1% elderly. HF was diagnosed in 46.8%. The number of drugs (9.6 ± 3.2, mean±S.D.) and pDDIs of clinical significance (14.8 ± 9.2) per patient was significantly higher in the group with HF (p<0.001 and p=0.013, respectively). The prevalence of pDDIs in the group with HF was 100%, compared to 93.5% without HF. Multivariable logistic regression model described 94.8% of the variance in the occurrence of pDDIs and identified following variables as predictors: polypharmacy, diabetes mellitus, renal disease, cardiovascular drugs (isosorbide mononitrate, nebivolol, and verapamil) and allopurinol, diclofenac, ranitidine, and methylprednisolone.
CONCLUSIONS: HF patients are exposed to an extensive number of drugs and pDDIs of clinical significance, that could additionally jeopardize the achievement of the desired clinical outcome and quality of life. Electronic drug interaction software may be a valuable tool for screening and reducing risk to patient drug-related harm.

12. Establishing standards of care for amiodarone monitoring in an outpatient setting. Sibyl Cherian, Pharm.D.[1,*], R. Naseem Amarshi, M.S., PharmD[2]; (1) School of Pharmacy, Fairleigh Dickinson University, Florham Park, NJ; (2) Central Arkansas Veterans Healthcare System, Little Rock, AR
INTRODUCTION: Amiodarone is a life-saving medication that is becoming more frequently utilized, but the rates of recommended monitoring for serious toxicities continue to be lacking. By implementing a quality improvement project that allows for education and interdisciplinary collaboration among pharmacists, cardiologists and primary care providers, we expect improved rates of amiodarone monitoring.
OBJECTIVES: To assess rates of monitoring of liver, thyroid and pulmonary function in the 6 months before and after initiation of a quality improvement project and to evaluate the effect of a pharmacist-managed dual warfarin and amiodarone monitoring on maintaining target INR.
STUDY DESIGN: Retrospective electronic chart review.
METHODS: We evaluated rates of monitoring according to an established Veterans Affairs (VA) protocol. Patients who filled a prescription for amiodarone and warfarin or direct oral anticoagulants (DOACs), apixaban, rivaroxaban, dabigatran between May 1, 2014 to April 30, 2015 were reviewed. Percent time spent in target INR (% TTR) was used as an outcome parameter to evaluate effect on maintaining target INR.
RESULTS: Seventy-three subjects were in the pre-intervention group and sixty-nine patients were in the post-intervention group. Rates of 6 week monitoring were noted to be low (6–19%). All rates of 6 month monitoring, except CXR, increased in the post-intervention group as compared to the pre-intervention group. Both the rates of monitoring of ALT (p=0.034) and free T4 (p≤0.001) were found to be significantly higher in the post-intervention group, as compared to the pre-intervention group. The % TTR was 64% in pre-intervention group and 58% in post-intervention group.
CONCLUSIONS: Collaboration with pharmacists in an outpatient setting leads to improved rates on monitoring on recommended laboratory tests. This study allowed us to remove unnecessary laboratory testing and imaging within our facility and demonstrate the effectiveness of an established anticoagulation clinic in maintaining target INR.

13. Intranasal Corticosteroid Use Prevalence and Adherence in Allergic Rhinitis: A Cross-sectional Study at Community Pharmacies in Singapore. Siew Jean Fong, MPharm[1,*], Shu Xuan Chia, BSc (Pharm) (Hons)[2], Wing Lam Chung, BSc (Pharm) (Hons), BCPS, CGP[1], Boon Ka Chong, MSc (Comm Pharm), CGP[1], Wai Keung Chui, Ph.D.[2], Kai Zhen Yap, Ph.D.[2]; (1) Department of Pharmacy, Watson's Personal Care Stores Pte Ltd, Singapore, Singapore; (2) Department of Pharmacy, National University of Singapore, Singapore, Singapore
INTRODUCTION: Recent changes to the forensic classification of intranasal corticosteroids (INCS) have enhanced the public's access to this first-line treatment for allergic rhinitis (AR) at community pharmacies without a prescription. However, the INCS use data among AR patients who visit community pharmacies is unknown.
OBJECTIVES: This study evaluated the prevalence of and adherence to INCS therapy among individuals with moderate-severe AR at community pharmacies in Singapore.
STUDY DESIGN: A cross-sectional survey was conducted at thirty-nine branches of a community pharmacy chain (Watson's Personal Care Stores Pte Ltd) in Singapore from August to December 2014.
METHODS: Customers who were 21 years old and above and identified with moderate-severe AR symptoms by pharmacists were recruited by pharmacists and project students to complete a self-administered hardcopy/online questionnaire. AR severity was assessed using the Allergic Rhinitis and its Impact on Asthma (ARIA) classification. Adherence to the prescribed/recommended INCS dosing regimen was identified using the Morisky Medication Adherence Scale modified for AR.
RESULTS: Among 283 respondents, 128 (45.2%, 95% CI 39.5% - 51.1%) were on INCS; where majority were prescribed by physicians (71.1%) and recommended by pharmacists (24.2%). Of the 113 respondents who were instructed to use INCS on a daily basis, 94.7% reported low to medium adherence to the dosing instructions, with the top reason for non-adherence being "stopping the use of INCS when AR symptoms are under control".

CONCLUSIONS: Despite being the gold standard therapy for moderate-severe AR, INCS were underused. Although INCS can be directly obtained from community pharmacies without a prescription, the number of INCS recommended by pharmacists was lower than that prescribed by physicians. Hence community pharmacists can play a greater role in triage and recommendation of INCS for individuals with AR who may benefit from its use, as well as assessment and counseling to improve adherence and appropriate use of INCS.

14E. Pharmacist impact on advanced cardiac life support compliance during in-hospital cardiac arrest. Joseph Cavanaugh, Jr., Pharm.D.*, Jesse Sullivan, Pharm.D., Nicole East, Pharm.D., Andrew Vassallo, Pharm.D., Sarah Barlow, Pharm.D., RPh, Jessica Hill, Pharm.D., BCPS; Department of Pharmacy, Community Medical Center, Toms River, NJ
Presented at the American Society of Heath-System Pharmacists Midyear Clinical Meeting, New Orleans, LA, December 6–10, 2015.

15. Evaluating protocol adherence during anti-inhibitor coagulant complex administration for reversal of Xa inhibitors for life-threatening bleeding. Alicia Sacco, Pharm.D.*, Sarah Young, Pharm.D.; Department of Pharmacy, Allegheny General Hospital, Pittsburgh, PA
INTRODUCTION: Anti-inhibitor coagulant complex (FEIBA®) contains the coagulation factors II, VIIa, IX, and X. Factor Xa inhibitors currently have no FDA approved reversal agent. Ex vivo studies utilizing human blood samples demonstrated that FEIBA® might reverse the anticoagulant effect induced by these agents. FEIBA's impact on clinically significant reversal is unknown at this time as no randomized, controlled trials in patients with life-threatening bleeding have been conducted. The purpose of our study is to examine the FEIBA® protocol at Allegheny General Hospital.
OBJECTIVES: Primary: Adherence to protocol for FEIBA administration
Secondary:

- Incidence of thromboembolic events within 7 days
- Clinical parameter of FEIBA administration to reverse the anticoagulant effect of FXa inhibitors
- Median change from baseline in coagulation assays after FEIBA®
- In-hospital mortality
- Effect of clinical pharmacy specialist involvement on adherence

STUDY DESIGN: Single-center retrospective cohort.
METHODS: Patients at least 18 years of age with life-threatening bleeding while taking an oral factor Xa inhibitor were included. IRB exemption was obtained. Medication administration and outcomes were evaluated using CPOE and the medical chart.
RESULTS:

- 52% of patients were non-adherent to protocol; 64% of which were due to unknown timing of the last dose of anticoagulant and aPTT <34 seconds
- 1 thromboembolic event occurred within 7 days of FEIBA® administration
- More pharmacy specialist involvement was seen in adherent versus non-adherent patients
- Median changes in coagulation assays were greater in adherent versus non-adherent patients

CONCLUSIONS:

- Our protocol dose of 20 units/kg appears to be safe given only one thromboembolic event occurred within 7 days of FEIBA® administration
- Based on clinical parameters of hemoglobin, GCS score, surgical procedures performed, and use of additional products, FEIBA® appears to have prevented further bleeding in our sample of patients
- Limitations include difficulty determining the time of the last dose of FXa inhibitor and relying on retrospective documentation.

16. Pain control during the transition from intensive care unit to general ward. Ohoud Aljuhani, Pharm.D., BCCCP[1,*], Brian Erstad, Pharm.D.[1], Asad Patanwala, Pharm.D.[2]; (1) Pharmacy Practice and Science, The University of Arizona College of Pharmacy, Tucson, AZ; (2) University of Arizona- College of Pharmacy
INTRODUCTION: The optimal management of pain during the transition from the intensive care unit (ICU) to general ward is challenging due to logistical issues.
OBJECTIVES: To identify predictors of pain control during the transition from the ICU to the general ward.
STUDY DESIGN: This was a cross-sectional study conducted at an academic medical center in the United States.
METHODS: Surgical/trauma patients who were discharged from the surgical ICU and admitted to the general ward were interviewed regarding their pain after 24 hours of transfer from the ICU using the Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R). The primary outcome measure was the total score of this validated instrument (0–180 points). Pertinent data were also collected from the patients' medical record. Predictors of pain control were identified using linear regression analysis.
RESULTS: A total of 50 patients were included. The mean age was 55±21 years and 72% (n=36) were male. The number of surgeries patients received prior to ICU transfer was 0 (16%, n=8), 1 (42%, n=31), 2 (26%, n=13), and 3 or more (16%, n=8). The mean opioid dose was 43±81 mg and the mean pain score was 5.1±2.2 (0–10 scale) in the last 24 hours of ICU stay. After transfer from the ICU, the mean score on the APS-POQ-R was 54±32 points (range 14–159 points). The only significant predictor of pain control measured on the APS-POQ-R was the mean pain score in the last 24 hours of ICU stay (coefficient 7.3, 95% CI 3.8–10.8, $p<0.001$, R-squared 27%).
CONCLUSIONS: Mean pain score in the last 24 hours of ICU stay is an important predictor of pain control during the transition from ICU to ward.

17. Evaluation of physician and nursing adherence to a sedation and analgesia protocol in mechanically ventilated patients. Khushbu Thaker, Pharm.D.[1,*], Ashmi Philips, Pharm.D., AAHIVP[2], Rani Madduri, Pharm.D., BCPS, AAHIVP[1], Mini Varghese, Pharm.D., BCPS[1], Keith Goldstein, MD[3]; (1) Department of Pharmaceutical Services, Hunterdon Medical Center, Flemington, NJ; (2) Department of Pharmacy Practice and Administration, Rutgers, the State University of New Jersey, Piscataway, NJ; (3) Hunterdon Medical Center, Flemington, NJ
INTRODUCTION: Implementation of goal-directed sedation and analgesia in the intensive care unit (ICU) has shown to improve outcomes in mechanically ventilated patients. The protocol at our institution was recently revised and titration guidelines were incorporated to provide standardized care.
OBJECTIVES: The objective of this study was to evaluate appropriate physician prescribing and nursing titration of sedatives and analgesics per protocol in mechanically ventilated ICU patients.
STUDY DESIGN: This was a single center, retrospective study conducted between March to September 2015, which received Institutional Review Board approval.
METHODS: Information was collected utilizing electronic health records for fifty protocol orders initiated within the study time frame. The following data was collected and analyzed: goal

Critical Care Pain Observation Tool (CPOT) score, goal Richmond Agitation Sedation Scale (RASS) score, bolus dose, starting, titration, and maximum rates of infusion. Prescriber adherence was measured by the percent of protocol orders completed correctly. Nursing adherence was measured by percentage of orders with documented RASS and CPOT scores, subsequent titration of medications and completion of daily awakenings per protocol.
RESULTS: Data from 50 protocol orders were included. Most commonly prescribed medication regimens were combinations of analgesics and sedatives (n=41). Appropriate completion of orders by prescribers was found to be 88%. The most commonly omitted component was the bolus dosing regimen. Nursing adherence rate was higher for RASS score documentation than CPOT scores (77% vs. 55%, respectively). Approximately 40% of medication titrations were not completed per protocol. Sixty percent of these inappropriate titrations were due to deviation from the prescribed starting rate. Nursing documentation for daily awakenings was performed per protocol for 40% of 198 patient days.
CONCLUSIONS: The study identified deviations from the protocol, which warrant further evaluation and reeducation to improve adherence.

18. Inadequate double-pseudomonal coverage with ciprofloxacin versus aminoglycosides in the intensive care unit. Jim Winegardner, Pharm.D.[1,*], Christine Yost, Pharm.D.[2], Kevin Grullon, M.D.[3]; (1) Department of Pharmacy, Beaumont Health, Royal Oak, MI; (2) Beaumont Health; (3) Minnesota Lung Center
INTRODUCTION: Pseudomonas aeruginosa is an important gram-negative bacilli often implicated in serious hospital and healthcare-associated infections. Although controversial, combination antimicrobial therapy with two different classes is likely indicated in certain high-risk patients and severe infections.
OBJECTIVES: This study compared the rates of resistance between ciprofloxacin and aminoglycosides to pseudomonas isolates that are resistant to piperacillin-tazobactam and/or cefepime in the intensive care units at our institution.
STUDY DESIGN: This is an observational, retrospective chart review.
METHODS: Medical records of adult patients admitted to any intensive care unit at Beaumont Hospital – Royal Oak between January 1, 2011 and December 31, 2012 were reviewed for microbiological cultures positive for pseudomonas isolates. Patients' demographics, source of positive cultures, antibiotic sensitivities, hospital and ICU mortality were documented.
RESULTS: A total of 323 pseudomonas isolates were identified and able to be evaluated. The majority of the isolates were identified from sputum, urine and wound cultures. The number of piperacillin-tazobactam and cefepime resistant isolates that were resistant to ciprofloxacin were 19/33 (57.6%) and 15/26 (57.7%), respectively. The number of piperacillin-tazobactam and cefepime resistant isolates that were resistant to gentamicin, tobramycin and amikacin were 11/33 (33.3%), 10/33 (30.3%) and 1/9 (11.1%), respectively.
CONCLUSIONS: High-quality data concerning the use of combination or monotherapy for serious infections due to pseudomonas is lacking. Combination therapy is likely indicated in certain high risk patients and in severe infections. In our study, we found piperacillin-tazobactam and cefepime resistant pseudomonas isolates cultured from critically ill patients were approximately twice as likely to also be resistant to ciprofloxacin compared to aminoglycosides. When using combination therapy for treatment of pseudomonas infections in critically ill patients, aminoglycosides should be favored over ciprofloxacin in the absence of contraindications.

19. Risk factors for methicillin-resistant *Staphylococcus aureus* hospital-acquired pneumonia among surgical intensive care unit patients at an urban, level I trauma, academic medical center. Nicole Wex, PharmD[1,*], Janelle Juul, PharmD[1], Ryan Feldman, PharmD[1], Joel Feih, PharmD[1], William Peppard, PharmD[1], John Weigelt, MD[2], Charles Edmiston, Jr, Ph.D[2]; (1) Froedtert and the Medical College of Wisconsin; (2) Medical College of Wisconsin
INTRODUCTION: Reported prevalence of MRSA HAP and associated risk factors identified by the Infectious Disease Society of America may not apply to the previously healthy adults admitted to the SICU. Approximately 60% of our institutions SICU HAPs receive anti-MRSA therapy however MRSA comprises only 6% of SICU isolates and 15% all *S. aureus* isolates. Identifying risk factors for MRSA HAP among SICU patients may help define subpopulations of SICU patients with HAP who require empiric MRSA coverage.
OBJECTIVES: Identify risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) among adult surgical intensive care unit (SICU) patients with culture-positive *S. aureus* hospital-acquired pneumonia (HAP).
STUDY DESIGN: An institutional review board approved retrospective cohort study of adult patients admitted to Froedtert Hospital's 21-bed SICU from July 2007 to August 2012 was evaluated.
METHODS: Eligible patients were hospitalized for ≥48 hours in the SICU with broncho-alveolar lavage (blinded or unblinded) culture-positive MRSA or methicillin-susceptible *S. aureus* (MSSA) HAP. Logistic regression analysis was performed to identify risk factors for MRSA HAP. Potential risk factors included age, sex, MRSA nasal colonization, ICU and hospital length of stay (LOS) prior to culture, hemodialysis, steroid administration, and receipt of antibiotics within the previous 90 days.
RESULTS: A total of 67 *S. aureus* HAPs were evaluated (MSSA, n=49; MRSA, n=18). Three risk factors were associated with isolation of MRSA: MRSA nasal colonization, LOS prior to culture, and age. MRSA nasal colonization was the most significant risk factor (OR 11.75, 95% CI 2.1–65.7, positive predictive 77%, negative predictive 79%). The risk for MRSA HAP increased by 1.27-fold for each day of hospitalization (95% CI 1.00–1.60) and 1.05-fold for each year of life (95% CI 1.00–1.10).
CONCLUSIONS: In adult SICU patients with culture-positive *S. aureus* HAP, MRSA nasal colonization, LOS prior to culture, and age are associated with the isolation of MRSA compared to MSSA.

20. Evaluation of intravenous milrinone in the treatment of vasospasm following an aneurysmal subarachnoid hemorrhage. Rebecca VanDerwall, PharmD[1,*], Laura Aykroyd, PharmD[1], Ranjeet Singh, MD[2]; (1) Department of Pharmacy, Indiana University Health, Indianapolis, IN; (2) Department of Medicine, Indiana University Health, Indianapolis, IN
INTRODUCTION: Delayed cerebral ischemia due to cerebral vasospasm (CV) is a complication of aneurysmal subarachnoid hemorrhage (aSAH). Systemic and intra-arterial (IA) hyperdynamic therapy (HYP) are treatment options and milrinone has been suggested as adjunctive therapy for inotropic and vasodilatory effects. Vasospasm monitoring includes transcranial Dopplers (TCDs) for cerebral blood flow velocity (CBFV) and rates greater than 120 cm/second suggest CV.
OBJECTIVES: Compare median CBFV on hyperdynamic therapy plus IV milrinone (MIL) versus HYP alone (CONT). Secondary outcomes include severity of CV, rate and duration of milrinone infusion, and modified Rankin scores (mRS) on discharge.
STUDY DESIGN: Retrospective, review of aSAH patients (n=9) post IA for CV receiving milrinone versus control (n=9), a matched cohort based on aSAH, IA and HYP for CV, age, gender, Glasgow Coma Scale (GCS), and Fisher grade on admission.
METHODS: Screened discharge diagnosis of aSAH, age ≥18 years, surgically clipped / coiled within 72 hours, with CV

and baseline TCD measurements prior to IA. Exclusion criteria <24 hours of milrinone.
RESULTS: Mean age was 53 ± 8.5 in MIL and 52 ± 7.1 in CONT. Median GCS on admission MIL 13 (IQR = 13–14) vs. CONT 9 (IQR: 8–12). The majority with admission Fischer grade 3. Median CBFV ranged from 79 to 147.5 cm/second MIL compared to 85 to 212 cm/second CONT (p=0.052). Treatment patients averaged 10 ± 3.42 days on MIL at 0.23 ± 0.11 μg/kg/min. CV severity did not differ between groups (p=1). 89% of MIL vs. 66% CONT were discharged with moderate to severe disability and dependence (mRS ≥3) (p=0.17).
CONCLUSIONS: No difference was detected between groups in baseline characteristics or outcomes. A larger randomized prospective clinical trial is required to assess effectiveness (initiated 11/2015). Limitations of this study include lack of safety data, limited patient documentation, and retrospective design.

21. Experiences and Perceptions of Doctor of Pharmacy Students in India on Practical Skills and Education Provided by Mentors during Clinical Rotations. Akshaya Bhagavathula, Pharm.D[1,*], Deepak Bandari, Pharm.D[2], Asim Elnour, Ph.D.[3]; (1) Department of Clinical Pharmacy, University of Gondar-School of Pharmacy, Warangal, Ethiopia; (2) Department of Pharmacy Practice, Vaagdevi College of Pharmacy, Warangal, India; (3) Pharmacology, UAE University, Al Ain, United Arab Emirates
INTRODUCTION: Pharmacy mentors have a crucial role in establishing a good teaching and learning environment in a clinical setup.
OBJECTIVES: To investigate the overall experience of students from the Doctor of Pharmacy (Pharm.D) program in India during their clinical rotations.
STUDY DESIGN: A cross-sectional study.
METHODS: We designed a prospective cross-sectional study using a self-administered survey instrument containing 34 items to obtain feedback from senior Pharm.D students in the latter three years of their six-year program from November 2014 to February 2015
RESULTS: A total of 415 Pharm.D students were approached for this survey, and 261 students (62.9% response rate) successfully completed it (53.6% males and 46.4% females). Of the surveyed participants, nearly three-forth (74%) were fifth and final year interns and undertaking clinical training in private hospitals (60.9%). Students observed that unnecessary drug therapy (78.2%), adverse drug reactions (39.1%), and non-adherence (35.2%) were the most common drug-related problems among the patients during their rotations. Interestingly, 37.9% of the students ranked their clinical training as "least satisfactory" and remarked that their clinical pharmacy services were not recognized or appreciated in their respective hospitals (42.9%). However, 20% of the students expressed that their site "definitely" provided them with the opportunity to hone clinical pharmacy skills. When asked to evaluate their mentors, only 10% of the students strongly agreed that their mentors encouraged them to use resource materials and learn on their own, met with them regularly to review their work and to provide feedback.
CONCLUSIONS: Our study revealed that the majority of the Pharm.D students we surveyed in India were "least satisfied" with their clinical training program and identified deficiencies in its quality and reliability. Mentors should take more efforts to demonstrate practice-based clinical training and provide patient-centered education to the Pharm.D students at their clinical sites.

22. Ready, Set, Go: Preparing students to enter the race for post-graduate training programs. Evangelina Berrios-Colon, Pharm.D., MPH[1,*], Charnicia Huggins, Pharm.D., MS[2]; (1) Department of Social, Behavioral and Administrative Sciences, Touro College of Pharmacy, New York, NY; (2) Department of Pharmacy Practice, Touro College of Pharmacy, New York, NY
INTRODUCTION: The American Society of Health-System Pharmacists Resident Matching Program's 2015 data reveals that of 4,358 applicants, 65% were successful in securing post-graduate year 1 residencies. Additionally, there has been unprecedented growth in the number of US colleges and schools of pharmacy and increased interest in post-graduate training. The larger applicant pool and resulting competition for positions allows programs to expect higher caliber applicants, i.e. students that are well prepared for the interview/application process. Some pharmacy schools offer activities promoting residency training, but few include formalized programs.
OBJECTIVES: The objectives of this study were to evaluate student attitudes regarding a series of five residency preparation workshops in a new college of pharmacy and to determine the impact of the workshops on students' post-graduate training readiness skills.
STUDY DESIGN: Observational cross-sectional survey.
METHODS: Five residency workshops were implemented over 12 months. Fourth year pharmacy students who attended at least one workshop were administered a 10-question survey, assessing demographics and attitudes. Descriptive statistics were used.
RESULTS: 50% of surveys were completed (n=23). The majority attended at least four workshops (55%). 82% applied to residencies; 9% applied to both residency/fellowships. The median number of programs applied to was 13. All strongly agreed/agreed they felt better prepared for interviews after workshop participation. All students (100%) strongly agreed/agreed they would recommend the workshops. 92% and 75% strongly agreed/agreed that their interviewing and CV skills improved, respectively, after attending the workshops.
CONCLUSIONS: All students reported benefits from the formalized residency workshops. Workshops also increased readiness for applying to residency programs. Post-graduate training preparation programs will give students the skills to succeed in an increasingly competitive market.

23. Perceived motivating factors and barriers for the completion of postgraduate training in American pharmacy students. Drayton Hammond, Pharm.D., MBA, BCPS, BCCCP[1,*], Jacob Painter, Pharm.D., Ph.D., MBA[2], Douglas Oyler, PharmD[3], Trisha Branan, Pharm.D.[4], John Devlin, Pharm.D.[5], Jeffrey Barletta, Pharm.D.[6], Scott Bolesta, PharmD, BCPS, FCCM[7], Brianne Dunn, Pharm.D.[8], Jason Haney, Pharm.D.[9], Paul Juang, Pharm.D.[10], Sandra Kane-Gill, PharmD, MSc, FCCM, FCCP[11], Tyree Kiser, PharmD[12], Hira Shafeeq, Pharm.D.[13], Debra Skaar, PharmD, FCCM[14], Pamela L. Smithburger, Pharm.D., MS, BCPS[15], Joseph Swanson, Pharm.D.[16], Jodi Taylor, Pharm.D.[17], Brett Bailey, BS[18]; (1) Department of Pharmacy Practice, University of Arkansas for Medical Sciences, Little Rock, AR; (2) Division of Pharmaceutical Evaluation and Policy, University of Arkansas for Medical Sciences, Little Rock, AR; (3) Department of Pharmacy, University of Kentucky, Lexington; (4) Department of Clinical and Administrative Pharmacy, University of Georgia College of Pharmacy, Athens, GA; (5) Northeastern University; (6) Department of Pharmacy Practice, Midwestern University College of Pharmacy-Glendale, Glendale, AZ; (7) Department of Pharmacy Practice, Wilkes University, Wilkes-Barre, PA; (8) South Carolina College of Pharmacy - USC Campus; (9) Roper Hospital, Charleston, SC; (10) St. Louis College of Pharmacy; (11) Department of Pharmacy and Therapeutics, University of Pittsburgh School of Pharmacy, Pittsburgh, PA; (12) Department of Clinical Pharmacy, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora, CO; (13) St. John's; (14) Department of Experimental & Clinical Pharmacology, University of Minnesota College of Pharmacy, Minneapolis, MN; (15) Pharmacy and Therapeutics, University of Pittsburgh School of Pharmacy, Pittsburgh, PA; (16) University of Tennessee; (17) Union University; (18) University of Arkansas for Medical Sciences
INTRODUCTION: Post-graduate training (PGT) for pharmacists (e.g., residencies, fellowships, and graduate degrees) is a critical

strategy to meet the growing demands and the evolving needs of patients and health-systems.
OBJECTIVES: To examine the perceived motivating factors and barriers (MFB) to the pursuit of PGT among pharmacy students.
STUDY DESIGN: IRB-approved, multicenter survey of third-year pharmacy students at 12 schools of pharmacy throughout the U.S.
METHODS: The survey was completed on paper at 10 schools and electronically [Qualtrics (Provo, UT)] at two schools. Questions included student demographics, plans for pursuing PGT, and perceived MFBs to pursuing PGT [5-point Likert scale (1 = strongly disagree, 5 = strongly agree)]. Frequency and descriptive statistics were used to characterize responses. Kruskal-Wallis equality-of-proportions rank tests were performed to determine if differences in perceived MFBs existed between students who indicated yes, no, or undecided to complete PGT. Perceived MFBs were grouped into five domains: self-actualization, future employment, awareness of PGT, internal MFBs, and external MFBs.
RESULTS: In total, 1218 (69.5%) students completed the survey. Overall 37.1% of students indicated they do plan to pursue PGT (vs. 32.9% that do not and 30.0% that are undecided). Approximately half of the students who first learned about PGT before beginning their first year in a school of pharmacy plan to pursue PGT ($p<0.001$). More students that plan to complete PGT had prior hospital work experience (50.2% vs. 16.8% vs. 29.3%, $p=0.001$). Among all three groups, the most common reason cited to complete PGT was, I desire to gain more knowledge and experience. Students who were undecided about pursuing PGT possessed greater self-actualization and future employment scores than those who were uninterested in pursuing PGT.
CONCLUSIONS: Introducing potential and current pharmacy students to the idea of completing PGT and work in the hospital setting may increase students desire to pursue PGT.

25. Concomitant Analgesia Use with Intubation in the Emergency Department. Andrea Miller, Pharm.D., BCPS *, Brad Hall, Pharm.D., June Vasquez, Pharm.D., BCPS, Georgia Keriazes, Pharm.D., BCPS, BCOP; Department of Pharmacy, Lakeland Regional Health, Lakeland, FL
INTRODUCTION: The Society of Critical Care Medicine (SCCM) recommends preemptive analgesia with an opiate based regimen prior to many invasive procedures including intubation. Patients who recalled pain had higher incidence of chronic pain, post-traumatic stress disorder, and lower health related quality of life.
OBJECTIVES: The purpose of this study was to determine the prevalence and impact of patient specific factors on frequency of analgesia administration with intubation in the emergency department (ED) at a tertiary care hospital.
STUDY DESIGN: This was an IRB-approved, retrospective, cohort study of 118 patients (100 adult and 18 pediatric) between June 2013 and June 2015.
METHODS: The primary outcome was frequency of analgesic administration within 60 minutes of intubation. Patient specific factors evaluated included Glasgow Coma Scale (GCS) score (responsive vs unresponsive), hemodynamic stability, sedative use and age (pediatric vs adult). The chi square test was used to compare differences between patient specific factors for analgesia administration.
RESULTS: The analysis included 118 patients, and sedation was provided to 86.4% while analgesia was provided to 28.8% of patients. No statistically significant difference was found with the following traits: GCS score >8 vs. ≤8 (31% vs 25.5%, $p=0.521$), patients who were hemodynamically stable versus unstable (24.4% vs 37.5%, $p=0.135$), no sedative administered compared to receiving a sedative (18.6% vs 30.4%, $p=0.3391$), or in pediatric versus adult patients (44.4% vs 26%, $p=0.156$)
CONCLUSIONS: Although there was a high frequency of sedative administration in intubated patients in the ED, there was a low frequency of analgesia administration. The factor most associated with analgesia administration was pediatric status. Patients who were responsive, hemodynamically stable, or given a sedative were also more likely to receive analgesia. A paradigm shift to an analgesic-first sedation protocol in the ED is needed to help adhere to current SCCM recommendations and prevent negative long-term health outcomes.

26. Current practice of hypoglycemia management in the emergency department. Matthew H. Bilhimer, Pharm.D.[1,*], Cierra N. Treu, Pharm.D.[2], Nicole M. Acquisto, PharmD, BCPS[3]; (1) Department of Pharmacy, University of Rochester Medical Center, Rochester, NY; (2) Department of Pharmacy, St. Barnabas Hospital, Bronx, NY; (3) Department of Pharmacy, University of Rochester Medicine, Rochester, NY
INTRODUCTION: Hypoglycemia is common in the emergency department (ED).
OBJECTIVES: Characterize hypoglycemia management and identify characteristics associated with refractory (need for additional treatment following initial management) and recurrent (adequate initial treatment followed by a subsequent BG ≤50 mg/dL) hypoglycemia.
STUDY DESIGN: Retrospective review of adult ED patients presenting to the health care system with hypoglycemia (BG ≤50 mg/dL) between January 2011 and July 2015 was conducted.
METHODS: Data collection focused on BG obtainment and treatment practices for the first 6 hours in the ED. Data are reported using descriptive statistics, Wilcoxon rank sum and chi-square analysis as appropriate.
RESULTS: Two-hundred forty-four patients were included (mean age 71 ± 12 years, weight 83.3 ± 24.7 kg). Patients arriving via pre-hospital care were assessed faster in the ED [median 29 minutes (IQR 12–53)] compared to ambulatory arrival [median 43 minutes (IQR 17–95)], $p=0.0018$. In the ED, initial BG was 59.9 ± 46.5 mg/dL. Only 62.2% of 176 patients with BG ≤50 mg/dL were treated with IV bolus dextrose/glucagon and 21 patients did not receive any treatment or food. Median time to treatment was 11 min (IQR 6–23.5) and 66 min (IQR 35.75–99) for point of care and serum testing, respectively. Repeat BG was obtained 34 minutes (IQR 8–44) after treatment. Refractory or recurrent hypoglycemia occurred in 30.3%. There were no differences in the total dextrose dose received in refractory ($p=0.46$) or administration of dextrose containing IV fluids/food in recurrent ($p=0.14$) hypoglycemia. Infection was the only associated characteristic, $p=0.021$.
CONCLUSIONS: There is a delayed time to BG in patients arriving via pre-hospital care with known hypoglycemia. Additionally, 12% of patients did not receive treatment for hypoglycemia in the ED once identified. About one-third of patients had refractory or recurrent hypoglycemia and infection was associated with this occurrence.

27. Relationship of perceived self-management, self-efficacy, medication adherence in adult diabetes patients. Sohail Ahmad, Pharm D, MSc (Clinical Pharmacy)[1,*], Safaa Ahmed Al Abboud, BPharm (Hons), MSc (Clinical Pharmacy)[1], Mohamed Badrulnizam Long Bidin, MBBS, FCCP[2], Nahlah Elkudssiah Ismail, BPharm (Hons), PhD (Clinical Pharmaceutics)[1]; (1) Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia; (2) Endocrine Unit, Medical Department, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia
INTRODUCTION: A The patientsâ€™ self-management, self-efficacy and medication adherence have substantial consequences on morbidity and mortality of diabetes.
OBJECTIVES: Â This study aimed to determine the relationship of perceived self-management, self-efficacy, and medication adherence among adult diabetes patients.
STUDY DESIGN: In this cross-sectional study, 62 adult diabetes patients were enrolled who visited the Hospital Kuala Lumpur between August 10, 2014 and November 20, 2014.

METHODS: Â For this study, three questionnaire (namely; Perceived Diabetes Self-Management Scale (PDSMS), Medication Understanding and Use Self-Efficacy Scale (MUSE), and Morisky Medication Adherence Scale -8 (MMAS-8)) were adopted. The permission to use and translate the questionnaires were obtained from the corresponding authors and questionnaires were translated into Malaysian language using international translation guidelines. The questionnaire were directly administered to the enrolled diabetes patients. HbA1c level were assessed and recorded. The extracted data were analyzed by Statistical Package for Social Sciences (SPSS) Â® version 19 for Pearsonâ€™s Product Moment Correlation (r).
RESULTS: Â The overall mean scores were 27.44 Â ± 4.27, 26.80 Â ± 4.15, and 5.50 Â ± 1.71 for perceived self-management, self-efficacy, and medication adherence, respectively. The perceived self-management showed a significant moderate positive correlation with self-efficacy ($r = 0.307$, $p<0.001$), and significant weak positive correlation with medication adherence ($r = 0.237$, $p=0.004$). Moreover, the medication adherence showed significant moderate positive correlation with self-efficacy ($r = 0.390$, $p=0.002$).
CONCLUSIONS: Â The perceived self-management, self-efficacy, and medication adherence showed significant positive correlations. This study strongly recommends to explore the relationship of this study variables with diabetes control variables like HBA1c so that better control and management can be ensured in diabetes patients.

28. Inappropriate medication prescriptions in elderly patients in a teaching hospital in Lebanon. Maguy Sakr, Doctor in Pharmacy[1], Souraya Sleyman, Doctor in Pharmacy[1], Latife Karam Kirejian, Pharm.D.[2], Lydia Rabbaa Khabbaz, Pharm.D., Ph.D.[3,*]; (1) Faculty of Pharmacy, Saint-Joseph University, Beirut, Lebanon; (2) Pharmacy department and Faculty of Pharmacy, Hotel-Dieu de France hospital and Saint-Joseph University, Beirut, Lebanon; (3) Faculty of Pharmacy, Saint-Joseph University, Beirut
INTRODUCTION: The selection of appropriate medication in the elderly people is a challenging and complex process. There are no criteria available for the evaluation of inappropriate medication in the elderly based on the availability of the drugs in Lebanese market.
OBJECTIVES: This was the first study performed in Lebanon to identify inappropriate medication prescriptions (IMPs) in hospitalized geriatric patients by using American Geriatric Society Beer's criteria (2012), at a Lebanese university hospital, Hotel-Dieu de France.
STUDY DESIGN: This retrospective study was conducted by reviewing all patient (≥65 years) records over a period of 6 months.
METHODS: Data on age, gender, diagnosis, duration of hospital stay, and treatment were collected. Statistical analysis was performed using the SPSS software for Windows.
RESULTS: Of the 201 files reviewed, 52.7% were of male patients, and average age was 74.2 years.
IMPs were most frequently observed in patients admitted for: orthopedic problems (19.8%), and urological-nephrological problems (17.9%). 37.31% of patients received one IMP, 8.5% two and 5.5% three IMPs (53% with at least one IMP). Hydroxyzine followed by butyl scopolamine were the most commonly used IM. Most frequent IMPs due to drug-disease or drug-syndrome interaction were: among patients with: epilepsy, 33.3% received tramadol, delirium, 40% received methylprednisolone, dementia, 37.3% received risperidone, urinary incontinence, 25.6% received inhaled anticholinergics, prostatic hypertrophy, 32.3% received oral anticholinergic drugs.
IMP to be used with caution in geriatric patients: 5.9% of patients aged 80 or more were treated with aspirin. As for IMPs that alter sodium levels, 6.5% of the patients received escitalopram, and 2.5% risperidone.
CONCLUSIONS: This study has identified IMPs according to Beer's criteria based on the American population. The possibility of adverse drug events may differ in Lebanese population because of genetic, prescribing, and environmental particularities. This highlights the need for population- and country specific prescribing guidelines.

30. An observational assessment of inhaler technique in older patients. Michele Pisano, Pharm.D., CGP[1,*], Sara Bughio, MD[2], Judith Beizer, Pharm.D., CGP[3], Liron Sinvani, MD[4], Martin Lesser, PhD[5], Christian Nouryan, MS[6], Gisele Wolf-Klein, MD[7]; (1) Department of Clinical Health Professions, St. John's University College of Pharmacy and Health Sciences, Queens, NY; (2) Medicine, Northwell Health System, Manhasset, NY; (3) Department of Clinical Health Professions, St. John's University College of Pharmacy and Health Sciences, Jamaica, NY; (4) Northwell Health System, Manhasset, NY; (5) Biostatistics, Northwell Health System, Manhasset, NY; (6) Medicine-Research, Northwell Health System, Great Neck, NY; (7) Medicine, Northwell Health System, NY
INTRODUCTION: Optimal management of chronic obstructive pulmonary disease (COPD) and asthma requires patients' correct self-administration of inhaler therapy.
OBJECTIVES: This study evaluated Dry Powder Inhaler (DPI) and Metered-Dose Inhaler (MDI) use in older patients to better identify errors and barriers to proper inhaler technique.
STUDY DESIGN: All patients in a geriatric continuum of care (outpatient facility, subacute care center and a long-term skilled nursing facility) currently self-administering a respiratory inhaler, were offered participation through informed consent between 9/1/15–12/1/15
METHODS: Demographics, number, type and dose of inhaler(s), and duration of inhaler use, were collected via survey. A pharmacist recorded direct observation of patient's technique, using placebo inhalers.
RESULTS: There were 32 subjects recruited; average age 81 (range: 67–96 years). Most, (63%), had COPD, 39% had asthma, 7% had both. Most (89%) had at least one maintenance inhaler, 33% had two or more, and 41% had one or more rescue inhalers, and 70% had been using an inhaler for at least a year. The survey documented reported ease of use by most participants (84%), and 69% reported previous training. Yet, during direct observation by a pharmacist, 67% demonstrated errors for MDI (simultaneous actuation and inhalation [80%], breathing out fully before inhalation [60%], and holding their breath after inhalation [60%]), and 71% for DPI (using the mouthpiece correctly [88%], and breathing out fully away from the inhaler [63%], and using the dose counter correctly [56%]). Finally, 73% required reeducation on their inhaler technique.
There were no significant differences reported between gender, age, disease type, previous training, or clinical setting.
CONCLUSIONS: This study suggests that older patients with COPD and asthma commonly use their inhalers incorrectly, despite their reported long term experience with inhaler use. Identification of common types of errors in inhaler technique may help health care professionals to better focus their education efforts, in successfully managing their older patients.

31. Assessing the potentially inappropriate medication use in elderly patients in Taiwan. Chu-Yun Huang, M.S.*, Ju-Huei Tseng, M.S., Yi-Wen Chen, B.S., R.Ph, Yun-Ju Chen, B.S., R.Ph, Jui-Chia Chang, M.S.; Department of Pharmacy, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan
INTRODUCTION: As the population ages, multiple chronic illnesses and hospital shopping leads to high rates of polypharmacy and potentially inappropriate medication (PIM) use in Taiwan. The Screening Tool of Older Persons' potentially inappropriate Prescriptions (STOPP) criteria and Beers criteria are the most commonly used tools to screen for PIM in the elderly and have been updated in recent years. However, little studies have assessed

the prevalence and types of PIM use in Taiwan by the updated criteria.
OBJECTIVES: To determine the prevalence and types of PIMs prescribed at outpatient setting from a hospital in Taiwan.
STUDY DESIGN: This is a single-center, retrospective observational study conducted in Shuang-Ho hospital (SHH), Taipei, Taiwan.
METHODS: We used Beers criteria (2015) and STOPP criteria (Version 2) to screen for the PIM use in outpatients during January 1st, 2015-August 31st, 2015. Patients aged >65 years, having more than two refillable prescriptions for chronic illnesses, and taking at least seven medications were recruited. The PIM prevalence was calculated by dividing the total number of PIMs by the total number of medications.
RESULTS: A total of 11,385 prescriptions from 474 patients had been reviewed. The overall PIM prevalence was 16.7%. The most common PIM categories were central nervous systems (5.80%; 660/11,385; benzodiazepines were the most common PIM), antiplatelet/anticoagulant (5.58%; 635/11,385; aspirin was the most common PIM), and cardiovascular system (3.21%; 366/11,385; doxazosin was the most common PIM).
CONCLUSIONS: This is the first study analyzed the PIM prevalence in Taiwan by the new version of Beers and STOPP criteria. The prevalence in this study is similar to the results of previous international studies. PIM use in the elderly may lead to serious adverse effects. Further studies are needed to develop an intervention and follow-up plans for PIM use in Taiwanese patients to improve patient safety.

32. Evaluating the quality of medication adherence mobile apps. Eskinder Eshetu Ali, MSc[1,*], Amanda Kai Sin Teo, BSc candidate[2], Sherlyn Xue Lin Goh, BA candidate[3], Lita Chew, BSc (Pharm) MMed (Oncology)[1], Kevin Yi-Lwern Yap, PhD[1]; (1) Department of Pharmacy, National University of Singapore, Singapore; (2) Department of Biological Sciences, National University of Singapore, Singapore; (3) Department of Economics, National University of Singapore, Singapore
INTRODUCTION: Motivated by the rampant problem of medication non-adherence, smartphone adherence apps are now abundantly available. However, many apps only incorporate medication reminders, but do not include features that promote and monitor adherence, nor are they able to handle complex medication regimens.
OBJECTIVES: Do medication adherence apps have sufficient features to be of appropriate quality for patient use?
STUDY DESIGN: Development of a quality assessment tool and evaluation of medication adherence apps.
METHODS: A quality assessment tool comprising of 24 items was developed based on a comprehensive literature review. The items assessed content reliability, feature usefulness and feature convenience of medication adherence apps. The apps were downloaded from the two major app stores (Google Play and iTunes). Inclusion criteria were: ability to handle multiple medications for multiple disease conditions, presence of a medication reminder feature, availability of the app on both platforms and published in English. Two evaluators independently rated eligible apps.
RESULTS: A total of 483 apps were screened. Thirty-nine apps (20 iOS and 19 android) fulfilled the inclusion criteria and were free of technical malfunctions. A wide range of quality was observed, with apps scoring between 8/43 (18.6%) and 28/43 (65.1%). More than half (24 apps, 61.5%) scored below 22/43 (51.2%). The highest-ranking app on the iOS platform scored 28/43 (65.1%) while the highest score for apps in the android platform was 27/43 (62.8%). All of the apps were unable to schedule medication tapers and did not have features for self-management of side-effects. Moreover, 32 (82.1%) apps did not consist of disease- and medication-related information.
CONCLUSIONS: Most medication adherence apps have deficiencies in features that limit their usefulness for patients. Developers of such apps should consider features that provide therapy-related information and help patients in medications and side-effects management.

34. Evaluation of a 5-day course of levofloxacin in males with a urinary tract infection, a subgroup analysis of a previously published trial. Geoffrey Mospan, Pharm.D.[1,*], Kurt Wargo, Pharm.D.[2]; (1) School of Pharmacy, Wingate University School of Pharmacy, Hendersonville, NC; (2) Hendersonville Regional Campus, Wingate University School of Pharmacy, Hendersonville, NC
INTRODUCTION: Based upon the current guideline recommendations, urinary tract infections (UTIs) in males are deemed complicated and are therefore treated for longer than their female counterparts. Given their efficacy and broad spectrum of activity, fluoroquinolones are among the recommended antimicrobials to treat complicated UTIs.
OBJECTIVES: This study evaluated a 5-day course of levofloxacin compared with a 10-day course of ciprofloxacin in patients with complicated UTIs to determine overall clinical success rates in males, and differences in clinical success rates between males and females.
STUDY DESIGN: Data was obtained from a previously conducted clinical trial (NCT00210886), a multicenter, double-blind, randomized, non-inferiority study comparing levofloxacin 750 mg once daily for 5 days and 400/500 mg IV/PO ciprofloxacin twice daily for 10 days in complicated UTI and acute pyelonephritis. This current study was a post-hoc, subgroup, analysis of male and female subjects with complicated UTI.
METHODS: Subjects were stratified into groups based on gender and antibiotic received. The subjects were analyzed at end of therapy (EOT) and post therapy (PT) for clinical success rates (defined as no further need for antimicrobial treatment).
RESULTS: A total of 189 male and 161 female subjects were included in the final analysis (microbiologically evaluable). Clinical success rates at EOT for males were 87% and 86% for the levofloxacin and ciprofloxacin groups, respectively (p=0.837). Clinical success rates at PT among males were 81% and 86% in the levofloxacin and ciprofloxacin groups, respectively (p=0.438). Differences in clinical success rates between males and females were not statistically significant at EOT or PT. Results were similar in the modified intent to treat population.
CONCLUSIONS: This study demonstrates that males can be treated with a shorter course of antimicrobial therapy for UTI than previously recommended.

35. Effects of a three-part antimicrobial stewardship intervention on duration of treatment of pneumonia in a primary hospital setting. Jennifer Cole, Pharm.D., BCPS, BCCCP[1,*], Jennifer Stark, Pharm.D., BCPS[2], Bradley Hodge, Pharm.D.[1]; (1) Department of Pharmacy, Veterans Healthcare System of the Ozarks, Fayetteville, AR; (2) Department of Pharmacy, Veterans Health Care System of the Ozarks, Fayetteville, AR
INTRODUCTION: Our facility's antibiotic duration for the treatment of uncomplicated pneumonia was previously shown to be, on average, longer than what is recommended in current guidelines. Based on these results, our facility implemented a three-part antimicrobial stewardship intervention. This study was conducted to test the effectiveness of this initiative.
OBJECTIVES: To determine if a multifaceted stewardship intervention could reduce antibiotic treatment duration of pneumonia closer to that recommended by national guidelines. The primary endpoint was change in total antibiotic duration. Secondary endpoints were duration of intravenous (IV) antibiotic therapy, duration of outpatient antibiotic therapy, and mean length of stay.
STUDY DESIGN: This was a retrospective, before and after chart review.
METHODS: Medical records of 103 patients were reviewed to establish our baseline prescribing practices (group 1). Our intervention consisted of (1) provider education of baseline results and

review of current guidelines, (2) prospective intervention and feedback during daily hospital admissions, and (3) the development of a stewardship note/template with reminders of clinical stability and duration of current therapy. Medical records of 88 patients were then reviewed after implementation of our stewardship strategy (group 2).
RESULTS: Duration of antibiotic therapy was significantly decreased in both community acquired pneumonia (11.1 days vs 8.4 days, p<0.0001) and healthcare associated pneumonia (11.8 days vs 8.8 days, p=0.002). Inpatient duration of IV antibiotics were decreased (3.8 days vs 2.7 days, p<0.0001) as well as outpatient antibiotic duration (6.3 days vs 4.7 days, p=0.001). Mean length of stay was shorter in the follow up group (4.9 days vs 4.0 days, p=0.02).
CONCLUSIONS: A three-part stewardship intervention can successfully shorten duration of antibiotic therapy to be more consistent with that recommended by current guidelines for uncomplicated pneumonia in a primary hospital setting.

36. National costs of inpatient pneumonia care among U.S. adults from 2001–2012. Braden J. Adamson, Pharm.D.[1,*], Russell T. Attridge, Pharm.D., MSc., BCPS[2]; (1) College of Pharmacy, Roseman University of Health Sciences, South Jordan, UT; (2) University of the Incarnate Word Feik School of Pharmacy, San Antonio, TX
INTRODUCTION: Limited national U.S. data describe the epidemiology of inpatient pneumonia care, particularly with regards to cost.
OBJECTIVES: To describe current, national trends for the cost of adult, inpatient pneumonia care.
STUDY DESIGN: Cost trend study using data from the 2001–2012 releases of the National Inpatient Sample (NIS) database from the Agency for Healthcare Research and Quality's (AHRQ), Healthcare Cost and Utilization Project (HCUP).
METHODS: We extracted cases of adults hospitalized with pneumonia in the U.S. from 2001–2012. Patients <18 years of age were excluded. We defined cases of pneumonia using ICD-9 codes into two groups: cases with a principal discharge diagnosis (PDD) of pneumonia, and cases with a PDD of sepsis or respiratory failure plus a secondary discharge diagnosis of pneumonia. Costs were adjusted to 2012 U.S. dollars using the medical consumer price index to account for inflation over time. Data weights were used to provide national estimates.
RESULTS: We identified nearly 15.3 million cases of inpatient pneumonia from 2001 to 2012. Median age was 72 years (interquartile range [IQR], 58–82), 47.3% were male, and 60% were Caucasian. From 2001–2012, the average annual cost of care in the U.S. was $16.6 billion, increasing from $12.1 billion in 2001 to $19 billion in 2012. The cost per pneumonia hospitalization has increased from $10,632 in 2001 to $14,239 in 2012. The mean annual cost to care for pneumonia cases with a PDD of pneumonia is substantially less than cases with a PDD of sepsis or respiratory failure ($9,714 vs. $24,534). Over the study period, the percentage of hospitalized pneumonia patients with a PDD of sepsis or respiratory failure has steadily increased from 11.2% in 2001 to 34.6% in 2012.
CONCLUSIONS: Costs of adult, inpatient pneumonia care increased from 2001 to 2012, which may be due to an increased proportion of cases with a PDD of sepsis or respiratory failure.

37. Switching of antibiotics for the treatment of MRSA pneumonia in an academic hospital. Paul Juang, Pharm.D.[1], Marissa Bear, Pharm.D., Candidate[2,*]; (1) Department of Pharmacy Practice, St. Louis College of Pharmacy, St. Louis, MO; (2) St. Louis College of Pharmacy
INTRODUCTION: The timely administration of antibiotics for the treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) pneumonia has been associated with improved outcomes. Studies have not examined the characteristics and outcomes of patients who required a switch in initial antibiotic therapy.
OBJECTIVES: Examine the characteristics and outcomes associated with a switch in antibiotic therapy for the treatment of appropriate empiric treatment of MRSA pneumonia.
STUDY DESIGN: Retrospective cohort analysis.
METHODS: A retrospective data analysis was conducted using an electronic data repository to identify patients 18 years of age or older with respiratory cultures positive for MRSA and started on anti-MRSA antibiotics. The primary results were the description of and the discharge disposition of patients treated with a single and those who required a switch anti-MRSA antibiotics. Descriptive and inferential statistics were utilized where appropriate.
RESULTS: From January 1, 2008 to December 31, 2014, 674 patients were admitted with culture-positive MRSA pneumonia, of which 420 patients received a single antibiotic while 209 patients required a switch in initial antibiotics. The majority of the patients received vancomycin as the initial antibiotic regardless of whether subsequent switch in antibiotic was needed. Patients who received a single antibiotic were predominately discharged home or to a nursing facility while those who required a switch in antibiotics predominately did not survive or were discharged to a long-term care facility (p=0.0001). The APACHE II score and average length of stay were 16.3 ± 6 and 21.8 ± 20 days for those with no switch in initial antibiotics and 17.7 ± 6 and 34.7 ± 28 days for those who required a switch (p=0.003 and p<0.001), respectively.
CONCLUSIONS: Our study suggests that patients who required a switch in initial anti-MRSA antibiotics were sicker and hence have worse outcomes then those who did not required a switch.

38E. Evaluation of nephrotoxicity associated with intravenous colistin or polymyxin B. Sarah Green, PharmD, BCPS*, Marissa Williams, PharmD, BCPS (AQ-ID), Nathan Everson, PharmD; Department of Pharmacy, Carilion Clinic, Roanoke, VA
Presented at The 50th American Society of Health-System Pharmacists (ASHP) Midyear Clinical Meeting and Exhibition, New Orleans, LA, December 6 - 10, 2015.

39. pharmacy benefit manager and health plan partnership to improve hepatitis b virus outcomes: impact of interventions for nonadherent members. Marnie Wickizer, Pharm.D.[1,*], William Miller, RPh, MBA[1], Alan Chuang, Pharm.D.[2], Robert Topp, PhD, RN[3]; (1) Navitus Health Solutions, Madison, WI; (2) Chinese Community Health Plan; (3) Hahn School of Nursing and Health Science at the University of San Diego
INTRODUCTION: Effective hepatitis B virus (HBV) disease management is of major importance and has been identified as a public health priority.
OBJECTIVES: The objective of this study is to determine if outreach to prescribers and members can result in the following: (1) increased medication adherence to HBV antiviral medications, as measured by a change in Proportion of Days Covered (PDC); and (2) reduced HBV viral load, for members identified as potentially nonadherent to HBV antiviral medications (PDC≤0.90).
STUDY DESIGN: This project is an IRB exempt longitudinal cohort analysis.
METHODS: The 78 members who were initially identified as nonadherent with their HBV medications, as evidenced by exhibiting less than or equal to 0.90 PDC in the 12 months preceding study initiation, were recruited into the study cohort and called to discuss their HBV medication adherence. Prescribers of nonadherent members were mailed initially in June 2014 and then if their patients remained nonadherent, mailed again in December 2014. PDC outcomes were obtained at 6 months (December 2014) and 12 months (June 2015). HBV DNA levels were obtained at the beginning of the study (June 2014) and at study completion (July 2015).

RESULTS: Mean PDC significantly increased in the first 6 months and continued to increase significantly in the second 6 months of the study from 0.69 to 0.75 over the 12 month duration of the study ($p<0.05$). At one year, 13 members were moved into adherence (PDC>0.90). There was a significant difference between the PDC changes between males and females over time ($p<0.05$). The PDC significantly increased among females, but there was no statistically significant PDC change among males. There were no significant differences in HBV DNA.
CONCLUSIONS: The combination of provider and member outreach for nonadherent HBV members improved medication adherence (PDC). The effect of such interventions on HBV DNA levels needs further analysis.

40E. Knowledge, perception, attitude and experience of pharmacist in Qatar towards drug use in pregnancy: a cross-sectional study. Binny Thomas, Mpharm, MRes, Ph.D. (student)[1,*], Pallivalapilla Abdul Rouf, Mpharm, Msc, Ph.D.[2], Wessam Elkassem, Bsc, MBA, Pharm.D.[3], Moza AlHail, Bsc (Pharm), PgDip[4]; (1) Pharmacy and life Science, Robert Gordon University, Garthdee, United Kingdom of Great Britain and Northern Ireland; (2) Pharmacy, Hamad Medical Corporation; (3) Hamad Medical Corporation, Qatar; (4) Hamad Medical Corporation, Doha, Qatar
Published in Asian Journal of Pharmaceutical Science.

41. The impact of pharmacist-led medication reconciliation in surgical ward targeting high risk patients. Lorraine Lok Yan Li, MClinPharm, MPharm*, Howard Ho Yeung Tsoi, MClinPharm, BPharm; Department of Pharmacy, United Christian Hospital, Hong Kong, Hong Kong
INTRODUCTION: Medication errors are highly prevalent upon hospital admission and discharge. Clinical pharmacist involvement in medication reconciliation is effective in identifying and rectifying medication errors. However, pharmacist involvement at all stages of the reconciliation process for every patient may not be feasible at individual institutions. This study evaluated a targeted approach in selecting high-risk patients in an effort to reduce unintended medication discrepancies.
OBJECTIVES: To determine the percentage of incidence and the severity of unintended medication discrepancies before and after targeting high risk patients in surgical wards.
STUDY DESIGN: Quasi-experimental pre-post intervention study.
METHODS: This was a single-center, pre-post intervention study conducted at the surgical wards in the United Christian Hospital, Hong Kong. Following institutional review board approval, pre-intervention data (From ward A) were collected retrospectively over 3 months from December 2013 to February 2014; while post-intervention data (From ward A and B) were collected prospectively over 3 months from December 2014 to February 2015. The potential severity of the unintended medication discrepancies were rated by pharmacists and classified into three levels according to NCC MERP index.
RESULTS: There was a non-statistically significant increase in the percentage of incidence from 5.32% to 7.35% (p-value 0.056) when comparing pre-intervention and post-intervention group. Statistical significance was shown when comparing ward A patients only in both groups, the percentage of incidence increased from 5.32% to 8.15% (p-value 0.021). There was no statistically significant difference in terms of the severity level of medication discrepancies between pre-intervention and post-intervention group (Ward A and B: p-value 0.295; Ward A only: p-value 0.388).
CONCLUSIONS: Targeting high risk patients in medication reconciliation process in surgical wards is a feasible approach given the limited time and resources available for pharmacists, resulting in a higher percentage of incidences of unintended medication discrepancies being detected, although the detected potential severity of the discrepancies may not be altered.

42. Prescriber satisfaction with medication history technicians within a transitions of care program. Andrew Aziz, Pharm.D.[1,*], Hinal Patel, Pharm.D., BCPS[1], Ashmi Philips, Pharm.D., AAHIVP[2], Rani Madduri, Pharm.D., BCPS, AAHIVP[1], Thom K. Nguyen, Pharm.D., BCPS, CTTS[2]; (1) Department of Pharmaceutical Services, Hunterdon Medical Center, Flemington, NJ; (2) Department of Pharmacy Practice and Administration, Rutgers, The State University of New Jersey, Piscataway, NJ
INTRODUCTION: Obtaining an accurate medication history during admission is integral to patient care to prevent errors and adverse outcomes. The utilization of pharmacy technicians to obtain medication histories upon admission was implemented at our institution as part of a pharmacy-driven transitions of care program in May 2015.
OBJECTIVES: To evaluate prescribers' satisfaction with the medication history technician program at admission, assess our current practices, and make improvements to optimize the transitions of care process.
STUDY DESIGN: This was a single-center, prospective study, conducted between September and November 2015 in a community, teaching hospital. Institutional review board exemption was obtained.
METHODS: Prescribers were surveyed to assess their satisfaction with medication history technicians and their role in the medication reconciliation process. The survey consisted of a combination of dichotomous and Likert-type questions for prescribers to evaluate different components of the program.
RESULTS: A total of 30 prescribers participated in the survey. The primary outcome, overall prescriber satisfaction, was reported as a median score of 4.5 out of 5, indicating that prescribers are highly satisfied with the program. Secondary outcomes indicated that prescribers found the technicians to be reliable, efficient, convenient, and preferred utilizing them to obtain a home medication history rather than obtaining it themselves. Responses also identified areas for improvement. Many prescribers were unfamiliar with the technicians' staffing hours. Forty percent of prescribers were unaware that part of the technicians' duty is to document notes regarding specific issues, such as noncompliance or discrepancies. Additionally, thirty-three percent of prescribers did not find it easy to contact the technicians.
CONCLUSIONS: Overall, the prescribers were highly satisfied with the medication history technician program. To further improve the program, our next steps will be to re-educate prescribers about the services, contact information, and schedule of technicians, and expand the service hours of the program to allow for more comprehensive coverage.

43E. Prevalence of medication discrepancies and its related causes in emergency department. Morvarid Zarif-Yeganeh, Pharm-D MPH[1], Mansoor Rastegarpanah, PhD[2,*], Gholamreza Garmaroudi, PhD[3], Molouk Hadjibabaie, Pharm. D., Clinical Pharmacy Specialty[4], Hojjat Sheikh Motahar Vahedi, MD[5]; (1) Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran; (2) Clinical Pharmacy Department, Tehran University of Medical Sciences, Tehran; (3) Department of Health Promotion and Education, Tehran University of Medical Sciences, Tehran; (4) Tehran Medical University, Tehran, Iran; (5) Tehran University of Medical Sciences, Tehran, Iran
Presented at 14th Iranian Pharmaceutical Sciences Congress and 1st Symposium of Biopharmaceutics and Pharmacokinetics

44E. Effect of moisture on the crystalline structure of pure Monoglycerides. Hannah Stonewall, Pharm.D. Candidate 2016[1,*], Haley Kessinger, Pharm.D. Candidate 2016[2], Abebe Mengesha, Ph.D.[1]; (1) College of Pharmacy and Health Sciences, Drake University, Des Moines, IA; (2) College of Pharmacy and Health Sciences, Drake University College of Pharmacy and Health Sciences, Des Moines, IA
Presented at the American Association of Pharmaceutical Scientists Annual Meeting; San Diego, CA in November 2014.

45. Lidocaine and bupivacaine syringe stability study. Anastasiya Shor, Pharm.D. Candidate[1,*], Mark Klang, BS, MS, Ph.D., Pharm.D.[2], Inna Abramova, Pharm.D. Candidate[1]; (1) Long Island University, Brooklyn, NY; (2) Research Pharmacy, Memorial Sloan Kettering Cancer Center, Rockefeller Research Laboratories, New York, NY

INTRODUCTION: Mixtures of lidocaine with bupivacaine are used for sensory blockade to control pain at the time of a procedure and to decrease discomfort. Combining the two anesthetic agents in one syringe offers an advantage of the rapid onset of lidocaine and the prolonged duration of bupivacaine.

OBJECTIVES: The purpose of this study was to test the stability of a mixture yielding 1% lidocaine and 0.25% bupivacaine in a 5 mL BD syringe at room temperature without protection from light over the course of nine days.

STUDY DESIGN: This was a compatibility and stability study of lidocaine and bupivacaine mixture.

METHODS: We used the previously established HPLC method using an Agilent SB-C18 3.5 μm 4.6 × 250 mm column with a mobile phase of 30 mM potassium dihydrogen phosphate buffer (0.16% triethylamine, pH adjusted to 4.85) and acetonitrile in a ratio of 63:37 (v/v) with UV detection at 220 nm. Peak areas were used to determine the concentration of a compound in the sample. A mixture of 1% lidocaine and 0.25% preservative-free bupivacaine was prepared and used to fill three 5 mL BD syringes. The samples were kept at room temperature and were not protected from light. The treatment with acid, base, oxidation, and heat provided insight into degradation pathways and products.

RESULTS: Calibration curves were constructed for each analyte over the concentration range of 5–15 mg/mL of lidocaine and 1.5–3.5 mg/mL of bupivacaine. A regression analysis for each standard yielded an $R^2 \geq 0.995$. The retention times for lidocaine and bupivacaine were 4.6 and 7.2 minutes, respectively. The graph of concentration of each analyte as a function of time showed no degradation over the period of nine days.

CONCLUSIONS: This study showed that solution of lidocaine 2% and bupivacaine 0.5% will be stable when stored in a BD syringe at room temperature without protection from light for nine days.

46. Association between trough Mycophenolic acid concentration and clinical events in live donor kidney transplant recipients. Sanket Patel, M.Pharm[1,*], Kalpesh Gohel, MD, DNB[2], Bharat Patel, M.Sc, Ph.D.[3]; (1) Department of Clinical Pharmacy and Pharmacology, Ramanbhai Patel College of Pharmacy, Changa, GA, India; (2) Department of Nephrology, Muljibhai Patel Urological Hospital; (3) Provost, CHARUSAT University Changa, India, Vallabh Vidyanagar, India

INTRODUCTION: Mycophenolic acid (MPA), an active metabolite of mycophenolate mofetil (MMF), is used as maintenance immunosuppressant in solid organ transplantation. Therapeutic drug monitoring of MPA is recommended due to large inter-patient variabilities and strong association between MPA exposure and clinical events.

OBJECTIVES: The present study was conducted to assess the correlation between trough MPA level and clinical outcomes in live donor kidney transplant recipients.

STUDY DESIGN: This was single centre non-randomized longitudinal prospective open-label study.

METHODS: A total of 104 live donor allograft recipients were enrolled from Muljibhai Patel Urological Hospital, Nadiad, Gujarat, India. MPA levels were measured on post transplant day 0 and 7 and months 1,3,6,9 and 12. Altogether, 582 samples were analyzed for trough MPA level by HPLC.

RESULTS: Twenty (19.2%) episodes of acute rejection (AR) were reported in study cohort. Mean trough MPA levels were significantly lower in patients with acute rejection (AR) compared with rejection free patients (1.61 mg/L vs. 2.15 mg/L; $p<0.05$). Likewise, Trough MPA levels were also significantly higher in patients with MPA related adverse events such as leucopenia (3.28 mg/L vs. 1.89 mg/L; $p<0.001$), GI adverse events (3.15 mg/L vs. 2 mg/L; $p<0.05$; GI AEs) and infections (2.25 mg/L vs. 1.88 mg/L; $p<0.05$) compared to patients without leucopenia, GI AEs and infection, respectively. Receiver operating curve analysis revealed trough MPA levels 1.60 mg/L best discriminate patients with and without AR, and MPA level 3 mg/L best differentiate patients with and without adverse events.

CONCLUSIONS: The present study demonstrates significant relationship between trough MPA levels and clinical events. Fixed dose regimen was associated with low trough MPA levels during initial period of transplantation and hence additional risk of AR due to under exposure of MPA. This study recommended patients with MPA related AEs such as leucopenia or GI AEs could be benefited, from concentration controlled MMF dose regimen.

47. Potential drug-drug interactions in kidney transplant patients. Bojana Golubovic, MPharm[1,*], Aneta Drndarevic, MPharm[1], Ivana Draganov, MPharm[1], Dragana Radivojevic, M.D.[2], Sandra Vezmar Kovacevic, Ph.D.[3], Katarina Vucicevic, PhD[3], Milica Prostran, PhD[4], Branislava Miljkovic, Ph.D.[3]; (1) Department of Pharmacokinetics and Clinical Pharmacy, University of Belgrade, Faculty of Pharmacy, Belgrade, Serbia; (2) Nephrology Clinic, Clinical Centre of Serbia, University of Belgrade, Belgrade, Serbia; (3) Department of Pharmacokinetics and Clinical Pharmacy, Faculty of Pharmacy, University of Belgrade, Serbia; (4) Departmant of Pharmacology, Clinical Pharmacology and Toxicology, School of Medicine, University of Belgrade, Belgrade, Serbia

INTRODUCTION: Beside immunosuppressive therapy, transplant patients frequently require a complex drug regimen that may consist of many drugs. Maintenance immunosuppression usually involves a combination of 2 or 3 agents.

OBJECTIVES: The objectives were to identify potential drug-drug interactions (pDDI) and evaluate their prevalence in kidney transplant patients.

STUDY DESIGN: The data for 105 adult patients over the period of maximum 5 years after transplantation, were collected from medical charts in the Nephrology Clinic, Clinical Centre of Serbia, University of Belgrade. All patients were informed and allowed the using of their charts.

METHODS: pDDIs were evaluated using *Lexicomp®* data base and data were analyzed using *IBM SPSS Statistics 22®*.

RESULTS: A total of 5788 prescriptions were evaluated. The median number of drugs per patients was 6, with minimum of 3 and maximum of 11 drugs per patients. The number of therapy regimens without identified interactions were 83. Total number of detected pDDIs was 2887. The pDDIs were classified according the *Lexicomp®* risk rating. The number of pDDIs in every category was: 215 in B (no action needed), 2420 in C (monitor therapy), 237 in D (modify regimen) and 15 in X (avoid combination). The drug included in the most of pDDIs classified as X (86.67%) was tacrolimus (TAC). The most frequent interactions in D category were TAC and omeprazole, TAC and esomeprazole and amlodipine and simvastatin.

CONCLUSIONS: The number of pDDIs in kidney transplanted patients is significant. More attention for clinically significant interactions is warranted in this population in order to provide safer and more effective therapy.

48. Evaluation of rasburicase use following the implementation of a standardized dosing protocol. Paige Watkins, Pharm.D. Candidate[1,*], Sara Krusenoski, Pharm.D. Candidate[1], Maria Whitmore, Pharm.D., BCPPS[2], David Reeves, Pharm.D., BCOP[3]; (1) St. Vincent Indianapolis Hospital, Indianapolis, IN; (2) Peyton Manning Children's Hospital at St. Vincent, Indianapolis, IN; (3) St.Vincent Indianapolis Hospital and College of Pharmacy and Health Sciences, Butler University

INTRODUCTION: Rasburicase is a recombinant urate oxidase that is indicated for the treatment of hyperuricemia secondary to tumor lysis syndrome. Due to the high cost of this medication, institutional guidelines have been implemented to help guide appropriate usage and dosage.
OBJECTIVES: This evaluation assessed the compliance to Ascension Health's new guideline for prescribing rasburicase and the appropriateness of a single dose.
STUDY DESIGN: The study was a retrospective chart review.
METHODS: Electronic health records were examined to identify all patients between June 2014 and May 2015 who received at least one dose of rasburicase during their admission. Based on institutional guidelines, rasburicase should be prescribed only by a hematology/oncology clinician for a patient with current hyperuricemia (uric acid >8 mg/dL) or who is classified as a high risk patient at a dose of 0.2 mg/kg with a maximum dose of 6 mg. Charts were reviewed to determine indication for usage, administered dose, and the area of practice of the prescribing clinician. Data collected included the uric acid level, weight based dose, the number of doses administered, and rational for any repeat doses. Descriptive statistics were used to assess compliance.
RESULTS: A total of 41 adult and 10 pediatric patients received rasburicase. Overall, there was a compliance rate to the guidelines of 85.4% in the adult and 40% in the pediatric populations. In adults, 100% of patients met the prescriber restrictions while 85.4% of patients met the patient criteria for receiving a dose of rasburicase. In pediatrics, 40% of patients met the prescriber restrictions while 100% of patients met the patient criteria.
CONCLUSIONS: Guidelines were generally utilized by providers for adult patients. Less compliance was seen in pediatrics, with renal and cardiac patients making up a large percentage of rasburicase doses. Further review of rasburicase literature in pediatrics is warranted to determine expansion of guidelines.

49. BACTERIAL infections in acute myeloid leukemia pediatric patients receiving ciprofloxacin prophylaxis. Suha Al Omar, Pharm.D.[1,*], Nadine Anabtawi, Pharm.D.[2], Wiam Al Qasem, MS, Rawad Rihani, MD; (1) King Hussein Cancer Center, Jordan; (2) King Hussein Cancer Center
INTRODUCTION: In our institution, pediatric patients with acute myeloid leukemia (AML) are treated per St. Jude AML-02 protocol. According to this protocol, ciprofloxacin and vancomycin are administered as prophylaxis during neutropenia. However, due to the low incidence of Gram-positive bacterial infections at our institution, we modified the protocol by removing vancomycin and giving only ciprofloxacin for prophylaxis.
OBJECTIVES: To describe the incidence and type of bacterial infections associated with ciprofloxacin prophylaxis.
STUDY DESIGN: A retrospective descriptive study of pediatric patients with AML who were treated according to St. Jude AML-02 protocol.
METHODS: The leukemia database was utilized to identify all AML pediatric patients who received AML-02 protocol between 2011 and 2015. The medical records were reviewed for any positive cultures from the initiation of the protocol until death or protocol discontinuation.Patient demographics, type of infections, type of isolated bacteria, and intensive care unit(ICU) admissions were recorded.
RESULTS: Fifty patients were evaluated, with median age of 8 years (range, 1–21 years). We identified 77 episodes of bacterial infections in 42(84%) patients. Among those bacterial infections, 73 episodes were with bacteremia and included 45(62%) Gram-positive bacterial infections, 24(33%) Gram-negative bacterial infections and 4(6%) mixed Gram-negative and positive bacterial infections. Coagulase-negative staphylococcus and Viridans streptococci were the most commonly isolated bacteria in 36% and 30% of the episodes, respectively. ICU admission was required for 31 patients, 21(68%) of whom had bacteremia.
CONCLUSIONS: A high rate of gram-positive bacterial infections was detected in our patients and a significant number of ICU admissions were required with the ciprofloxacin prophylaxis. Vancomycin prophylaxis may be necessary to decrease the incidence of Gram- positive bacterial infections and its associated complications.

50. Retrospective analysis of probiotic effectiveness in acute myeloid leukemia and transplant patients receiving chemotherapy. Daniel Przybylski, Pharm.D. Student*, David Reeves, Pharm.D.; College of Pharmacy and Health Sciences, Butler University, Indianapolis, IN
INTRODUCTION: Patients receiving intensive chemotherapy regimens are at high risk for infectious complications due to prolonged neutropenia and hospital stay. Currently, some attempt to prevent infection by utilizing probiotics in addition to prophylactic antibiotics despite a lack of data supporting this practice.
OBJECTIVES: The primary objective of the study is to compare the incidence of febrile neutropenia in those receiving and those not receiving probiotics. Secondary objectives include a comparison of the incidence of *Clostridium difficile* infection, time to first fever, time to *Clostridium difficile* infection, incidence of documented infection, and 30 day readmission for and infectious issue.
STUDY DESIGN: Retrospective chart review.
METHODS: Patients receiving induction or re-induction chemotherapy for acute myeloid leukemia and those undergoing hematopoietic stem cell transplants were included. Patients were split into two groups based on receipt of probiotics.
RESULTS: A total of 175 patients were included in the study. There were no statistically significant differences between patients taking probiotics (n=29) and patients not taking probiotics (n=146) in regards to incidence of febrile neutropenia (79% vs. 71%, respectively, p=0.337), incidence of *Clostridium difficile* infection (10% vs. 6%, respectively, p=0.422), time to first fever (10 days vs. 9 days, respectively p=0.606), or 30 day readmission (28% vs. 44% respectively p=0.104). However, there was an association between probiotic use and documented infection (48% vs. 29%, respectively, p=0.04). Bacteremia (45% vs. 21%, respectively, p=0.006) was most notably increased in patients taking probiotics.
CONCLUSIONS: Our results suggest that probiotics lack benefit in preventing infections in those at risk for prolonged neutropenia and should not be recommended for use in patients without other indications for probiotic use.

51. Comparing the incidence of febrile neutropenia resulting in hospital admission between the branded docetaxel and the generic formulations. Nour Alfaqeer, Pharm.D[1,*], Lama H. Nazer, Pharm.D, BCPS[2], Ola Mashni, Pharm.D[3], Rawan Dawoud, Pharm.D[4], Asma Rumman, Pharm.D[3], Esraa Hanoun, Pharm.D[5]; (1) Department of Pharmacy, King Hussein Cancer Center, Amman, Jordan; (2) Pharmacy Department, King Hussien Cancer Center, Amman, Jordan; (3) Department of Pharmacy, King Hussein Cancer Center, Jordan; (4) King Hussein Cancer Center, Jordan; (5) Department of Pharmacy, King Hussein Cancer Center
INTRODUCTION: Though generic medications are commonly used, studies have raised the concern about their safety, compared to the branded drugs.
OBJECTIVES: To compare febrile neutropenia (FN) resulting in hospital admission between the branded docetaxel (Taxotere®, Sanofi) and two generic formulations (docetaxel Ebewe and docetaxel Hospira) in breast cancer patients.
STUDY DESIGN: A retrospective study conducted at a 170-bed comprehensive cancer center.
METHODS: We utilized the pharmacy database and medical records to identify patients with breast cancer who had received docetaxel. Among those patients, we identified patients who had an admission diagnosis of FN and had received docetaxel within 14 days prior to their admission. We recorded the patients' characteristics and outcomes, as well as the docetaxel brand, dose and

cycle number. The incidence of FN was compared between the branded and the generic formulations using Chi-square tests.
RESULTS: During the study period, 2904 cycles of docetaxel were given for 814 patients (1519 cycles of Taxotere®, 811 cycles of docetaxel Hospira, and 574 cycles of docetaxel Ebewe). Among the cycles given, 130 cycles were associated with FN. The incidence of FN was significantly higher in the 100 mg/m^2 docetaxel Hospira group, compared to Taxotere® [35(8.3%) cycles vs. 36 (4.5%) cycles, p=0.006], but there was no significant difference between docetaxel Ebewe and Taxotere® [22 (6.6%) cycles vs. 36 (4.5%) cycles, p=0.136]. No significant difference was seen between the groups in the incidence of FN at the 75 mg/m^2 dose regimen. FN resolved in all except for two patients who died in the ICU. The mean hospital LOS for all cases of FN was 4.18 days ± 2.14 (SD).
CONCLUSIONS: There was a significant difference in the incidence of FN between Taxotere® and docetaxel Hospira in the 100 mg/m^2 dose regimen, but all cases in both groups resolved completely.

52. Effect of intravenous acetaminophen on post-anesthesia care unit length of stay, opioid consumption, pain, and analgesics drug costs after ambulatory surgery. Moteb Khobrani, Pharm.D.[1,*], James Camamo, Pharm.D.[2], Asad E. Patanwala, Pharm.D., BCPS[3]; (1) Department of Pharmacy Practice & Science, College of Pharmacy, University of Arizona, Tucson, AZ; (2) Department of Pharmacy Services, Banner University Medical Center Tucson, AZ; (3) Pharmacy Practice and Science, The University of Arizona College of Pharmacy, Tucson, AZ
INTRODUCTION: In the ambulatory surgery setting intravenous APAP has some unique properties that make it an appealing adjunctive agent. It has been theorized that the use of a single post-operative dose of intravenous APAP would enable earlier recovery, which would facilitate an earlier discharge home after ambulatory surgery.
OBJECTIVES: The primary objective was to assess if intravenous acetaminophen (APAP) use in the ambulatory surgery setting is associated with a decreased length of stay in the post-anesthesia care unit (PACU). The secondary outcomes evaluated were pain scores and opioid consumption.
STUDY DESIGN: This was a retrospective cohort study conducted in adult patients (age ≥18) who received an eye, ear, nose, or throat (EENT) procedure at an outpatient surgery center between January 2014 and January 2015.
METHODS: Patients were consecutively included until the desired sample was reached during two 6-month time periods: (1) intravenous APAP available on the formulary (APAP group), and (2) intravenous APAP not available on the formulary (non-APAP group).
RESULTS: The cohort included 174 patients who received an EENT procedure (87 patients in APAP group and 87 patients in the non-APAP group). The median PACU length of stay was 66 minutes (IQR 48–92 min) in the APAP group and 71 minutes (IQR 52–89 min) in the non-APAP group (p=0.269). Mean pain score categories in the APAP versus non-APAP group were mild (85% vs. 53%, respectively, p<0.001), moderate (13% vs. 33%, respectively, p=0.002), and severe (2% vs. 14%, respectively, p=0.005). The median opioid consumption in morphine equivalents was 9 mg (IQR 5–13 mg) in the APAP group and 8 mg (IQR 5–12 mg) in the non-APAP group (p=0.081).
CONCLUSIONS: Intravenous APAP use in ambulatory surgery is not associated with decreased PACU length of stay. However, it may decrease post-operative pain.

53. Safety of >3 days of therapy with parecoxib injection in the management of postoperative pain. Margaret Noyes Essex, Pharm.D.[1,*], Raymond Cheung, Ph.D.[2], Chunming Li, Ph.D.[3], Li Xie, MD[4]; (1) Global Medical Affairs, Pfizer Inc, New York, NY; (2) Medical Affairs, Pfizer Inc, New York, NY; (3) Department of Statistics, Pfizer Inc, New York, NY; (4) Medical Affairs, Pfizer Investment Company, Ltd, Beijing, China
INTRODUCTION: Multi-modal pain management that includes parenteral non-opioid analgesics is strongly recommended in fast-track surgery.[1,2] Guidelines recommend NSAIDs and coxibs to improve postoperative analgesia, decrease opioid consumption and side effects.[3] Parecoxib is an injectible coxib used to treat postoperative pain.
Most patients tolerate oral administration within 2–3 days following surgery. However, in certain surgeries (i.e. gastrointestinal) or when patients are debilitated, parenteral administration of analgesics may be needed beyond 3 days post-surgery.
OBJECTIVES: To assess the clinical safety data of >3 days therapy with parecoxib in the management of postoperative pain.
STUDY DESIGN: A retrospective review of the parecoxib clinical trial database.
METHODS: Duration of therapy was assessed in the 28 trials. In 3 trials patients received treatment for postoperative pain for >3 days. Adverse events (AE) were pooled for those receiving parecoxib >3 days and compared to the placebo group. Specific analyses were performed for cardiovascular (CV) thrombotic/embolic, serious gastrointestinal (GI) and renal events.
RESULTS: A total of 358 patients received parecoxib for >3 days: 63/320 (19.7%) in a hip arthoplasty study, 92/211 (43.6%) in a gynecological surgery/hysterectomy study, and 203/525 (38.7%) in a general surgery trial. Any AE was reported for 10.3% (37/358) and 9.7% (31/318) of parecoxib and placebo treated patients, respectively. AE were similar between groups: CV disorders (0.6% parecoxib, 0.6% placebo), nervous system (0.8%, 0.6%), dizziness (0.6%, 0%), headache (0.3%, 0.6%), insomnia (0.6%, 0.6%), and skin disorders (0.8%, 0.9%). In the Specific AE Analyses, there were no CV thrombotic/embolic events or GI perforations/ulcerations/hemorrhage/obstructions in either group. There was 1 report of oliguria in the parecoxib group.
CONCLUSIONS: Surgical patients who received parecoxib for >3 days postoperatively reported similar AE to those receiving placebo in three clinical trials.
1. Scott MJ et al. *Acta Anaes Scand* 2015.
2. Nanavati AJ, Prabhakar S. *Anesth Essays Res*. 2014;8(2):127–33.
3. Feldheiser A et al. *Acta Anaes Scand* 2015.

54E. Evaluation of dexmedetomidine safety and dosing for outpatient pediatric electroencephalogram. Letha Huang, Pharm.D.[1,*], Maria Whitmore, Pharm.D., BCPPS[2], Mitchell Goldman, DO[3], Nicole Mohr-Eslinger, CPNP[4], Davaina Schounce, RN, CPEN[4]; (1) St. Vincent Hospital- Indianapolis, Indianapolis, IN; (2) Peyton Manning Children's Hospital at St. Vincent, Indianapolis, IN; (3) St. Vincent- Indianapolis, IN; (4) St. Vincent-Indianapolis, Indianapolis, IN
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55. Use of palivizumab for prevention of respiratory syncytial virus (RSV) in the New York State (NYS) Medicaid population. Irene Reilly, Pharm.D.*, Barbara Rogler, Pharm.D., MS, Terry Dunn, Pharm.D., Holly Coe, Pharm.D., Walter Gibson, MS, Steve Feuerstein, MS; Department of Pharmacy Practice, State University of New York at Buffalo, Buffalo, NY
INTRODUCTION: RSV is the most common cause of bronchiolitis in infants and infects most children by age 2 years. Occurrence is seasonal, varying by geography and climate. Palivizumab is the only pharmacologic option for prevention of serious RSV infection. The American Academy of Pediatrics (AAP) has recommendations on RSV prophylaxis, updated in July 2014 with regard to eligible risk groups. In the NYS Medicaid Program, palivizumab use is subject to criteria which historically were influenced by AAP recommendations.

OBJECTIVES: We sought to determine changes in palivizumab utilization and RSV-related outcomes in the NYS Medicaid population, comparing RSV seasons prior to and after publication of the 2014 AAP guidance.
STUDY DESIGN: Retrospective analysis of NYS Medicaid claims data.
METHODS: NYS Medicaid enrollees with a paid prescription claim for palivizumab between October 16, 2012 and October 15, 2015 were identified from the Medicaid Data Warehouse. The RSV season was defined as October 16 to March 31, according to CDC surveillance data. Overall utilization was assessed for the 2012, 2013, and 2014 RSV seasons. The number of beneficiaries with hospitalizations attributed to RSV or respiratory illness during these periods was determined using inpatient claims data and ICD-9 codes.
RESULTS: In 2012, there were 2,613 beneficiaries with 8,023 claims for palivizumab; in 2013, there were 2,498 beneficiaries with 8,129 claims and in 2014, 1,333 beneficiaries with 4,551 claims. In all periods, >97% of palivizumab users were aged 0–12 months at the start of the season. There was a decrease in beneficiaries with hospitalization from 267 in 2012 to 266 in 2013 and 166 in 2014.
CONCLUSIONS: Observed trends in palivizumab utilization and RSV-related outcomes among NYS Medicaid members appeared to be in-line with the 2014 AAP recommendations. NYS Medicaid clinical criteria for palivizumab were later revised to be more consistent with these recommendations.

56. Review of palivizumab prescribing in neonates during two consecutive respiratory syncytial virus seasons. Heather Carico, Pharm.D. Candidate[1,*], Leesa Prunty, Pharm.D., BCPS[2], Derek Grimm, Pharm.D., BCPS[3]; (1) School of Pharmacy, Marshall University, Huntington, WV; (2) Department of Pharmacy Practice, Administration, and Research, Marshall University School of Pharmacy, Huntington, WV; (3) Cabell Huntington Hospital, Huntington, WV
INTRODUCTION: Palivizumab is used to prevent high risk neonatal patients from contracting respiratory syncytial virus (RSV). The American Academy of Pediatrics (AAP) updated the palivizumab prophylaxis prescribing guidelines between the 2013–2014 and 2014–2015 RSV seasons.
OBJECTIVES: The primary objective of this study is to determine if providers followed current guidelines for prescribing palivizumab administered during 2 subsequent RSV seasons.
STUDY DESIGN: This study is a retrospective cohort comparing the 2013–2014 and 2014–2015 RSV seasons for compliance to the guidelines, defined by AAP recommendations for prescribing palivizumab.
METHODS: Medical records of 88 neonatal patients admitted to Cabell Huntington Hospital who received a dose of palivizumab during their inpatient Neonatal Intensive Care Unit admission between 11/4/13 and 3/10/15 were reviewed. Patient's birth date, date and dose of palivizumab, gestational age at birth, sibling status, oxygen requirements, vasopressor therapy, and the medical conditions bronchopulmonary dysplasia and respiratory distress syndrome were documented.
RESULTS: There were a greater number of total doses of palivizumab given in the 2013–2014 RSV season than the 2014–2015 RSV season (63 doses vs. 25 doses) suggesting that overall prescribing for palivizumab decreased after implementation of the 2014 AAP guidelines. The percentage of doses given per AAP guidelines decreased from the 2013–2014 RSV season to the 2014–2015 RSV season (86% vs. 60%). Two out of ten palivizumab doses given in the 2014–2015 RSV season did not meet either the 2010 or the 2014 AAP guidelines.
CONCLUSIONS: Prescribers followed the previous 2010 AAP guidelines more often than the updated 2014 AAP guidelines when utilizing palivizumab in neonates. This may be due to lack of familiarity with the new AAP guidelines or concern that the updated AAP guidelines are too stringent. More research is needed to review patient outcomes, such as RSV diagnosis, readmissions, and administration of follow-up doses of palivizumab.

57. Long term stability of polyethylene glycol 3350 and lactulose in common liquids. Allison Lardieri, PharmD[1,*], Jill Morgan, PharmD[2], Soundarya Vaithianathan, MS[3], Claire Carter, PhD[3], Maureen Kane, PhD[3], James Polli, PhD[3]; (1) Department of Pharmacy Practice and Science, University of Maryland School of Pharmacy, Baltimore, MD; (2) University of Maryland School of Pharmacy, Baltimore, MD; (3) Department of Pharmaceutical Sciences, University of Maryland School of Pharmacy
INTRODUCTION: Constipation is a common problem in pediatric patients. Polyethylene glycol (PEG 3350) and lactulose are commonly used to treat children with constipation, but adherence rates have been reported as <40%. To increase adherence, PEG 3350 or lactulose can be mixed with liquids a child may be more likely to drink. However, there is no stability information for PEG 3350 or lactulose in liquids other than water.
OBJECTIVES: Can lactulose (Kristalose®) and PEG 3350 (Miralax®) be mixed with water, juices, soda, and milk and maintain stability for up to 72 hours?
STUDY DESIGN: In vitro stability testing.
METHODS: Commercially available lactulose and PEG 3350 were prepared with water according to their respective package insert directions, as well as prepared with 4 common liquids: soda, orange juice, apple juice, and milk. Physical characteristics of the solutions were evaluated at time of preparation (time 0) and at 24 hour intervals for 3 days. At each time point, the samples were examined for obvious changes in color and odor. Immediately after the visual/odor observations, the samples were analyzed using Matrix Assisted Laser Desorption Ionization (MALDI) mass spectrometry. Stability of PEG 3350 was assessed by monitoring for its sustained presence as well as formation of degradation products. Since there are no known degradants of lactulose, stability was assessed by monitoring only for its sustained presence.
RESULTS: There were no significant differences in the profiles for 0 and 72 hours, suggesting the stability of both PEG 3350 and lactulose.
CONCLUSIONS: Both PEG 3350 (Miralax®) and lactulose (Kristalose®) were stable for 72 hours in water, juice, soda, and milk. This stability finding has significant impact on clinical practice as these common liquids may be more preferable to children, thus potentially increasing adherence.

58. Cost reduction with inhaled corticosteroid prescribing guide in children admitted for severe acute asthma. Michi Yang, PharmD Candidate[1,*], Shreya Joshi, PharmD Candidate[2]; (1) Department of Pharmacy, Philadelphia College of Pharmacy at the University of the Sciences, Philadelphia, PA; (2) Philadelphia College of Pharmacy at the University of the Sciences, Philadelphia, PA
INTRODUCTION: Pediatric patients with severe acute asthma (SAA) were commonly prescribed home asthma controller medications at our institution upon admission to support adherence resulting in concomitant prescribing of both systemic (SCS) and inhaled corticosteroids (ICS). However, the benefit of this practice and pharmacokinetic principles do not support it. A prescribing guide was implemented to limit ICS prescribing for SAA pediatric patients receiving SCS to reduce cost.
OBJECTIVES: To compare ICS cost in the pre- to post-guide implementation cohort in pediatric patients admitted for SAA.
STUDY DESIGN: Retrospective chart review of children admitted for SAA in the month of September 2013 (pre-guide cohort A) and September 2014 (post-guide cohort B).
METHODS: Patients that received SCS during the study time period were screened for inclusion based on following criteria: age 6 months – 14 years old, home ICS use prior to admission, and SAA admission diagnosis. Primary endpoint was total cost of ICS dispensed. Secondary endpoints were ICS cost per patient

and readmission rate. Statistical analysis included Fisher exact and Mann-Whitney U.
RESULTS: Forty-one patients were included: 16 in cohort A and 25 in B. No difference in baseline demographics was detected including age, gender, and asthma classification prior to admission. High dose ICS use at home was more common in cohort B (31% vs. 4%, p=0.023). All patients in cohort A were prescribed ICS compared to 3 patients (12%) in cohort B (p<0.001). Total institutional ICS cost for cohort A and B was $3122 and $681, respectively, and mean cost per patient was $195 ± 77 compared to $27 ± 86 for cohort A and B, respectively (p<0.001). No patients were readmitted within 30 days.
CONCLUSIONS: Implementation of a prescribing guide significantly reduced the incidence of ICS prescribing and cost to the institution.

59. Harms of antimuscarinics for the treatment of overactive bladder in older adults: a systematic review and meta-analysis. Scott Vouri, Pharm.D., MSCI, BCPS, CGP, FASCP[1,*], Clark Kebodeaux, Pharm.D., BCACP[1], Paul Stranges, Pharm.D., BCPS, BCACP[2], Besu Teshome, Pharm.D., MSPS, BCPS[1]; (1) Department of Pharmacy Practice, St. Louis College of Pharmacy, St. Louis, MO; (2) University of Illinois at Chicago
INTRODUCTION: Overactive bladder (OAB) is a condition that negatively impacts 25% of the older adult population. Antimuscarinics are a treatment option for OAB and should be used with caution in older adults due to the potential for adverse drug events (ADEs). Previous systematic reviews and meta-analyses (SRMAs) for antimuscarinics did not differentiate based on age.
OBJECTIVES: To explore and evaluate harms (ADEs and treatment discontinuations) in adults 65 or older taking antimuscarinics for OAB.
STUDY DESIGN: Systematic Review and Meta-analyses.
METHODS: Searches for randomized controlled trials (RCTs) along with sub-analyses and pooled analyses that compared antimuscarinics (oxybutynin, tolterodine, trospium, solifenacin, darifenacin, fesoterodine) to placebo or another antimuscarinic were performed using MEDLINE, EMBASE, SCOPUS, and Cochrane Central Register for Controlled Trials. Studies assessing harms in a population of adults 65 or older were included.
RESULTS: A total of 16 studies met the inclusion criteria (7 RCTs, 3 sub-analyses of RCTs, and 6 pooled analyses of RCTs). Eighty adverse events and 27 reasons for treatment discontinuation were explored. Adverse events and anticholinergic ADEs were more common in antimuscarinics compared to placebo. There were significantly higher rates of dizziness, dyspepsia, and urinary retention with fesoterodine, headache with darifenacin, and urinary tract infections with solifenacin. In head-to-head trials, subjects on solifenacin had less adverse events and dry mouth compared to subjects on oxybutynin immediate-release and subjects receiving fesoterodine had more adverse events and dry mouth when compared to tolterodine extended-release (ER). Discontinuation rates due to adverse events and dry mouth were higher in the antimuscarinics and fesoterodine groups when compared to placebo. In head-to-head trials, discontinuation rates due to adverse events were higher in fesoterodine compared to tolterodine ER.
CONCLUSIONS: Treatment for overactive bladder using antimuscarinics in adults aged 65 or older resulted in significant increase risk for several adverse events compared to placebo including anticholinergic and non-anticholinergic ADEs.

60. A prospective study of prevalence of uncontrolled glycaemia in type 2 diabetes mellitus outpatients. Mohamed A. Hammad, MPharm., BCPS, Ph.D. Candidate[1,*], Dzul Azri Mohamed Noor, MPharm., Ph.D.[1], Syed Azhar Syed Sulaiman, Pharm.D.[1], Nor Azizah Aziz, MD, Dip. Int. Med, MRCP[2], Yasmin Elsobky, BCPS, MSc, PGDipBiostat Candidate[3]; (1) Clinical Pharmacy Department, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia; (2) Endocrinology Clinics, Penang General Hospital, Penang, Malaysia; (3) High Institute of Public Health, Alexandria University, Alexandria, Egypt
INTRODUCTION: Uncontrolled diabetes is a non-specific diagnosis, which reveals the patient's blood sugar level is not kept within acceptable levels by the current medications. This leads to significant morbidity and mortality that could be reduced with proper glycemic control. American Diabetes Association (ADA) recommends HbA1c test to be performed in all diabetic patients, as part of continuing care. HbA1c reducing by 1% can cut mortality risk within 5 years by 50%.
OBJECTIVES: To determine the prevalence of uncontrolled glycemia in type 2 diabetic outpatients in endocrine clinics at Penang General Hospital between June–December, 2015 in Penang, Malaysia.
STUDY DESIGN: A prospective cross-sectional study.
METHODS: Patients records of 1400 cases were reviewed to identify demographic criteria and lab tests. The prevalence of glycemic control (Glycated haemoglobin, HbA1C<7% for patients <65 years, and <8% for patients >65 years) was estimated, according to ADA guidelines. The results were presented as descriptive statistics.
RESULTS: From 1400 diabetic cases were scanned with mean age of 64.1±8.9 years, only 757 (54.1%) cases had HbA1c test and 643 (45.9%) did not have HbA1c test. Only 385 (50.9%) patients from this 757 cases, had controlled glycemia, while 372 (49.1%) cases had uncontrolled glycemia. Patients with (HbA1c 7–7.9%) were 114 (30.6%), patients with (HbA1c 8–8.9%) were 98 (26.3%), patients with (HbA1c 9–9.9%) were 58 (15.6%) and patients with (HbA1c>10%) were 102 (27.4%).
CONCLUSIONS: About half of the patients did not have HbA1c test, which important for glycemic monitoring. Also, nearby half of the patients had uncontrolled glycemia which need more efforts to control their blood glucose level. More than quarter of patients with uncontrolled glycemia had HbA1c>10%, which increase the risk of diabetic complications incidence. Controlling of blood glucose level will improve patients' outcome, quality of life and decrease the total cost of illness.

61. Therapeutic drug monitoring of infliximab in patients with rheumatic diseases versus optimization of treatments based on clinical response. JosÃ© GermÃ¡n SÃ¡nchez, Pharmacy[1,*], Maria del Pilar GarcÃa, Pharmacy[1], Esther Laso, Pharmacy[1], Alba Quesada, Medicine[2], MarÃa AnunciaciÃn FernÃ¡ndez, Pharmacy[1], NoemÃ Rebollo, Pharmacy[1], M. V. Calvo, Pharmacy[1]; (1) Pharmacy Service, University Hospital of Salamanca, Salamanca, Spain; (2) Rheumatology Service, University Hospital of Salamanca, Salamanca, Spain
INTRODUCTION: Individual clinical response to biologic therapy, particularly antiTNF, can be influenced by their pharmacokinetics and immunogenicity, so therapeutic monitoring of drug levels (TDM) can guide the biologic treatments.
OBJECTIVES: Evaluation of the concordance of dose setting based on clinical response and serum infliximab trough levels (SITLs), as well as, anti-drug antibodies (ADA). Analysis of the utility of TDM to guide dose setting.
STUDY DESIGN: Prospective and descriptive study of patients with rheumatic diseases treated with infliximab and under TDM. Informed voluntary consent was obtained from all patients.
METHODS: Medical records were reviewed and dosage regimens were recorded. Dose schemes were established according to an index of clinical response (DAS28, BASDAI…). SITLs (Therapeutic range: 2.5–9 μg/mL) and ADA were measured by Elisa (Promonitor®). ADA presence was considered as a therapeutic failure indicator.
RESULTS: 34 patients were included with median age of 57 years (range [30-83]). Infliximab standard dose according to clinical guidelines (3 mg/kg or 5 mg/Kg every 8 weeks for rheumatoid arthritis or other diseases, respectively) were administered to 13 patients [69.2% showed SITLs under the therapeutic

range, 61.5% with ADA]. In 19 patients with maintained good clinical response, dose decrease or interval elongation had been implemented [63.2% showed SITLs under the therapeutic range, 26.3% with ADA]. It had been necessary to increase the dose or shorten the interval in 2 patients due to inadequate clinical response [100% under the therapeutic range with ADA].
CONCLUSIONS: Although optimization based on clinical response of biologic treatments in patients with rheumatic diseases can reduce the therapy costs is not always an effective strategy,since a high percentage of patients with SITLs under the therapeutic range and ADAs was found. TDM of infliximab and ADA is a tool to individualize infliximab treatments.

62. Simulation analysis of different creatinine clearance estimation methods for dosing target-specific oral anticoagulants in overweight and obese patients: when does the method matter?. Duyen-Anh Pham, Pharm.D.[1,*], Yuliya Byakina, Pharm.D. Candidate[1], Xiao (Tom) Zhao, Pharm.D. Candidate[1], Michael Kruse, Pharm.D., MBA, BCPS[2], Manny Saltiel, Pharm.D. FCCP[3], Douglas Steinke, Ph.D.[4], Tina Denetclaw, Pharm.D., BCPS[5]; (1) School of Pharmacy, University of California, San Francisco, San Francisco, CA; (2) Palomar Health; (3) Comprehensive Pharmacy Services; (4) Manchester Pharmacy School, University of Manchester, Manchester, United Kingdom; (5) Department of Clinical Pharmacy, School of Pharmacy, University of California, San Francisco, San Francisco, CA
INTRODUCTION: Characteristics and bleeding risk are not described well for obese patients in TSOAC literature.
OBJECTIVES: To evaluate the effect of using total body weight (TBW) compared to ideal body weight (IBW) for estimating creatinine clearance (CrCl) on dosing magnitude in overweight and obese patients for four target-specific oral anticoagulants.
STUDY DESIGN: Simulation analysis.
METHODS: Estimated CrCl (eCrCl) was determined for 237 simulation patients using TBW and IBW in the Cockcroft and Gault equation. Characteristics for patients with BMI >25 kg/m^2 who had different doses for dabigatran, rivaroxaban, edoxaban and apixaban depending on the CrCl estimation method were compared to characteristics for patients with BMI >25 kg/m^2 who had the same dose regardless of CrCl estimation method.
RESULTS: For dabigatran, 104 patients (85%) with BMI > 25 kg/m^2 had the same dose and 18 patients (15%) had different doses depending on the eCrCl method; the two groups had different mean $eCrCl_{TBW}$, age, SCr, and IBW. For rivaroxaban, 91 patients (75%) with BMI >25 kg/m^2 had the same dose and 31 patients (25%) had different doses; the two groups had different mean $eCrCl_{TBW}$, age, IBW, %IBW, and BMI. For edoxaban, 72 patients (59%) with BMI > 25 kg/m^2 had the same dose and 50 patients (41%) had different doses; the two groups had similar mean $eCrCl_{TBW}$, age, and SCr, but different mean IBW, %IBW, and BMI. For apixaban, all patients had the same dose for both eCrCl methods.
CONCLUSIONS: Using TBW to calculate eCrCl may overestimate the dosing needs for older patients with worse renal function receiving dabigatran, and for older patients with modestly increased SCr and higher degrees of excess weight receiving rivaroxaban. Patients with higher degrees of obesity had different dose determinations for edoxaban depending on the eCrCl method. Dose determination for apixaban was not affected by the eCrCl method.

63. Neonatal gentamicin population pharmacokinetics. Ronald Floyd, Pharm.D., M.S.[1,*], Michael Neely, M.D.[2], Adrian Allen, Pharm.D.[3], Roger Jelliffe, M.D.[4]; (1) Department of Pharmacy, Sharp Mary Birch Hospital for Women and Newborns, San Diego, CA; (2) Saban Research Institute, Children's Hospital Los Angeles, Los Angeles, CA; (3) Sharp Mary Birch Hospital for Women and Newborns, San Diego, CA; (4) Laboratory of Applied Pharmacokinetics and Bioinformatics, Los Angeles, CA
INTRODUCTION: Individualized, predictive dosing of gentamicin for neonates has been an important goal for many years. Previous approaches have been limited by populations that had limited ranges of gestational and post natal ages.
OBJECTIVES: To develop a predictive pharmacokinetic model for accurately dosing gentamicin in newborns across broad ranges of gestational and post natal ages.
STUDY DESIGN: Population pharmacokinetic analysis.
METHODS: Study approval was obtained from our institution's IRB. Demographic, clinical and gentamicin dosage regimen and serum concentration information was gathered on all NICU patients known to have received gentamicin from September 2009, through July 2014. Data were subjected to cross-checking, error correction, and validation. After validation in Excel, gentamicin dosage regimen information and clinical covariates were placed in Pmetrics format. We used the Pmetrics iterative 2-stage Bayesian population pharmacokinetic modeling program to estimate population parameter values for the one compartment model with multiple infusion inputs.
RESULTS: We collected and analyzed data for 163 neonates (105 males). Their gestational ages ranged from 22 to 42 weeks (73 of 163 were <27 weeks). At the time of gentamicin administration ages ranged from day of life (DOL) 2 through DOL 125 (76 of 163 were <29 days) while weights were between 395 and 4930 g. Only 9 had serum creatinines exceeding 0.8 mg/dL. Good estimates of each patient's individual parameters were obtained; regression of observed gentamicin serum concentrations on those predicted from the individual's estimated distribution volume and elimination rate constant yielded an r^2 of 0.998. Our predictive model, based on dosing weight, DOL, and serum creatinine yielded an $r^2$of 0.885.
CONCLUSIONS: Our predictive model for serum gentamicin levels in neonates appears useful in neonates of GA greater than 23 weeks who have serum creatinines that are age appropriate and who are DOL up to 70 days.

64. Rapid attainment of pharmacodynamic parameter goals in patients receiving vancomycin or aminoglycosides for serious infections. Larry Bauer, PharmD*; UW Department of Pharmacy, Box 357630, University of Washington, Seattle, WA
INTRODUCTION: Pharmacodynamic targets for antibiotic treatment are available. However, there is considerable variation in how clinicians attempt to achieve them when prescribing doses.
OBJECTIVES: Compare AUC_{24}/MIC for initial vancomycin doses or Cmax/MIC for initial gentamicin/tobramycin doses selected by clinicians using estimated population versus actual parameters to those attained after individualization.
STUDY DESIGN: Observational design, 152 vancomycin/146 aminoglycoside patients, criterion: clinicians' self-identified treatment goals: vancomycin AUC_{24}/MIC>400, aminoglycoside Cmax/MIC≥10, culture-documented MRSA or gram-negative infection, MIC, antibiotic plus serum creatinine concentrations.
METHODS: Estimated population AUC_{24} for vancomycin: $AUC_{24} = D/\{[(CrCl_{est} \cdot 0.79) + 15.4] \cdot 0.06\}$, where D = dose, $CrCl_{est}$ = estimated creatinine clearance. Estimated population C_{max} for gentamicin/tobramycin: $C_{max} = [(D/t')(1-e^{-kt'})]/[kV(1-e^{-kt})]$, where D = dose, t'=infusion time, t = dosage interval, k = elimination rate constant ($k = 0.00293(CrCl_{est})+0.014$), V=volume of distribution (0.26 L/kg for nonobese, or ABW for obese [ABW = IBW+[0.4(TBW-IBW)], TBW = total body weight). Estimated population MIC was the institutional average during the previous 6 months. Actual and adjusted AUC_{24}or C_{max} were computed using a Bayesian computer program. Initial doses were determined by clinicians, and adjusted doses were prescribed to attain treatment goals.
RESULTS: While clinicians anticipated all doses initially prescribed would attain the treatment goals, only 51% of the vancomycin regimens and only 76% of the aminoglycoside regimens were expected to achieve goals using population estimates. For initial dosing of vancomycin, only 35% of patients actually achieved an AUC_{24}/MIC>400. For initial dosing of

aminoglycosides, only 64% of patients actually achieved a Cmax/MIC≥10. Adjusted dosages achieved the treatment goal in all cases ($p<0.01$).
CONCLUSIONS: Antibiotic doses can be rapidly individualized using Bayesian techniques to attain pharmacokinetic/pharmacodynamic goals. Clinician-prescribed initial doses or doses computed using population estimates will not achieve this goal for all patients, but at the outset a higher percentage of aminoglycoside patients with reach goal pharmacodynamic values compared to vancomycin patients.

65. Impact of asthma severity on self-stigma in adult asthma patients. Sohail Ahmad, Pharm D, MSc (Clinical Pharmacy)[1,*], Ahmad Izuanuddin Ismail, MBBChBAO, MRCP, AM, FCCP[2], Mohd Arif Mohd Zim, MBBS, Bch, BAO, MMed[2], Muhammad Qamar, Pharm D, MPharm (Clinical Pharmacy)[3], Waqas Akram, Pharm D, MSc (Clinical Pharmacy)[1], Nahlah Elkudssiah Ismail, BPharm (Hons), PhD (Clinical Pharmaceutics)[1]; (1) Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia; (2) Faculty of Medicine, Universiti Teknologi MARA, Batu Caves, Malaysia; (3) Faculty of Pharmacy, MAHSA University, Kuala Langat, Malaysia
INTRODUCTION: Asthma severity may be a more salient stressor influencing negatively the psychosocial well-being of the asthma patients.
OBJECTIVES: The aim of this study was to determine the impact of asthma severity on self-stigma in adult asthma patients.
STUDY DESIGN: This cross-sectional study was conducted at four respiratory specialist clinics in Selangor, Malaysia.
METHODS: Post local ethics approval (MOH-NMRR-14-557-20184) and patients' consents, 74 asthma patients (aged > 18 years old; nil cognitive disability; not diagnosed with other respiratory diseases) were recruited using purposive sampling method. The enrolled patients were classified on the basis of asthma severity (combined assessment of symptoms and lung function) according to Global Initiative for Asthma (GINA) guidelines. Lung function tests were performed by CosMed® spirometer. A 22-item self-stigma scale was adapted and translated into Malay language using international standard translation guidelines after taking approval from the corresponding author. The patients' responses were recorded of a 5-point Likert scale. A one-way analysis of variance (ANOVA) was conducted by Statistical Package for Social Sciences (SPSS)® version 21 to explore the impact of asthma severity on self-stigma in asthma patients.
RESULTS: The overall mean self-stigma score was 61.62 ± 6.52 (61.62/110). Among 74 adult asthma patients, 14.9% patients had intermittent (n=11), 39.2% had mild persistent (n=29), 25.7% had moderate persistent (n=19), and 20.2% patients had severe persistent asthma (n=15). A one-way ANOVA revealed a significant difference in the mean score of self-stigma among four asthma severity groups, $F(3, 70) = 6.906$, $p>0.001$. The Post-hoc comparisons using the Tukey HSD test indicated the self-stigma score vary significantly among all asthma severity groups.
CONCLUSIONS: The findings of this study suggest that the self-stigma in asthma patients becomes more apparent and severe with increasing asthma severity. Therefore, patients with severe asthma need more psychological support from their families and healthcare team.

66E. Assessing the impact of comorbidity on asthma severity and asthma control in adult asthma patients. Sohail Ahmad, Pharm D, MSc (Clinical Pharmacy)[1,*], Ahmad Izuanuddin Ismail, MBBChBAO, MRCP, AM, FCCP[2], Mohd Arif Mohd Zim, MBBS, Bch, BAO, MMed[2], Muhammad Qamar, Pharm D, MPharm (Clinical Pharmacy)[3], Nahlah Elkudssiah Ismail, BPharm (Hons), PhD (Clinical Pharmaceutics)[1]; (1) Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia; (2) Faculty of Medicine, Universiti Teknologi MARA, Batu Caves, Malaysia; (3) Faculty of Pharmacy, MAHSA University, Kuala Langat, Malaysia
Presented at 12th MPS Pharmacy Scientific Conference 2015 (MPS-PSC 2015), Subang Jaya, Selangor, Malaysia. November 13–15, 2015.

67. Assessing the knowledge of community pharmacists about the correct use of inhaler technique in Klang valley, Malaysia. Muhammad Qamar, Pharm D, MPharm (Clinical Pharmacy)[1,*], Nadiatul Azra, BPharm, MS, PhD[1], Mustafa Sheilla, BPharm (Hons)[1], Sohail Ahmad, Pharm D, MSc (Clinical Pharmacy)[2]; (1) Faculty of Pharmacy, MAHSA University, Kuala Langat, Malaysia; (2) Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia
INTRODUCTION: Inhaled medicines are the mainstay of asthma and chronic obstruction pulmonary disease (COPD) therapy. Metered dose inhaler technique is the most widely used technique to administer the medications. Patient relies on the pharmacists to provide information on the proper metered dose inhaler technique while dispensing.
OBJECTIVES: The aim of this study was to evaluate the knowledge of correct use of metered dose inhaler technique among the community pharmacists in Klang valley, Malaysia.
STUDY DESIGN: A Cross sectional study.
METHODS: Evaluation of metered dose inhaler technique was based on a standard 11 points checklist adopted from the National Asthma Education and Prevention Program of America (NAEPP). Among which 6 steps are essential (critical) to cover. Based on the critical steps such as shake the contents well, remove the cap, breath out slowly, open the mouth with inhaler 1–2 inches away or in the mouth with the lips tightly sealed around, begin breath in slowly and deeply through the mouth and actuate the canister once and hold breath for 10–20 seconds outlined by NAEPP, five evaluation categories were formulated as follows; optimal technique, adequate technique, poor technique, totally unfamiliar with the device, and does not know.
RESULTS: A total 138 community pharmacists agreed to participate in this study. The results of the study showed that 81.9% of pharmacists failed to complete the critical steps, 4.3% did not demonstrate any of the critical steps, 1.4% were unfamiliar with the device, 8% completed the steps and only 4.3% completed all the 11 steps.
CONCLUSIONS: The majority of the community pharmacists in Klang valley had poor inhaler technique. Those community pharmacists with recent training on metered dose inhaler had a better technique compared to those without training.

68E. Outcomes after implementation of an alcohol withdrawal protocol at a single institution. Mary Eberly, Pharm.D.[1,*], Kelly Davis, Pharm.D., BCPS[1], Anna Lockwood, Pharm.D., BCPP[1], Sean Lockwood, MD[2]; (1) Department of Pharmacy, Lexington VA Medical Center, Lexington, KY; (2) Department of Medicine, Lexington VA Medical Center, Lexington, KY
Presented at the College of Psychiatric and Neurologic Pharmacists Annual Meeting, Colorado Springs, CO, April 17–20, 2016.

69. Impact of a pharmacist-led vaccine recommendation program for pediatric kidney transplant candidates. Clarice Carthon, Pharm.D., BCPS*, Reed Hall, Pharm.D., BCPS, Pamela Maxwell, Pharm.D., BCPS, Barrett Crowther, Pharm.D., BCPS; University Health System, San Antonio, TX
INTRODUCTION: Previous studies have shown that a significant proportion of pediatric transplant recipients have incomplete age-specific vaccination schedules at the time of transplantation. Currently, no published studies have described the role of a transplant pharmacist in improving immunization rates for this vulnerable population.

OBJECTIVES: To evaluate the impact of transplant pharmacist interventions on the completion rate of vaccination schedules at the time of transplant.
STUDY DESIGN: Single-center, retrospective study.
METHODS: Pediatric kidney transplant recipients with available vaccine records who underwent transplantation between 1/1/12 and 9/30/15 were included. We compared patients who received pharmacist-led vaccination recommendations prior to transplant to a control group without pharmacist recommendations. Intervention began 1/1/14 and included assessment of vaccination status at time of initial evaluation according to the CDC immunization schedule and provision of recommendations for a vaccination catch-up schedule.
RESULTS: Forty-seven pediatric patients were included. The intervention and control groups included 29 and 18 patients, respectively. Overall, the mean age was 11 (range 1–18) years at transplant and a majority was Hispanic (60%), female (53%), and recipients of a deceased donor transplant (89%). Baseline characteristics were similar between groups. The median percentage of up-to-date vaccinations at the time of evaluation was 80% in both groups [p=0.62]. The median percentage of up-to-date vaccinations at the time of transplant was significantly higher in the intervention group (90%; IQR 82–100%) vs. the control group (80%; IQR 71–80%) [p=0.0008]. No patient was admitted for a vaccine-preventable infection within 6 months post-transplant.
CONCLUSIONS: In this cohort, not all patients were fully immunized at the time of evaluation; however, with pharmacist intervention, significantly more patients were up-to-date with vaccination schedules at the time of transplant. These results suggest that a transplant pharmacist may serve as a valuable resource to increase immunization schedule compliance between time of evaluation and transplantation.

70. The efficacy of fosfomycin for treatment of cystitis in abdominal transplant recipients. Ashley Loethen, B.S.[1,*], Margaret Jorgenson, Pharm.D.[2], Jillian Descourouez, Pharm.D.[1], Sarah Emanuele, Pharm.D., BCPS[1], Jeannina Smith, MD[1]; (1) University of Wisconsin Hospital and Clinics, Madison, WI; (2) UW Health, Madison, WI
INTRODUCTION: Increased use of antimicrobial prophylaxis following abdominal solid organ transplant (aSOT) has resulted in the emergence of multidrug resistant organisms. Fosfomycin (FOS) is FDA approved for the treatment of uncomplicated urinary tract infections in women. Literature supports in vitro efficacy against MDR pathogens including vancomycin resistant enterococci (VRE). However, limited data supports the clinical efficacy of FOS in aSOT.
OBJECTIVES: This study aims to investigate the efficacy of FOS for the treatment of cystitis in the aSOT population.
STUDY DESIGN: Retrospective.
METHODS: Chart review of adult aSOT receiving FOS from 1/1/2007–1/1/2013.
RESULTS: Seventy-six courses of targeted therapy with FOS were identified in 64 patients. Renal transplant recipients accounted for 74% of courses. Patients with urinary foreign body placement accounted for 40% of courses, 20% were ureteral stents. The overall rate of treatment success was 85.5%. Enterococcus was isolated in 59% of courses, 72.2% of these were VRE. In 22% of courses FOS was used for the treatment of gram-negative organisms. Concomitant systemic antibiotics for other indications were present in 36.8% of courses. In the 11 failed treatment courses, 90% were targeted against enterococcus, of which 82% were VRE. Six of these failures were then successfully retreated with nonsystemic therapy (FOS or nitrofurantoin). A subgroup analysis was conducted comparing single dose therapy (n=36) against multidose therapy (n=40) in a matched cohort of courses. There was no difference in the success rate of single dose therapy versus multidose therapy (80.6% vs 90%, p=0.24). However, concomitant systemic antimicrobial therapy was more common in the multidose group (70% vs 47.2%, p 0.04), possibly suggesting selection bias toward multidose for more subjectively ill individuals.
CONCLUSIONS: FOS appears to be efficacious for the treatment of cystis in aSOT recipients. In this study, single dose was non-inferior to multidose therapy.

71. Pharmacokinetic evaluation of Astagraf XL® and Prograf® in renal transplant candidates following laparoscopic sleeve gastrectomy. Alicia Lichvar, PharmD[1,*], Abbie Leino, PharmD[1], Tiffany Kaiser, PharmD[1], Tomoyuki Mizuno, PhD[2], Tsuyoshi Fukuda, PhD[2], Uwe Christians, MD, PhD[3], Rita Alloway, PharmD[1], Alexander Vinks, PhD[2], E. Steve Woodle, MD[1], Tayyab Diwan, MD[1]; (1) University of Cincinnati, Cincinnati, OH; (2) Cincinnati Children's Hospital, Cincinnati, OH; (3) University of Colorado, Aurora, CO
INTRODUCTION: Impact of laparoscopic sleeve gastrectomy (LGS) on immunosuppressive drug pharmacokinetics (PK) is unknown.
OBJECTIVES: To evaluate PK following LSG for two tacrolimus (FK) formulations (Astagraf XL® and Prograf®) with mycophenolate mofetil (MMF) in end stage renal disease patients awaiting renal transplantation (RTx) across genotypes.
STUDY DESIGN: Open-label, randomized, two-way crossover PK study.
METHODS: RTx candidates who were >3 months post-LSG were randomized to Astagraf XL® 8 mg (1 dose) or Prograf® 4 mg (2 doses 12 h apart) in combination with MMF 1gm (2 doses 12 h apart). 24-hour PK profiles were analyzed by LC-MS and compared. Genotyping was performed for MDR1/ABCB1, CYP3A4, and CYP3A5. PK differences across genotypes were compared. Astagraf XL® bioequivalence to Prograf® was assessed by 90% CI for LSMeans ratio of $AUC_{0–24}$ and C_{max}.
RESULTS: 23 patients completed the study: male (56.5%), Caucasian (56.5%) with a mean age of 50.8 years (+11.4). Table 1 includes PK and bioequivalence results. CYP5A5*1 genotype conferred lower AUC_{0-24} values in Prograf® (73.8 ng*h/mL vs. 180.5 ng*h/mL, p<0.001) and Astagraf XL® (116.8 ng*h/mL vs. 150.8 ng*h/mL, p=0.008). CYP5A5*1 genotype also conferred higher CL/F values in Prograf® (108.5L/h vs. 44.5L/h, p<0.001) and Astagraf XL® (68.51L/h vs. 53.1L/h, p=0.008). CYP3A4*22 and ABCB1 did not impact tacrolimus PK. Ideal (R^2 = 0.15) and actual (R^2 = 0.229) body weights poorly correlated with FK $AUC_{0–24}$.
CONCLUSIONS: Single dose PK analysis revealed Astagraf XL® and Prograf® were bioequivalent. CYP3A51* allele influences PK parameters of FK formulations in an LSG population. Alternative starting doses of Prograf® and Astagraf® following transplant are not necessary.
Table 1

Parameter	Astagraf XL®	Prograf®	p
$AUC_{0–24}$ (ng*h/mL)	129.8 (34.3–292.7)	138.7 (26.5–356.2)	0.50
CL/F (L/h)	61.6 (51.9–73.8)	57.7 (42.1–106.0)	0.88
C_{max} (ng/mL)	13.9 (6.0–31.0)	18.9 (4.0–35.2)	0.04
C_{min} (ng/mL)	2.6 (0.7–6.27)	0–12 h: 2.4 (1.52–6.9) 12–24 h: 3.9 (1.5–10.7)	0.09 0.004
	Reference/ Test formulation	Ratio of geometric means (%)	90% CI
$AUC_{0–24}$	Prograf®/ Astagraf XL®	103.49	89.6–119.6
C_{max}	Prograf®/ Astagraf XL®	92.53	80.45–106.43

72. Elevated de novo donor specific antibody after alemtuzumab induction in renal transplant recipients. Margaret Jorgenson, PharmD[1], Jillian Fose, PharmD[2], Robert Redfield, MD[3], Kassandra Fabbri, BS[4,*]; (1) UW Health, Madison, WI; (2) University of

Wisconsin Hospital and Clinics, Madison, WI; (3) University of Wisconsin Hospital and Clinics; (4) School of Pharmacy, University of Wisconsin-Madison
INTRODUCTION: Recent data suggests an association between de novo DSA and alemtuzumab induction, believed to result in an above average annual incidence of 3–4% in renal transplantation (RTX).
OBJECTIVES: This study aims to investigate the association between de novo DSA and alemtuzumab in RTX at our center.
STUDY DESIGN: A single center retrospective analysis of RTX recipients that received a single dose of alemtuzumab (30 mg).
METHODS: We collected DSA of 16 RTX recipients that received a single dose of alemtuzumab during 2010–2015. DSA was determined by solid phase single antigen bead testing pretransplant and at 1, 6 month and yearly after RTX.
RESULTS: Sixteen RTX patients received alemtuzumab during the study period. The majority (68%) received early steroid withdrawal. Average follow up time was 814 days (342–1290 days). A quarter (4/16) of patients developed de novo DSA after alemtuzumab with average time to de novo DSA of 387 days (± 135 days). Donor and recipient characteristics appear in Table 1 (not included in abstract). In patients with de novo DSA, 75% (3/4) had class I only, 25% (1/4) had class II only, and no patients had both class I and II. The average sum MFI of de novo DSA was 3600 (312–6943). Rejection preceded development of DSA in 25% (1/4) patients. Development of de novo DSA triggered a kidney biopsy in 75% (3/4) of patients; 100% (3/3) of these demonstrated rejection and 50% (2/4) received treatment. There was no difference between groups in kidney function defined as average creatinine and proteinuria) at last follow up.
CONCLUSIONS: Alemtuzumab induction was associated with a significant increase in development of de novo DSA. More study is needed to characterize the mechanism and risk factors associated with development of de novo DSA post RTX and its effect on long-term kidney allograft survival.

73. Neonatal and maternal effects of buprenorphine in the treatment of opioid-maintained pregnant women. Christina Inteso, Pharm.D.[1,*], Alicia B. Forinash, Pharm.D., FCCP, BCPS, BCACP[1], Abigail Yancey, Pharm.D.[1], Rebecca L. Bragg, Pharm.D., BCPS[1], Jaye Shyken, MD[2], Judy Thomspon, RN, CRRC[2], Collin Miller, MSW[2]; (1) St. Louis College of Pharmacy, St. Louis, MO; (2) St. Louis University/SSM Health St. Mary's, St. Louis, MO
INTRODUCTION: Infants born to women using illicit drugs can experience neonatal abstinence syndrome (NAS). Methadone has been the standard of treatment for opioid addiction during pregnancy, but recent studies have shown buprenorphine is effective and decreases NAS.
OBJECTIVES: To determine the neonatal and maternal effects of buprenorphine in opioid-maintained obstetric patients enrolled in the Women and Infant Substance abuse Help (WISH) clinic.
STUDY DESIGN: This is phase 1 of data collection in a retrospective cohort study.
METHODS: WISH patients who were prescribed buprenorphine and delivered within the SSM health system from 9/1/2014 to 11/4/2015 were included. The chart review included various maternal demographics and infant outcomes.
RESULTS: A total of 22 patients met eligibility with a mean age of 27.8 years. Six patients were treated for a psychiatric condition and 19 used tobacco. Patients attended on average 8.5 clinic visits and received buprenorphine for 97.3 days. At delivery, 68% of maternal urine drug screens were negative. On average, the mean gestational age at delivery was 38 weeks 3 days (range 34 weeks 6 days, 41 weeks 1 day). Peak NAS scores were 9.05 (range 2, 15) and occurred 46.9 hours after delivery. Six infants (27%) were treated for NAS. Excluding one outlier, the average total amount of morphine required was 2.46 mg, with a peak dose of 0.056 mg. No other medications were required for NAS treatment. For WISH infants, observation is 4–7 days. Length of stay (LOS) was 7.71 days, with an average of 2.66 days in the well-infant nursery and 5.05 days in the neonatal intensive care unit.
CONCLUSIONS: Treatment of opioid-maintained women with buprenorphine in this clinic showed comparable results to previously published literature. There were less infants treated for NAS, a shorter LOS, lower peak NAS scores, and a lower total morphine dose was used.

74. Implementation of chronic care management services in a patient-centered medical home. Bianca Korkis, Pharm.D.[1,*], Insaf Mohammad, Pharm.D.[1], Candice L. Garwood, Pharm.D., FCCP, BCPS[2]; (1) Department of Pharmacy Services, Harper University Hospital, Detroit Medical Center, Detroit, MI; (2) Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, MI
SERVICE OR PROGRAM: Chronic Care Management (CCM) provided to patients with at least 2 chronic conditions became reimbursable by the Centers for Medicare and Medicaid Services (CMS) on January 1, 2015. Services must account for at least 20-minutes of non-face-to-face time, and may include care coordination, preventative care review, and self-management education including medications. Services can be conducted by "clinical staff" under general, rather than direct, supervision. CCM creates an opportunity to reconcile medications and reinforce adherence. At our geriatric patient-centered medical home (PCMH) in an urban academic medical center, a pharmacy team, serving as "clinical staff", initiated collaborative CCM services focused on medication use and adherence. We developed an electronic dashboard to aid in population management.
JUSTIFICATION/DOCUMENTATION: Quality management of complex chronic diseases requires ongoing medical care and communication, which must often be provided beyond the confines of a primary care visit. Medication and lifestyle adherence are associated with reduced chronic disease burden and decreased health care utilization. Pharmacists have expertise in influencing positive medication adherence.
TRANSFERABILITY: Prior to billing for CCM, a patient must provide written consent for services. Additionally, a number of CMS directives determine patient eligibility for billing CCM in a given month. Using a dashboard in provision of services can assist in workflow, prioritizing patient care, and billing. In our PCMH, collaboration of interprofessional staff, including pharmacy residents and students, was key in implementing CCM services. Pharmacists practicing in primary care can adopt our model.
IMPACT: We anticipate that provision of CCM services will lead to improvements in medication adherence, medication access, and chronic disease outcomes such as reduced A1c and blood pressure. We also anticipate increased vaccination rates and Medicare Annual Wellness visits, and a decrease in emergency department visits. Increased revenue as well as an increase in patients scheduled for in-office pharmacotherapy clinic visits is expected.

75. Pharmacist delivered patient care in an institutional palliative care clinic. Lindsey Dayer, Pharm.D.[1,*], Sarah Harrington, MD[2]; (1) Department of Pharmacy Practice, University of Arkansas for Medical Sciences College of Pharmacy, Little Rock, AR; (2) Department of Internal Medicine, Division of Hematology/Oncology, University of Arkansas for Medical Sciences College of Medicine, Little Rock, AR
SERVICE OR PROGRAM: The Palliative Care Clinic, located at the University of Arkansas for Medical Sciences' (UAMS) Cancer Institute sees over 1,600 follow-up and 200 new patients each year. In 2012, a process of care (POC) involving a part-time clinical pharmacist (CP) in collaboration with other providers was instituted to deliver comprehensive medication management. In March 2013, the CP position became full-time. The CP's role involves working with providers to implement the best care plan for patients by: performing patient assessments, optimizing the patient's medication therapy, education and counseling, follow-up phone evaluations, among others. The CP also presents at

educational conferences including the regional Annual Hospice and Palliative Care Conference. The pharmacist is funded by the UAMS College of Pharmacy and holds the rank of Assistant Professor.

JUSTIFICATION/DOCUMENTATION: A 16-month period of the POC was evaluated and revealed 10,264 documented CP interventions including approximately 850 pain and/or adjuvant medication consultations, 6,500 prescriptions written, 130 follow-up phone calls, 25 drug interaction consults/interventions, 815 patient assessments, etc. There were 1,292 patients seen by the CP.

TRANSFERABILITY: This POC could be implemented in many types of palliative care settings. One factor contributing to the CP's success is the interdisciplinary team approach. Each clinic was staffed with a physician, nurse, pharmacist, and social worker. Chaplains and dieticians were also available.

IMPACT: A CP in this clinic benefits many stakeholders. First, patients benefit by having a medication expert available to answer questions and review their medications. Second, other providers benefit because services provided by the CP allow them to focus their attention in other areas of patient care. With a growing emphasis on providing interdisciplinary educational experiences, sites such as the UAMS Palliative Care Clinic also benefits students in multiple health professions by providing the opportunity to learn from professionals practicing in a team-based model to deliver quality patient-centered care.

76. Lessons from the trenches: implementation of smoking cessation services at an outpatient pharmacy in Ontario. Joyce WS Chan, Pharm.D., BCPS(AQ Cardiology), CDE, ACPR*, Andrew Cornacchia, BScPhm, Rick Fung, BScPhm, Lillian Gavura, BScPhm, Jessica Mak, BScPhm, Peter Nguyen, BScPhm, Anna Lee, BScPhm, ACPR, CCPE, Karen Chuk, MBA, BScPhm, Esther Fung, BScPhm, MScPhm; Toronto General Hospital Outpatient Pharmacy, Toronto, ON, Canada

SERVICE OR PROGRAM: Toronto General Hospital Outpatient Pharmacy (TGHOP) Smoking Cessation Program allows patients, staff, families to meet one-on-one with a Certified Smoking Cessation Pharmacist, which includes a readiness assessment, first consultation and seven follow-up counselling sessions over one year. The pharmacist can facilitate improved access through utilizing a new Ontario policy for Pharmacists Expanded Scope of Practice to prescribe smoking cessation medications. The program is modelled after the new Ontario Pharmacy Smoking Cessation Program (provincial public plan) and private payer reimbursement program. Since implementation (May 2014), there have been 32 patients enrolled. Fourteen patients have already completed the program year, and 9 (64%) have quit. Pharmacists are greatly involved in either prescribing or recommending prescription smoking cessation medication (92%) for this program.

JUSTIFICATION/DOCUMENTATION: Patients are provided with a standard of care with structured documentation based on provincial and private payer forms. Although clients can self-refer, standardized referral forms are available inside the hospital, outpatient clinics, and the pharmacy.

TRANSFERABILITY: Patients and staff can also connect via a QUIT Smoking telephone line, a Smoking Cessation email address, and an automatic referral through online questionnaire. Innovative advertising through hospital intranet, You tube videos, Stop Smoking week, hospital clinic presentations and Grand Rounds have increased referral rates and raised awareness. These strategies are easy to implement and highly transferrable.

IMPACT: This is the first known descriptive report of an outpatient pharmacy experience on smoking cessation services reimbursement for public and private drug plan beneficiaries in Ontario. Pharmacist- managed smoking cessation program in an outpatient setting promotes inter-professional communication, educates staff about the pharmacist's expanded scope, and provides seamless transition of smoking cessation after hospital discharge. It also improves access to smoking cessation for workplace smokers. This is an example of successful utilization of cognitive services reimbursement in Ontario to improve patients' outcomes.

77. Implementing shared medical appointments across multiple patient aligned care teams: the role of coordinated care in the improvement of type 2 diabetes outcomes. Addison Ragan, Pharm.D.[1,*], Sara Britnell, Pharm.D.[2]; (1) Pharmacy, Central Alabama Veterans Health Care System, Montgomery, AL; (2) Pharmacy Service, Durham VA Medical Center, Durham, NC

SERVICE OR PROGRAM: The type 2 diabetes mellitus Shared Medical Appointment (SMA) service started at the Central Alabama Veterans Healthcare System (CAVHCS) was created to allow widespread adoption throughout the system. The model includes a monthly SMA run by an interdisciplinary team of providers, including clinical pharmacists. Patients with HbA1c greater than 9% are identified and recruited for the program via telephone. The SMA is split into two hour-long segments. The first hour involves facilitated discussion, with topics at each appointment based on group interest. The second hour focuses on patient-centered goal-setting. Medications are adjusted in the group setting by the clinical pharmacist and primary care provider. Telephone follow-up is done two weeks later, during which the pharmacist reviews goals, glucose monitoring, medication adherence, and adverse events. Patients graduate from the SMA when they achieve their HbA1c goal.

JUSTIFICATION/DOCUMENTATION: The time required to manage a patient with diabetes, along with its increasing prevalence, makes access to quality care a challenge. This system-wide model employs an interdisciplinary team to provide well-rounded patient care, with pharmacists playing a large role in patient education, medication adjustment, and follow-up. The SMA model also provides patients with a strong social support system from peers in the group.

TRANSFERABILITY: The SMA program is spread via a series of local conferences which defines the standardized procedures and team roles. Interested providers are invited to view an existing SMA via video conference. Overall, twelve patient aligned care teams at four CAVHCS sites have successfully adopted the SMA model presented.

IMPACT: Median baseline HbA1C in 186 SMA participants was 10%, which was decreased by a median of 0.85% across all patients. The greatest benefit was seen in patients attending six or more SMAs, with a median HbA1C reduction of 1.2%.

78. Development and implementation of next generation clinical pharmacy services (NGPS) at Kaiser Permanente Colorado. Jessica Milchak, Pharm.D., BCPS[1,*], Beverly Kroner, Pharm.D., BCPS[1], Bharati Bhardwaja, Pharm.D., BCPS, LSSB[2], Catherine Riggs, Pharm.D., BCACP[1], Erin Herrera, Pharm.D., BCPS[1], Ann Nadrash, Pharm.D., BCPS[1], Katie Garrison, Pharm.D., BCPS[1]; (1) Department of Primary Care, Kaiser Foundation Health Plan of Colorado, Aurora, CO; (2) Gastroenterology, Rheumatology, Kaiser Foundation Health Plan of Colorado, Aurora, CO

SERVICE OR PROGRAM: Primary Care Clinical Pharmacy Services (PCCPS) Kaiser Permanente Colorado (KPCO) is a decentralized service of 37 clinical pharmacy specialists within 26 medical offices around Denver/Boulder and the Front Range. KPCO is a group model, integrated health care delivery system where PCCPS work collaboratively alongside physicians and healthcare professionals to provide education and support optimal medication use. Direct patient care activities, predominantly via telephone, include chronic disease state management and quality, safety, and affordability medication initiatives.

JUSTIFICATION/DOCUMENTATION: With ongoing membership growth, increased demand for PCCPS services, and no new resources, it became apparent the PCCPS model needed modification to support members and healthcare teams. Additionally, there was interest in PCCPS incorporating more longitudinal chronic disease state management alongside usual responsibilities.

The new model includes four groups of approximately 10 PCCPS to provide electronic medical record (EMR) consult cross coverage and coverage for PCCPS during longitudinal patient care. Focused time for longitudinal care is felt to be more efficient. Team members appreciate balance between individual and population patient care. The new model better distributes workload without moving PCCPS to distant clinics or splitting time between clinics.
TRANSFERABILITY: The NGPS model is applicable to settings where multiple clinical pharmacists are providing patient care via EMR. Team-based EMR support allows for built-in coverage for administrative time and vacations, less EMR consult fatigue, and focused time to complete regional medication quality and affordability initiatives.
IMPACT: Multiple PDSA cycles (Plan, Do, Study, Act), resulted in four NGPS teams. Optimization of patient care occurred through more efficient management of consults and designated time for longitudinal population management and initiatives. Team productivity increased by 18.5%. Greater than 90% of individuals are satisfied with the new model. There is less EMR consult fatigue, improved ability to cover time off and increased camaraderie among team members.

79. Implementation of a transitions of care and care coordination service for patients with acute venous thromboembolism in the emergency department and observation unit. Insaf Mohammad, Pharm.D.*, Jesse Shuster, Pharm.D., BCPS; Department of Pharmacy Services, Harper University Hospital, Detroit Medical Center, Detroit, MI
SERVICE OR PROGRAM: The pharmacy team at an urban academic medical center implemented a transitions of care process for patients with acute venous thromboembolism (VTE) being discharged directly from the emergency department or observation unit to the outpatient setting on direct oral anticoagulants (DOACs). The pharmacy team established interprofessional workgroups, patient assistance options for DOACs, and electronic health record (EHR) order-sets and alerts to facilitate the process. The pharmacist's role includes ensuring appropriate DOAC prescribing, providing patient education prior to discharge, care coordination during the transition to outpatient, and post-discharge care and follow-up.
JUSTIFICATION/DOCUMENTATION: The cost of care and length of stay rendered by hospitalizations for the treatment of VTE continues to contribute to the economic burden on our health care system. The standard of care for acute VTE has historically been an oral vitamin K antagonist with low-molecular weight heparin bridging. However, discharge on DOAC therapy from the site of diagnosis, which is often the emergency department or observation unit, decreases hospital length of stay and reduces health care costs. Pharmacists have the opportunity to provide dosing recommendations, patient education, and care coordination during this process to ensure safe and efficacious therapy.
TRANSFERABILITY: Prior to implementation of this process, a relationship must be established between the pharmacists, physicians, nursing staff, and management staff to facilitate interprofessional collaboration. Furthermore, access to patient medication assistance is important for the transition of uninsured and underinsured patients to the outpatient setting. Utilization of EHR capabilities can assist in workflow and patient prioritization for prescribers, pharmacists, and nurses.
IMPACT: We anticipate that this transitions of care process will reduce hospital length of stay and cost of care, while improving care coordination. Furthermore, this process will improve patient safety, increase pharmacy interventions, and justify further positions for pharmacists to provide care coordination and effective transitions of care in various settings.

80. Pharmacist-To-Dose Dofetilide (Tikosyn®) for Medication Initiation in Atrial Fibrillation Patients. Robert Duvall, Pharm.D.*; Department of Pharmacy, Grant Medical Center, Columbus, OH
SERVICE OR PROGRAM: Pharmacist-To-Dose Dofetilide (Tikosyn®) for Medication Initiation in Atrial Fibrillation Patients.
JUSTIFICATION/DOCUMENTATION: Dofetilide (Tikosyn®) is a Class III antiarrhythmic agent used to treat patients with atrial fibrillation and/or atrial flutter. Accurate dosing upon initiation of this medication is essential to prevent an accidental induced arrhythmia secondary to a prolongation of the QT. A pharmacist-to-dose order set was created to assist physicians upon ordering of dofetilide (Tikosyn®). The order set guides the consulted pharmacist to verify the physician is an approved prescriber, evaluate the patient specific medication profile for drug interactions and to assess the baseline QTc to ensure the patient is not contraindicated for treatment with dofetilide (Tikosyn®). Once appropriateness of treatment is determined, the initial dose is calculated by the pharmacist based on the patient's estimated creatinine clearance using the Cockcroft-Gault equation. The pharmacist also ensures the proper laboratory and diagnostic monitoring orders are in place. Once dofetilide (Tikosyn®) has been initiated, the pharmacist in conjunction with the prescribing physician will evaluate each resulted QTc to ensure that continuation of the treatment at the prescribed dose is appropriate. If a dose adjustment is required, the pharmacist will contact the physician to discuss the patient case. The pharmacist will also assist in monitoring of electrolytes and ensures appropriate replacement has been administered as indicated.
TRANSFERABILITY: Development of a pharmacist-to-dose order set within any institution requires careful education of the pharmacy staff and a physician champion to lead the initiative. This type of service is otherwise easily transferable for most inpatient settings.
IMPACT: As stated above, the accuracy of initiation of dofetilide (Tikosyn®) therapy is extremely important to maintain patient safety and prevent adverse drug effects. The impact of this initiative could be life-saving for a patient.

81. Pharmacist role in chronic disease medication management during disaster response. Vidya Nair, Pharm.D.[1,*], Courtney Sellers, Pharm.D.[1], Jenny Arnold, Pharm.D.[2], Matthew Gardner, Pharm.D.[3], Michael Loehr, CEM, CBCP[4]; (1) Providence St. Peter Hospital, Olympia, WA; (2) Washington State Pharmacy Association, Renton, WA; (3) Emergency Medicine, Providence St. Peter Hospital, Olympia, WA; (4) Office of Emergency Preparedness and Response, Washington State Department of Health, Tumwater, WA
SERVICE OR PROGRAM: Pharmacists Response Network.
JUSTIFICATION/DOCUMENTATION: An estimated 50% of the patient population in the United States experiences at least one form of chronic disease in their lifetime. During disasters displaced patients may lose access to chronic care medications, which may lead to disease exacerbations. Disaster survivors are often left without access to medications leading to disease exacerbations, which subsequently may lead to costly Emergency Department (ED) and hospital admissions for critical conditions such as stroke and myocardial infarction.
TRANSFERABILITY: Chronic disease management in disaster response has not been a primary focus. Through PRN, pharmacists have the ability to fulfill this unmet need at a local, state and national level through integration of their chronic disease management capabilities within the emergency management infrastructure.
IMPACT: To address this gap in care, Pharmacists Response Network (PRN) was formed under the Washington State

Pharmacy Association (WSPA) to utilize volunteer pharmacists to provide prescriptions for chronic care medications during disasters. The goal of PRN is to prevent ED visits for medication refills, and hospital admissions subsequent to disease exacerbations from lack of access to chronic care medications. All volunteer pharmacists will be registered through the Medical Reserve Corps (MRC). Current partners include the Washington State Department of Health (DOH), the MRC, and the American Red Cross.

PRN will provide refill services for the following disease states utilizing collaborative drug therapy agreements: hypertension, diabetes, coronary heart diseases, anticoagulation, seizure disorders, asthma/COPD and mood disorders. In a given disaster, PRN will deploy pharmacists and student pharmacists to shelter sites where student pharmacists will triage and register patients. After capturing and documenting vital signs, eligible patients will be seen by a pharmacist for 10 to 15 minutes for assessment, prescriptions for medication refills, and medication counseling. Patients discharged with prescriptions for medication refills may fill them at any major retail pharmacy.

82. Implementation of a pharmacy consult for stress ulcer prophylaxis management in the ICU. Kathryn Wdowiarz, Pharm.D., BCPS, Maria Ochoa, Student Pharmacist*; Midwestern University, Downers Grove, IL

SERVICE OR PROGRAM: We aim to describe the development and implementation of a novel method to ensure appropriate discontinuation of acid suppression therapy (AST) in the ICU. A pharmacy consult was created and embedded within several order sets containing stress ulcer prophylaxis (SUP) medications. The consult advances the clinical role of the ICU pharmacist who is now responsible for AST assessment, evaluation, and potential discontinuation on a daily basis.

JUSTIFICATION/DOCUMENTATION: There is a high incidence of inappropriate SUP utilization in the inpatient setting. Inappropriate utilization of AST, specifically proton pump inhibitors, has been associated with an increased risk of *Clostridium difficile* infections (CDIs) and pneumonia. Inadvertant continuation of AST at the time of hospital discharge is also problematic. Exposure to chronic AST can put a patient at further risk for bone fractures, drug interactions, and arrhythmias. Interventions to decrease AST exposure in patients without an active indication are warranted to limit these morbidities.

TRANSFERABILITY: Including a pharmacy consult for AST management is beneficial to patients on the general medical ward in addition to those in the ICU. Due to the over-the-counter availability of AST and its widespread use in the outpatient setting, the potential for expansion of this service into the community is substantial. Patients on AST therapy outside of the hospital setting continue to be at risk for CDIs and the adverse effects of long term AST.

IMPACT: The implementation and utilization of this novel pharmacy consult has the potential to decrease medication costs and improve patient outcomes. It will also increase awareness about the appropriate prescribing of stress ulcer prophylaxis within the institution. The impact of a pharmacist-driven AST management service enhances the role of the clinical pharmacist and encourages further development of innovative pharmacy services.

83. Implementation and evaluation of a resident-run residency preparatory program for fourth year pharmacy students at an academic medical center. Justin Arnall, PharmD[1,*], Jerod Braschler, PharmD[1], Rebecca Bookstaver, PharmD[1], Marie Cavalier, PharmD[1], Ashley Wester, PharmD[1], Ashley Wester, PharmD[1], Amanda White, PharmD[1], Steven Davis, PharmD[2], Lindsey Goldman, PharmD[3], Tina Thornhill, PharmD[4]; (1) Department of Pharmacy, Wake Forest Baptist Health, Winston-Salem, NC; (2) Wake Forest Baptist Health/Campbell University, Winston-Salem, NC; (3) Wingate University/Wake Forest Baptist Health, Winston-Salem, NC; (4) Campbell University/Wake Forest Baptist Health, Winston-Salem, NC

SERVICE OR PROGRAM: Residents at our institution planned and implemented a five part presentation series for fourth year students to offer guidance through the residency application process. Each presentation focused on particular points and was planned so that students received information in a just-in-time manner. A survey was given to students prior to and after the presentation series to gauge the usefulness of the information provided.

JUSTIFICATION/DOCUMENTATION: With the increased interest in residency programs nationwide, and a large number of candidates going unmatched, the application process has become increasingly complex. Insight from residents has been found to be particularly useful as expressed by students in reports of residency panels at pharmacy schools. In reviewing the literature there are reports on student organizations and professors inviting residents to speak about the process, but nothing reported to guide and encourage residents themselves to offer guidance on preparation.

TRANSFERABILITY: The students at our institution expressed a desire to receive further insight into the residency application process, and responses to our survey suggest that they perceived benefit to the preparatory series coordinated by residents who had most recently experienced the process.

IMPACT: 16 students completed the pre-survey and 6 students completed the post-survey. On a scale of 1 to 4 (1 being least, 4 being most), students rated their overall understanding of the application process before the series at a mean of 2.68 and 3.92 after the series. Students rated their overall confidence in the application process at a mean of 2.01 prior to and 3.92 at the completion of the series. Noted differences were identified in the understanding of various aspects of the application process.Our project identifies an approach to residency application preparation that is novel in the literature and warrants further evaluation of the benefits for both pharmacy students and residents.

85. Hospital-wide formulary conversion and implementation of extended infusion cefepime. Angela Plewa-Rusiecki, PharmD, BCPS*, Renee Xamplas, PharmD, BCPS, Gail Itokazu, PharmD; Department of Pharmacy, John H. Stroger Jr. Hospital of Cook County, Chicago, IL

SERVICE OR PROGRAM: A multidisciplinary team was formed to address the switching of formulary 3rd-generation cephalosporin (ceftazidime to cefepime) and the feasibility of converting from the standard 30-minute infusion to an extended infusion of cefepime. On the day of hospitalwide conversion, the orderables for cefepime were reprogrammed in the computerized prescriber-order-entry system to allow separate options for the 30-minute infusion (for pediatric and emergency room patients) and the extended-infusion regimen. A splash screen reminding prescribers of the formulary change and extended infusion was instituted and smart pump drug libraries were also modified to default to the 4 hour extended infusion rate.

JUSTIFICATION/DOCUMENTATION: The most recent (2013–14) antibiogram from our institution shows that cefepime has better in vitro activity against selected Enterobacteriacae such as Enterobacter species, and similar in vitro activity against *P. aeruginosa*, *E. coli*, and *K. pneumonia* compared to ceftazidime. Like other beta-lactams, cefepime displays time-dependent bactericidal activity which is enhanced when each dose is administered as an extended (i.e., 4 hour) infusion. The development and implementation of an extended-infusion cefepime program may be associated with lower mortality compared to a standard 30 minute infusion based on a 2013 quasi-experimental study of the treatment of Pseudomonas infection.

TRANSFERABILITY: With the use of computer generated default order sentences, informational splash screen alerts, and use of smart pump drug libraries, the transition to an extended infusion medication program can be seamlessly rolled out leading to potentially better patient outcomes.

IMPACT: A hospitalwide program for the administration of extended-infusion cefepime was safely and successfully

implemented using a multi-disciplinary approach in an urban teaching hospital, leading to broader coverage against susceptible aerobic gram-negative bacilli including Enterobacter species and *P. aeruginosa* and possible better patient outcomes.

86. Recognizing and educating about excipient-related side-effects from use of antiretroviral therapy in Mbeya, Tanzania. Nadiya Jiwa, Bachelors of Pharmacy, Master of Science in Health Policy and Management[1,*], Mariana Zacharia, Diploma in Pharmaceutical Sciences[1], Antonia Mdemu, Diploma in Pharmaceutical Sciences[1], Jason Bacha, Pediatrician[2], Liane Campbell, Pediatrician[2], Bertha Kasambala, Doctor of Medicine[2], Lumumba Mwita, Doctor of Medicine[2]; (1) Pharmacy (pediatric HIV/AIDS care), Baylor College of Medicine Children's Foundation (Mbeya) Tanzania, Mbeya, Tanzania; (2) Baylor College of Medicine Children's Foundation (Mbeya) Tanzania, Mbeya, Tanzania
SERVICE OR PROGRAM: Pharmaceutical formulation is the process in which different chemical substances constituting Active Pharmaceutical Ingredient (API) including excipients comprising of colours, flavors, emulsifiers, diluents, bulking agents, sweeteners, and preservatives are combined to produce a final medicinal product. Excipient-related reaction to certain ART formulations has been described in the literature, but is often overlooked and under-recognized by ART clinicians.
JUSTIFICATION/DOCUMENTATION: Having noted possibility of excipient-related side-effects for common adult and pediatric ART formulations used at Mbeya COE, we developed a presentation teaching on what excipients are and which pediatric ART could have excipient-related side-effects. During this session, we demonstrated solubility of dispersible tablets compared to non-dispersed tablets and passed formulations for viewing and smelling flavoring agents from available pediatric ART. We also discussed about future of ART formulations with regard to the new WHO recommendations and possibility of adaptation in Tanzania. A unique case reports seen in Mbeya was discussed in which clients using blue colored AZT-3TC-NVP for adults in complained about feeling weaker during working hours as compared to when they used the white colored AZT-3TC-NVP for adults product from another company.
TRANSFERABILITY: Side-effects and drug interactions are usually attributed to API and little attention is paid to excipients which are regarded as inert/non-reactive ingredients. However, with changing formulations and availability of better palatable ART formulation in pediatric patients, it will become imperative for clinicians to be aware of excipient reactions in children using ART. Many ART clinicians were unaware of these reactions, and benefited from the session.
IMPACT: As part of learning curriculum, we intend to integrate this topic into curriculum for pharmacy attachments at our center. We also shared this presentation with our counterpart adult CTC clinic at Mbeya Referral Hospital.

87. System dose conversion protocol evaluation and formulary exclusion of U-500 insulin. Derek LaBar, Pharm.D., BCPS[1,*], Leah Frantzen, Pharm.D., BCPS[2]; (1) Department of Pharmacy, HealthEast Care System, Maplewood, MN; (2) Department of Pharmacy, HealthEast Care System, St. Paul, MN
SERVICE OR PROGRAM: To promote safe and cost-effective blood glucose management, HealthEast Hospitals removed U-500 insulin from formulary and implemented a conversion protocol for hospitalized patients.
JUSTIFICATION/DOCUMENTATION: The Institute for Safe Medication Practices (ISMP) recognizes an increase in medication errors related to dose conversions of home U-500 insulin to inpatient regimens and has called upon health systems to implement practices that avoid inappropriate dosing. Inaccurately reported insulin doses is a common error leading to a potential 5-fold overdose when using U-500 insulin. Standards of practice and protocols are necessary in managing this high risk medication.
TRANSFERABILITY: Decentralized clinical staff pharmacists are uniquely positioned to provide alternative conversion recommendations to prescribers for all concentrated insulins. In collaboration with the diabetes educators, a protocol was approved by HealthEast's P&T Committee and Medication Safety Committee. All U-500 orders are converted to a basal/prandial insulin regimen in a 50:50 ratio utilizing insulin glargine and insulin aspart along with a custom resistant correction bolus. Prescriber acceptance of the recommendation is required before initiation of the conversion regimen.
IMPACT: An evaluation of this implemented protocol was completed from January 1st, 2015 to December 23rd, 2015. Ten hospitalized patients with orders to resume home U-500 insulin were reviewed. Eight of ten (80%) patients were initiated on a pharmacist recommended insulin glargine/insulin aspart regimen per protocol. Of those initiated on the protocol, no hypoglycemic events [blood glucose (BG)<70 mg/dL] were documented and four hyperglycemic events (BG>200 mg/dL) were documented. No incorrect U-500 insulin dose administrations or safety events have been reported following protocol initiation. Concentrated insulins pose new challenges for pharmacists and implementing U-500 formulary exclusion and conversion protocols further promote safe and cost-effective blood glucose management.

88. Pharmacist-driven pain management service for patients at high risk for respiratory depression. Olga Zirka, Pharm.D.*; Department of Pharmacy, Southwest General Health Center, Middleburg Heights, OH, OH
SERVICE OR PROGRAM: Pharmacist-driven pain management service for patients at high risk for respiratory depression.
JUSTIFICATION/DOCUMENTATION: Millions of Americans are affected by pain on a daily basis, and significant disparities exist in appropriate pain management – both in the inpatient and outpatient setting. Furthermore, opioid analgesics rank among the drugs most frequently associated with adverse drug events. In recognition of the nationwide epidemic of opioid-induced respiratory depression and over-sedation, The Joint Commission released Sentinel Event Alert #49 on the safe use of opioids that are prescribed and administered within the inpatient hospital setting. The Alert provides a number of evidence-based recommendations that can be taken to avoid the unintended consequences of opioid use among hospital inpatients, one of which is to create and implement policies and procedures for a second-level review of pain management plans with high-risk opioids by pain specialists or pharmacists. The primary objective of this service is to evaluate the effect of an inpatient pharmacist-driven pain management service and opioid stewardship on the number of respiratory depression and over-sedation cases, amount and types of opioids prescribed, patient pain scores and overall patient outcomes and satisfaction.
TRANSFERABILITY: A pharmacist-driven service that offers the second-level review of pain management plans is a service that can be carried out in a variety of different care settings, particularly in the hospital acute-care setting.
IMPACT: A pharmacist-driven pain management service offered to inpatients at high risk for respiratory depression can make a great impact on patient safety and satisfaction. Second-level review and optimization of pain medication regimens can reduce the incidence of opioid-related adverse effects such as over-sedation and respiratory depression, and improve patient outcomes and satisfaction.

89. Assessment of enoxaparin thromboprophylaxis dosing and anti-factor Xa levels in low-weight patients. Lily Yam, Pharm.D.*, Lisa Hong, Pharm.D., BCPS; School of Pharmacy, Loma Linda University, Loma Linda, CA
INTRODUCTION: Centers of Medicare and Medicaid Services and The Joint Commission have set standards for reimbursement for Medicare-covered inpatient services, including venous

thromboembolism (VTE) prophylaxis. For hospitalized patients at increased risk for thrombosis, pharmacologic thromboprophylaxis with anticoagulants is recommended. Fixed prophylactic doses of enoxaparin in low-weight patients may pose an increased risk of bleeding and prolonged hospitalization. Measured anti-factor Xa levels and observed bleeding events may be used to monitor the safety and efficacy of enoxaparin. Few articles have published the relationship between anti-factor Xa levels and body weight in low-weight patients.
OBJECTIVES: This study will evaluate anti-factor Xa levels in low-weight patients receiving enoxaparin for VTE prophylaxis. More specifically, we will determine what factors are associated with anti-factor Xa levels and measure the extent to which body mass index affects anti-factor Xa levels.
STUDY DESIGN: Retrospective chart review.
METHODS: Data is currently being collected from electronic medical records of patients admitted to any Loma Linda University Health inpatient facility between January 1, 2008 through August 24, 2015. We anticipate complete data analysis by March 2016.
RESULTS: To date, six patients have been included in this study. These patients have a mean age of 29.7 years, mean weight of 42.5 kg, and mean BMI of 17.0 kg/m^2. One patient received enoxaparin 40 mg once daily, four patients received enoxaparin 30 mg once daily, and one patient received enoxaparin 30 mg twice daily. Therapeutic anti-factor Xa levels (pre-specified as 0.2–0.5 units/mL) were observed in 67% of patients and supratherapeutic anti-factor Xa levels were observed in 33% of patients. The mean anti-factor Xa level was 0.42 units/mL.
CONCLUSIONS: Data collection is in progress. Presentation of the results of this study will provide clinicians with additional information on how to efficaciously and safely dose enoxaparin for VTE prophylaxis in low-weight patients.

90. Evaluating vitamin D levels and the tolerability of every-other-day statin administration in patients with previous statin intolerance. Marcus Costner, PharmD, BCPS, Melissa Waterhouse, Pharm.D.*; Pharmacy (119), Veterans Health Care System of the Ozarks, Fayetteville, AR
INTRODUCTION: Statin therapy is established in the literature as an effective means of reducing stroke and cardiovascular events in patients at risk. Statins are generally well tolerated; however some patients discontinue use due to adverse effects. Some studies suggest that statin use, along with low Vitamin D levels, are associated with increased myalgias.
OBJECTIVES: This study will (1) assess the efficacy and tolerability of every other day statin dosing in patients with previous statin intolerance, and (2) evaluate patient vitamin D levels in instance of statin intolerance.
STUDY DESIGN: Retrospective chart review of Veterans prescribed a statin with intermittent administration between January 2010 and July 2015 at Veterans Health Care System of the Ozarks.
METHODS: Veterans with intermittent statin prescriptions were included if they were between 18 to 89 years of age and had lipid panels records before and after starting therapy. Efficacy of statin therapy was measured by change in plasma LDL-C; tolerability was measured by the percentage of patients who continue therapy 6 months. Vitamin D levels were assessed in patients who discontinued therapy.
RESULTS: Preliminary data shows intermittent dosed statins were prescribed to 199 unique patients during the study period. The most commonly prescribed statin and dose was atorvastatin 40-80 mg every other day. The statin was discontinued in 135 Veterans (68%), of whom 64% had Vitamin D levels available.
CONCLUSIONS: Preliminary results shows that more than half of the intermittent statin prescriptions were subsequently discontinued. Reasons for discontinuation and any association with low vitamin D levels have not been yet been identified. Data collection and analysis will be completed March 15, 2016.

91. Integration of pharmacy services into an outpatient specialty clinic. Stephanie Paul, Pharm.D.[1,*], Ryan Baker, Pharm.D.[1], Alyssa Laurich, Pharm.D.[2], April Risner, Pharm.D.[1], Jodi Flynn, MS, PA-C[1]; (1) CoxHealth, Springfield, MO; (2) Pharmacy, CoxHealth, Springfield, MO
INTRODUCTION: Specialty pharmacy focuses on high cost, high touch medication therapy for patients with complex diseases. These patients often need additional support and resources to overcome barriers such as medication cost, coverage, and complexity. New pharmacy practice models involve interdisciplinary teams of physicians, nurses, and pharmacists and provide improved patient compliance, accessibility, convenience, and patient confidence. CoxHealth recently started a Multiple Sclerosis (MS) Specialty Medication Management Program in September 2015, at their Center for Health Improvement Clinic. This research study is being conducted to assess specialty pharmacy services being used as part of this new program.
OBJECTIVES: Primary objective is to examine service line metrics related to pharmacy services integration; specifically, patient and provider satisfaction, number and type of pharmacist intervention, recommendation acceptance rate, patient medication adherence, and patient work productivity. Secondary objective is to assess disease state metrics.
STUDY DESIGN: Single-center, service-based quality improvement study.
METHODS: Participants are adults 18 and older who are participants of the CoxHealth insurance plan and received care at the specialty clinic. Individuals are excluded if they choose not to participate in the program. The primary investigator will be responsible for facilitating all study-related activities. Patient and provider satisfaction surveys will be used. Data to assess other study objectives will be obtained from patient charts. Descriptive statistics will be used to describe primary and secondary outcomes. This study was approved by the Western Institutional Review Board.
RESULTS: Preliminary data has been assessed for 20 eligible patients. Average age is 47.1 years and 60% are female. 19 patients have relapsing remitting MS and one has secondary progressive MS. Patient population averages 0.58 relapses per year, 5.46 second 25-foot walking time, 1.39 on MS disease steps scale, 33.01/35.42 on MSIS-29, 4.35 FSS score, and 3 EDMUS score.
CONCLUSIONS: Estimated completion date of May 1, 2016.

92. Pharmacist impact on high risk medication use and adherence in a senior health center. Alyssa Laurich, Pharm.D.[1,*], Stefanie Hawkins, Pharm.D.[2], Stephanie Paul, Pharm.D.[3], April Risner, Pharm.D.[3]; (1) Pharmacy, CoxHealth, Springfield, MO; (2) CoxHealth, MO; [3]CoxHealth, Springfield, MO
INTRODUCTION: Medicare Advantage plans are now reimbursing physicians based on quality metrics including avoidance of high risk medications (HRMs) and non-adherence. Currently, there are no studies showing pharmacist impact on HRM prescribing and patient adherence rates and their resulting effect on star ratings.
OBJECTIVES: The objective of this study is to reduce the number of senior health center patients 65 years and older flagged by Medicare Advantage plans contracted with a not-for-profit health care system as having HRMs or non-adherence to prescribed medications for diabetes (excluding insulins), cholesterol, and blood pressure.
STUDY DESIGN: This prospective study has been approved by the Western Institutional Review Board. The study will seek to review approximately 100 patients. Patients must be 65 years or older and have a primary care physician within the senior health center.
METHODS: The patients will be identified and reported by contracted Medicare Advantage plans as having medication issues related to high risk of side effects or adherence. Recommendations for alternative medications will be made via the electronic medical record and face-to-face communication with providers. Adherence issues will be addressed by face-to-face interaction

with the patient or via phone call to the patient and/or patient's pharmacy. Information involving medications continued, discontinued, switched to alternative therapy, or documented inaccurately after pharmacist intervention will be collected. Additionally, physician HRM prescribing rates and star ratings for payer's reporting will be collected.
RESULTS: Preliminary results show 36 patients on high risk medications in the senior health center and approximately 225 patients with adherence issues. With recent IRB approval, interventions and recommendations have commenced.
CONCLUSIONS: Estimated completion date of the study protocol will be April 2016.

93. Integration of a clinical pharmacy team into the patient centered medical home to improve transitions of care for Missouri Medicaid patients. April Risner, Pharm.D.[1,*], Cassie Heffern, Pharm.D., BCACP[2], Alyssa Laurich, Pharm.D.[2], Stephanie Paul, Pharm.D.[1], Karen Foote, Doctor of Medicine[3], Shelby Hahn, Doctor of Medicine[3]; (1) CoxHealth, Springfield, MO; (2) Pharmacy, CoxHealth, Springfield, MO; (3) Family Medical Care Center, CoxHealth, Springfield, MO
INTRODUCTION: A Centers for Medicare and Medicaid Services study found pharmacy services are an added value providing improved clinical outcomes, enhanced patient compliance, and reduced healthcare costs associated with medications. This study focuses on pharmacy-provided education services to assist Missouri Medicaid patients transitioning from inpatient to ambulatory care.
OBJECTIVES: Primary objective is to improve medication compliance rates (medication possession ratio (MPR)) through pharmacy-provided education for Medicaid patients with polypharmacy. Secondary objectives are to reduce 30-day hospital readmission rates, reduce number of emergency room visits, decrease medication discrepancies, report interventions, track the number of contacts per patient for compliance correlation, and address revenue generated by completion of interventions.
STUDY DESIGN: Minimal risk, cohort study seeking to compare patient medication compliance rates pre- and post-pharmacy service implementation.
METHODS: Adults 18 years of age or older with an inpatient admission on the interprofessional team, Medicaid as the primary payer source, and polypharmacy will be included. Patients who meet inclusion criteria during hospitalization will be reviewed by the pharmacist for medication related problems and provided pre-discharge education. Post- discharge, billable interventions identified through the Missouri Medicaid MOHealthnet database, including recognized non-compliance, will be addressed by the ambulatory care pharmacy team face-to-face during patient follow-up primary care visits. Interventions will be documented in the medical record and the Medicaid database as appropriate.
RESULTS: The average 90 day MPR for the currently enrolled study patients is 71.9% (range: 49–100%) pre-pharmacy service implementation. Current readmission rates for November 2015 extrapolated to a total of approximately 1700 Missouri Medicaid patients were 576 readmissions and 1824 emergency room visits annually, which totals $4,704,000 in healthcare costs. Pre- and post-data will be compared at completion.
CONCLUSIONS: Expected completion May 1, 2016.

94. 13-Valent pneumococcal conjugate vaccine utilization in the primary care setting. Mary Lomberk, Pharm.D.[1,*], Deanna Rattray, Pharm.D., BCPS[2], Rebecca Bean, Pharm.D.[2]; (1) Population Health, Novant Health, Winston Salem, NC; (2) Novant Health, Winston Salem, NC
INTRODUCTION: The Centers for Disease Control and Prevention (CDC) began recommending a one-time dose of 13-valent pneumococcal conjugate vaccine (PCV13), Prevnar 13®, for adults 65 years and older in September 2014. A detailed immunization schedule also exists for PCV13 in the elderly based on previous pneumococcal vaccinations that may complicate adherence.
OBJECTIVES: To assess the utilization and adherence of PCV13 vaccine in adults ≥ 65 years old in three clinics in accordance with updated CDC recommendations for PCV13 immunization.
STUDY DESIGN: This ongoing study is a retrospective chart review examining the percentage of elderly patients who qualify for and receive the recommended PCV13 vaccination among three sample outpatient clinics in the greater Winston Salem area.
METHODS: Inclusion criteria for the study include: Adults ≥ 65 years old seen by a medical group-associated primary care physician (PCP) for a Medicare annual wellness visit within the month of February 2015. Patients < 65 years old, not seen for a Medicare annual wellness visit or deceased upon review were excluded.
Primary endpoints are the percentage of patients who received prescriptions for PCV13 vaccine as well as percentage of patients with documented administration of PCV13 vaccine. Secondary endpoints of 23-valent pneumococcal polysaccharide vaccine (PSV23) administration and adherence to CDC pneumococcal immunizations schedule will be assessed. Descriptive analysis will be used for all comparisons.
RESULTS: Preliminary results from one clinic suggest 50% of patients have received prescriptions for PCV13; however, only 10% were addressed and documented during the patient's Medicare annual wellness visit. Remainder of patients received prescriptions for PCV13 at other medical office visits. Thirty two percent of patients have documented administration dates in the electronic medical record.
CONCLUSIONS: Based on preliminary results, there appears to be a discrepancy with documentation habits for PCV13 prescribing and administration. Full study conclusions anticipated in February 2016.

95. Evaluation of the impact of pharmacist-run tobacco cessation classes on abstinence rates in patients of a Patient-Centered Medical Home (PCMH) practice. Angela Raymond, Student (PY3)[1,*], Lauren Wolfe, PharmD[1], Jamie McConaha, PharmD, CGP, BCACP[1], Gibbs Kanyongo, Ph.D., M.A., B.S.[2]; (1) Duquesne University Mylan School of Pharmacy, Pittsburgh, PA; (2) School of Education, Duquesne University, Pittsburgh, PA
INTRODUCTION: Over 50 years have passed since the Surgeon General's Advisory Committee report on smoking and health. Even with the resulting decline in cigarette smoking from 42% in 1965 to 18% in 2012, over 42 million Americans still smoke. Guidelines explicitly advocate for the combined use of counseling and medication(s) as the most effective means to improve cessation rates.
OBJECTIVES: This study evaluates abstinence rates of patients in a PCMH that attended pharmacist-led group tobacco cessation classes in conjunction with tobacco cessation medications compared to those who utilized the same medications but did not attend classes.
STUDY DESIGN: Patients for this study were recruited from a PCMH in Pittsburgh, PA. Patients with a documented active smoking status in the electronic medical record (EMR) beginning July 2013 were invited to a pharmacist-led tobacco cessation class.
METHODS: Study inclusion criteria for the intervention group included the use of nicotine replacement treatment (NRT), bupropion, or varenicline and attendance in at least 80% of the classes. An EMR report was used to identify patients for the control group who utilized NRT during the same timeframe but did not attend the class. Using a standardized script, tobacco abstinence rates in both the control and intervention groups will be assessed telephonically at 2, 4, 12, and 24 weeks following treatment. Results will be evaluated using descriptive statistics.
PRELIMINARY RESULTS: Telephonic follow-up calls to both groups are being conducted, and dependent upon agreement to enroll in the study, the anticipated final sample size is 80. Cessation rates for patients with complete follow-up response are

approximately 20% and 0% for patients in the intervention group and control group respectively.
CONCLUSIONS: Data collection continues through April 2016 to meet specified follow-up times.

96. Evaluation and standardization of current practices for reinitiation of warfarin therapy post-procedurally at a VA healthcare facility. Macayla Landi, PharmD*, Annette Pimenta, PharmD, CACP, Eric Kuszewski, PharmD, BCACP, Seth Cioffi, PharmD, CDE; Department of Pharmacy, VA Connecticut Healthcare System, West Haven, CT
INTRODUCTION: Current anticoagulation guidelines do not address optimal dosing of warfarin following peri-procedural interruption in patients bridged with low molecular weight heparin (LMWH). Several strategies may be used post-operatively, including reinitiation of the maintenance dose, which may result in prolonged reestablishment of a therapeutic international normalized ratio (INR) and continued need for LMWH bridging. Alternatively, a loading dose strategy has been found to achieve a therapeutic INR more rapidly.
OBJECTIVES: This quality improvement project aims to evaluate two strategies of warfarin dosing post-procedurally at a VA healthcare facility, to improve pharmacist interventions and optimize patient care.
STUDY DESIGN: This is a 12-week, prospective, two-phase study, which has received Institutional Review Board exemption as a quality improvement project.
METHODS: The first phase of this study included an anonymous survey of anticoagulation pharmacists to assess current warfarin reinitiation practices at a VA healthcare facility. The second phase will prospectively evaluate of two strategies of warfarin dosing for reinitiation post-procedurally in patients being bridged with LMWH. Time to therapeutic INR, discontinuation of LMWH, and 30-day outcomes will be evaluated for all patients.
RESULTS: A survey of anticoagulation pharmacists evaluating warfarin reinitiation practices was completed in October 2015. Preliminary survey results found that all pharmacists use a 7-day follow-up to assess INR post-procedurally. There was also found to be consistency in that most pharmacists use a loading dose strategy for warfarin post-procedurally, however, the way in which this is done differs between individual pharmacists. Variation in dosing is expected to have an effect on time to a therapeutic INR.
CONCLUSIONS: Upon completion of this project, data analysis will be used to identify areas of improvement in the process of warfarin reinitiation within a VA healthcare facility. Results will be utilized to provide pharmacist education and standardization of clinic practices.

97. A pharmacist-run proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitor clinic: short-term results and practical strategies. Matthew Stryker, Pharm.D.[1,*], Michael Kane, Pharm.D., FCCP, BCPS, BCACP[1], Robert Busch, M.D., FACE[2]; (1) Department of Pharmacy Practice, Albany College of Pharmacy and Health Sciences, Albany, NY; (2) Albany Medical Center Division of Community Endocrinology, Albany, NY
INTRODUCTION: Proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors represent the newest class of lipid-lowering therapies designed to reduce LDL-C; alirocumab and evolocumab are the only agents currently approved within the United States. Inhibition of the PCSK9 chaperone protein allows for continued LDL receptor recycling and increased cholesterol removal from circulation.
OBJECTIVES: The goal of this research is to report the real-world safety and efficacy of these medications in a pharmacist-run PCSK9 inhibitor clinic.
STUDY DESIGN: This is a prospective, observational, IRB-approved study from an endocrinology practice involving patients referred to a pharmacist-managed PCSK9 inhibitor clinic.
METHODS: This study will assess the efficacy (percent change in LDL-C, TC, non-HDL-C, TG, and HDL-C from baseline) and tolerability of alirocumab and evolocumab in approximately 60 patients with cardiovascular disease and/or diabetes mellitus. Collected data will include: patient demographic information, indication for referral and history of prior antilipemic therapy. A description of pharmacist activities will also be provided.
RESULTS: To date, 55 patients (55% alirocumab, 45% evolocumab) have been referred to the clinic and received at least one dose of a PCSK9 inhibitor. Twenty-two patients have completed at least 1 month of therapy and of these patients, 56% were receiving statin therapy when a PCSK9 inhibitor was initiated and the mean baseline LDL-C was 133 mg/dL ± 70. From these twenty-two patients, the following observations were observed [mean percent change ± standard deviation]: −51.4% ± 18.1 in LDL-C; −31.3% ± 10.1 in TC; −45.2% ± 13.0 in non-HDL-C; −26.1% ± 27.4 in TG, and +9.6% ± 15.3 in HDL-C.
CONCLUSIONS: These real-world interim data reinforce results observed from clinical trials of alirocumab and evolocumab. PCSK9 inhibitors are a unique class of antilipemics associated with intensive and consistent reductions in LDL-C.

98. Electronic cigarettes: the perceptions of pharmacists and physicians. Alana Grabigel, PharmD Candidate 2016, Dominick DiLucente, PharmD Candidate 2017*, Lauren Wolfe, PharmD, Jamie McConaha, PharmD, CGP, BCACP; Duquesne University Mylan School of Pharmacy, Pittsburgh, PA
INTRODUCTION: Electronic cigarettes, also known as e-cigarettes, are electronic nicotine delivery systems that have been increasing in popularity in recent years. While many manufacturers of e-cigarettes advertise their product as a smoking cessation aid, there is insufficient evidence to support this claim. The long-term health outcomes associated with e-cigarette use remain unknown.
OBJECTIVES: This study aims to evaluate pharmacists' and physicians' perception and knowledge of e-cigarettes, including comfort level in counseling patients on these products. The study will also assess if, and to what extent, patient e-cigarette usage is collected by these healthcare professionals as a marker of tobacco use status.
STUDY DESIGN: A cross-sectional survey has been distributed to two focus groups: pharmacists and physicians. Survey responses will be analyzed utilizing descriptive and inferential statistics, as appropriate.
METHODS: Data will be collected via survey methodology. Pharmacists practicing in the community pharmacy setting and physicians practicing in family medicine are the targeted subjects. The timeframe for survey distribution will be a period of 3 months or until a total of 200 surveys are completed (100 surveys from each group).
RESULTS: Based on preliminary results, pharmacists and physicians will benefit from further information on e-cigarettes. Pharmacists feel only slightly confident or not confident at all on counseling patients about e-cigarettes. Mixed results have been gathered on whether participants believe e-cigarettes may be used as an effective smoking cessation tool. Data collection is ongoing with anticipated completion by March 2016.
CONCLUSIONS: Due to the increasing popularity of e-cigarettes, pharmacists and physicians will be called upon to serve as informational resources and care providers for patients who use them. This proactive assessment highlights the upward trend in e-cigarette use and enhances patient care by presenting the topic in a forum that provides pharmacists and physicians the opportunity to become more familiar with e-cigarettes.

99. Pharmacist-physician collaborative care model vs. standard care: assessing time to blood pressure goal. Eric Parod, PharmD[1,*], Dave Dixon, PharmD, BCPS, CDE, CLS, AACC, FNLA[2], Evan Sisson, Pharm.D., M.H.A.[3], Pramit Nadpara, PhD[4], Leticia R. Moczygemba, PharmD, PhD[5], Dan Carl, MD[6], Alan Dow, MD[6]; (1) School of Pharmacy, Virginia Commonwealth University, Richmond, VA; (2) Department of Pharmacotherapy and Outcomes Science, Virginia Commonwealth University School of Pharmacy, Richmond, VA; (3) Department of Pharmacotherapy and Outcome Science, Virginia Commonwealth University School of Pharmacy, Richmond, VA; (4) Virginia Commonwealth University School of Pharmacy, Richmond, VA; (5) Department of Pharmacotherapy and Outcomes Sciences, Virginia Commonwealth University School of Pharmacy, Richmond, VA; (6) VCU Health System, Richmond, VA

INTRODUCTION: Pharmacist-physician collaborative care models (PCCMs) are shown to improve BP control rates and reduce mean BP, but it is unknown if PCCMs affect time to BP goal.

OBJECTIVES: The primary objective is to compare the time to BP control of a PCCM to standard care (SC) in an indigent population. Secondary objectives include the proportion of patients with BP control at the end of the 12-month follow-up period and any factors that may affect time to BP control.

STUDY DESIGN: This retrospective cohort study utilizes paper and electronic medical records.

METHODS: New patients first seen in clinic between January 1, 2012 and December 31, 2013 with a documented diagnosis of hypertension (or taking antihypertensive medication at the initial visit) were included. Exclusion criteria consists of eGFR <30 mL/min, <2 BP readings, and pregnancy. A Virginia safety-net free clinic serves as the PCCM site and a Virginia health system providing primary care to patient-assistance program recipients serves as the SC site. Time to BP control is defined as the time from the initial clinic visit to the first visit with a BP <140/90. The proportion of patients at goal was determined by evaluating the last BP measurement obtained during the 12-month follow-up period. The median (IQR) time to goal for each group was calculated and descriptive statistics used for patient demographics.

RESULTS: Interim results for the 350 eligible PCCM patients show the median time to BP control was 21 days (IQR 15–28) requiring a mean of 2.6 visits. At 12-months, 61% of PCCM patients were at goal. The remaining data collection and analysis for the SC group is expected to be complete by April 2016.

CONCLUSIONS: These preliminary findings suggest that the early and intensive follow-up provided by the PCCM quickly gets patients with hypertension to their goal BP.

100. A pharmacist's impact on secondary stroke prevention. Olivia Stanton-Ameisen, PharmD Candidate 2017, BA in Medical Anthropology[1,*], Sara Walton, PharmD Candidate 2017[1], Charles Ruchalski, PharmD[2], Jennifer Andres, PharmD[2]; (1) Temple University School of Pharmacy, Philadelphia, PA; (2) Department of Pharmacy Practice, Temple University School of Pharmacy, Philadelphia, PA

INTRODUCTION: Patients admitted to Temple University Hospital with a cerebrovascular accident (CVA) or transient ischemic attack (TIA) are referred to the pharmacist-run Stroke Prevention Clinic (SPC). CVA/TIA risk factors include hypertension, dyslipidemia, atrial fibrillation, diabetes, and smoking. Once a patient has a CVA/TIA, the risk for another event is higher than someone without an event. The goals of the SPC are to obtain optimal surrogate markers including blood pressure, LDL, and hemoglobin A1c values, and increase smoking cessation to reduce hospital admissions for secondary CVAs/TIAs, myocardial infarction (MI), and peripheral artery disease (PAD). The SPCS adjusts medications based on patient characteristics, preventing hospital admissions for CVA/TIA, MI, and/or PAD.

OBJECTIVES: The objective was to determine if patients receiving SPC care have better outcomes than patients that did not visit the clinic.

STUDY DESIGN: This was a retrospective chart review of patients referred to the SPC.

METHODS: Data was collected from the electronic medical record. At time of CVA/TIA, associated risk factors and pertinent medications were recorded. For patients that attended clinic, the number of appointments with the SPC was recorded and if new medications were added. Blood pressure, LDL, Hemoglobin A1c, weight, and smoking status were collected at time of CVA/TIA, before initial visit to the SPC, and after last SPC visit. Hospital admissions were reviewed to assess for secondary CVA, MI, and PAD. Data was collected for patients that did not attend clinic visits and was used as a control.

RESULTS: Records were reviewed for 456 patients. Readmissions for stroke, MI, and PAD were lower in the SPC group. Initial results show surrogate markers improved in the SPC group. Final analysis will be available by presentation date.

CONCLUSIONS: Pharmacists can play a role in reducing risk factors for secondary CVA/TIA and can prevent future hospital admissions.

101. Fall risk with trazodone versus zolpidem for the treatment of insomnia in the elderly. Christine Vaudo, PharmD[1,*], Maileah Nguyen, PharmD, BCACP[2], Amy Boutet, PharmD, BCACP[2], Jason Lancaster, PharmD, MEd, BCPS[3]; (1) Department of Pharmacy, Lahey Hospital & Medical Center, Burlington, MA; (2) Lahey Hospital & Medical Center, Burlington, MA; (3) Department of Pharmacy Practice, Northeastern University, Boston, MA

INTRODUCTION: Zolpidem and trazodone are the two most commonly prescribed medications for insomnia, and the prevalence of insomnia increases with age to more than 50% in the elderly. Use of either zolpidem or trazodone in the elderly is the associated adverse effects that put patients at risk for falls and subsequent injury. Currently, there is limited data demonstrating the efficacy of zolpidem and trazodone for the treatment of insomnia in the elderly, yet there is more evidence for adverse effects that increase the risk of falls.

OBJECTIVES: Primary objective: to determine if there is a difference in fall risk with trazodone compared to zolpidem for the treatment of insomnia in elderly patients in the ambulatory setting. Secondary objective: to determine if there is a difference in efficacy with trazodone compared to zolpidem for the treatment of insomnia in the elderly.

STUDY DESIGN: This single-center, IRB-approved, survey study aims to evaluate 160 ambulatory patients, aged 65 years and older, with a diagnosis of insomnia who received either zolpidem or trazodone.

METHODS: Patients with a diagnosis of depression or Parkinson's disease or with prescriptions for benzodiazepines, antidepressants, or other medications for insomnia will be excluded. Patients meeting eligibility criteria will be contacted via telephone and asked scripted questions regarding falls, near-falls, and efficacy of insomnia treatment over the preceding 12 months.

RESULTS: Thus far, data collection is complete for a total of 42 patients. Of these, 26% have experienced a fall/near fall (N=8 for zolpidem, and N=3 for trazodone). Additionally, patients on zolpidem have reported a better quality of sleep compared with trazodone.

CONCLUSIONS: Currently, zolpidem has been associated with more falls/near falls than trazodone. Continued data collection is ongoing.

102. Clinical and genetic predictors of anti-platelet therapy selection in coronary artery disease patients undergoing percutaneous coronary intervention. Nicholas Varunok, M.D. Candidate[1,*], Kasey Hamrick, Pharm.D. Candidate[2], Melissa Polasek, Pharm.D.[2], John Andrew Lee, Pharm.D.[2], Michael Wells, PharmD Candidate[3], Alexandra Cervantes, Pharm.D. Candidate[2], Vindhya B. Sriramoju, M.D.[1], Lucius Howell, M.D.[1], George A. Stouffer, M.D.[1], Craig Lee, Pharm.D., Ph.D., FCCP[2]; (1) Division of Cardiology, UNC School of Medicine, Chapel Hill, NC; (2) Division of Pharmacotherapy and Experimental Therapeutics, UNC Eshelman School of Pharmacy, Chapel Hill, NC; (3) UNC Eshelman School of Pharmacy

INTRODUCTION: Our institution implemented an algorithm incorporating clinical factors and *CYP2C19* genotype to guide $P2Y_{12}$ inhibitor selection (clopidogrel, prasugrel, or ticagrelor) in high-risk patients undergoing percutaneous coronary intervention (PCI).

OBJECTIVES: We aimed to evaluate algorithm use following its first year of implementation and identify key predictors of $P2Y_{12}$ inhibitor selection.

STUDY DESIGN: This single-center, retrospective cohort study included 597 consecutive patients undergoing PCI from July 2012-June 2013.

METHODS: Demographic and clinical characteristics, *CYP2C19* genotype, and anti-platelet therapy were abstracted from the medical record. Predictors of anti-platelet therapy (clopidogrel versus either prasugrel or ticagrelor) were identified by logistic regression.

RESULTS: Selection of clopidogrel maintenance therapy (69.8%) was more common than prasugrel (26.6%) or ticagrelor (3.5%). A *CYP2C19* genotype was obtained in 433 patients (72.5%); of these, 127 (29.3%) carried 1 or 2 loss-of-function alleles (LOF carrier). Prasugrel or ticagrelor was prescribed in 101/127 (79.5%) LOF carriers. In contrast, clopidogrel was prescribed in 243/306 (79.4%) of those without a LOF allele. In addition to *CYP2C19* genotype, several clinical factors were significantly associated with $P2Y_{12}$ inhibitor selection (see table).

Predictors of prasugrel/ticagrelor selection	Clopidogrel (n=269)	Prasugrel/Ticagrelor (n=164)	Adjusted odds ratio (95% CI)
LOF carrier	26 (9.7%)	101 (61.6%)	21.8 (12.2–41.3)
Acute myocardial infarction	98 (36.4%)	82 (50.0%)	2.10 (1.25–3.55)
Prior clopidogrel use	65 (24.1%)	14 (8.5%)	0.34 (0.15–0.71)
Age ≥75	56 (20.8%)	16 (9.7%)	0.27 (0.12–0.57)
Previous stroke	23 (8.6%)	3 (1.8%)	0.14 (0.03–0.54)
End-stage renal disease	15 (5.6%)	3 (1.8%)	0.17 (0.03–0.72)

CONCLUSIONS: When available, *CYP2C19* genotype is the strongest predictor of $P2Y_{12}$ inhibitor selection following PCI. However, acute myocardial infarction, prior clopidogrel use, contraindications to prasugrel use and end-stage renal disease are also independently associated with drug selection. Observational studies evaluating the relationship between *CYP2C19* genotype and $P2Y_{12}$ inhibitor use will need to account for clinical factors that influence anti-platelet agent selection.

103. Thrombotic events with use of recombinant activated factor VII in high-risk cardiac surgery. Neda Krunic, Pharm.D. Candidate 2017[1,*], Delia Saadeh, Pharm.D. Candidate 2016[2], Andrew J. Berry, Pharm.D, BCPS[3], Laura Tsu, Pharm.D, BCPS, CGP[4]; (1) College of Pharmacy – Glendale, Midwestern University, Glendale, AZ; (2) Midwestern University-College of Pharmacy, Glendale, AZ; (3) Banner University Medical Center Phoenix, Phoenix, AZ; (4) Department of Pharmacy Practice, Chapman University School of Pharmacy, Orange, CA

INTRODUCTION: Bleeding complications are common during high-risk cardiac surgeries, which necessitate the use of prothrombotic agents such as recombinant activated factor VII (rVIIa). However, large doses of rVIIa can increase the risk of thrombotic events, such as stroke or venous thromboembolism.

OBJECTIVES: Investigate the adverse outcomes of 2 patient cohorts receiving rFVIIa during cardiac surgery, particularly the primary endpoint of a thrombotic event.

STUDY DESIGN: Retrospective cohort study.

METHODS: Patients who were 18 years or older who were undergoing cardiac surgery from July 2011 to August 2014 at Banner Boswell Medical Center (BBWMC) and Banner University Medical Center Phoenix (BUMCP) were included. Key exclusion criteria were patients admitted for Transcatheter Aortic Valve Replacement or Left Ventricular Assist Device implant. Main outcome measures that will be collected include thrombotic events, dose of rVIIa, and concomitant agents used for control of bleeding.

RESULTS: The BBWMC cohort (n=34) demographics were 56% males and 44% females, with median age of 75 years. The mean dose of rFVIIa was 1.65 mg. The most common cardiac surgery was aortic valve replacement (50%) followed by mitral valve replacement (32%). Thrombotic events were identified in one (2.94%) patient. The BUMCP cohort (n=17) data is currently in the collection stage. Preliminary data show that three (17.65%) patients had a thrombotic event, 23.5% died and 5.9% were discharged to hospice. The mean dose of rFVIIa administered was 5.64 mg.

CONCLUSIONS: We predict the outcomes of this study will show an association between the dose of rFVIIa administered and incidence of a thrombotic event in cardiac surgery patients. The results of this study may be used to demonstrate an association between adverse outcomes related to rFVIIa dose during cardiac surgery, providing additional information regarding safe utilization of rFVIIa for postoperative bleeding in cardiac surgery patients.

105. Barriers to medication counseling in a rural community telepharmacy setting. Grace Unruh, PharmD[1,*], Rex Force, Pharm.D., BCPS, FCCP[2], John T. Holmes, Pharm.D., BCPS[3]; (1) School of Pharmacy, Idaho State University, Pocatello, ID; (2) Department of Family Medicine, Departments of Family Medicine and Pharmacy Practice, Idaho State University, Pocatello, ID; (3) Departments of Family Medicine and Pharmacy Practice, Idaho State University, Pocatello, ID

INTRODUCTION: Telepharmacy provides an option for delivery of pharmacy services in rural areas that would not otherwise support a pharmacist. Pharmacy best practices and state pharmacy law dictate that medication counseling be provided with all new prescriptions filled in the community telepharmacy. In our rural setting, medication counseling is offered, but the rate of acceptance of counseling is low.

OBJECTIVES: To examine perceived barriers to medication counseling identified from patients, technicians, and pharmacists in the rural community telepharmacy setting.

STUDY DESIGN: A structured interview guide was developed and determined to be exempt by our IRB. Barriers to medication counseling may be multifactorial and may include a lack of awareness of the service, having been told about a medication by another healthcare professional, perceived difficulty or length of time required to receive counseling, lack of value for the service, technical factors with telecommunication, workflow issues, concerns about privacy, or other reasons. The survey included questions regarding these barriers.

METHODS: Pharmacy technicians and patients at the remote sites will be surveyed to gain a better understanding of potential reasons for low rates of medication counseling. Data will be compiled and grouped into thematic area for describing barriers.

RESULTS: Five of six pharmacy technicians have been interviewed. Patient surveys will be distributed in January and February for reporting at the Virtual Poster session in May. Initial

results suggest that perceived length of time required for medication counseling is the most common barrier cited, per the technician interviews. Patient surveys will further elucidate reasons for low rates of counseling.
CONCLUSIONS: Understanding the most common reasons for low rates of medication counseling in a rural community telepharmacy setting will allow the pharmacy staff to make operational changes that may result in more consistently accepted services.

106. Comparison of extended infusion versus standard infusion magnesium repletion in adult trauma intensive care unit patients. Katharine Nault, Pharm.D., MBA[1,*], April Miller Quidley, Pharm.D., BCPS, FCCM[1], Christopher Dennis, Pharm.D., BCPS[1], Michael Bard, MD, MBA[2], Deanna Bice, Pharm.D., BCPS[1]; (1) Vidant Medical Center, Greenville, NC; (2) Trauma and Surgical Critical Care, East Carolina University Brody School of Medicine, Greenville, NC
INTRODUCTION: Hypomagnesemia can be detrimental in intensive care unit (ICU) patients, and rapid infusion times may cause increased renal excretion. There is minimal evidence on best practice for repleting magnesium, with standard infusion rates of 1 g over 30 minutes to an hour.
OBJECTIVES: The primary endpoint of this study is to determine if there is a difference in the effectiveness of magnesium repletion, measured by change in serum magnesium level per gram of magnesium administered, in trauma ICU subjects who received intravenous magnesium via extended infusion (>1 g per hour) compared to standard infusion (≤1 g per hour).
STUDY DESIGN: This is a retrospective, single-center comparison of trauma ICU patients receiving standard versus extended intravenous magnesium sulfate for magnesium repletion from January 2013 to October 2015.
METHODS: Extended infusions are randomly matched to standard infusions according to baseline magnesium (<1.0; 1.0–1.4; 1.5–1.9 mg/dL) and glomerular filtration rate (30–59; 60–89; ≥90 mL/min/1.73m^2) of the recipients. To achieve 80% power and detect a difference in magnesium of 0.17 mg/dL, 400 infusions (200 per arm) are required. Exclusions include renal impairment, enteral repletion, TPN, preeclampsia or vasospasm. Confounders will be evaluated including loop diuretics and fluid balance. Secondary endpoints include the percentage of doses that increased magnesium to ≥2.0 mg/dL and the change in serum potassium.
RESULTS: Preliminary results comparing 20 infusions in each arm resulted in a higher mean change in serum magnesium level per gram of magnesium administered with extended than standard infusions (0.201 mg/dL vs. 0.145 mg/dL). Additionally, lower doses of magnesium were given in the extended than standard arm (2.2 g vs. 2.8 g).
CONCLUSIONS: Data collection is underway and will be completed by March 2016. Preliminary results suggest extended infusion magnesium repletion could produce greater efficacy while utilizing fewer doses. Final results could allow for standardization of electrolyte repletion in a trauma ICU setting.

107. Improving adherence to a severe alcohol withdrawal protocol through targeted order-set interventions. Jessica Neal, Pharm.D.[1,*], Jennifer Catlin, PharmD, BCPS[2], Christina Stafford, PharmD, BCPS[2]; (1) Department of Pharmacy, CoxHealth, Springfield, MO; (2) CoxHealth, Springfield, MO
INTRODUCTION: Evidence-based guidelines for the prevention or treatment of severe alcohol withdrawal syndrome (SAWS) in critically ill patients are currently lacking. Benzodiazepines (BZDs) are generally accepted as the cornerstone of therapy, while agents such as phenobarbital, propofol, or dexmedetomidine are reserved for BZD-refractory patients. Previous research at our community hospital indicated adjunctive therapies are often employed before adequate trials of BZDs have been administered.
OBJECTIVES: To improve SAWS protocol adherence through targeted order-set interventions and healthcare provider education. Medication therapy received by patients with SAWS and admitted to the intensive care unit (ICU) will be documented after order-set interventions have been implemented to 1) compare medications administered before and after protocol implementation, and 2) evaluate dexmedetomidine usage before and after physician and nursing education.
STUDY DESIGN: Single-center, prospective, observational study with retrospective control group.
METHODS: Medical records of 66 patients admitted to the ICU at our hospital and treated for SAWS from August 2011 to October 2013 were reviewed in phase one data analysis. Patient's hospital course, medication management, and sedation and agitation scores were documented. The SAWS protocol was then revised and education was provided to staff before the start of phase two. Phase two data collection will begin January 19, 2016 and will evaluate patients treated for SAWS according to the revised protocol. Phase two study participants will be compared with phase one participants to assess changes in prescribing practices, order-set adherence, and dexmedetomidine use.
RESULTS: Sixty-six patients were evaluated in phase one. Of those initial 66 patients, 35 (53%) received dexmedetomidine for SAWS. Of those who received dexmedetomidine, 21 (60%) did not receive concomitant BZDs during dexmedetomidine administration. Patients who received dexmedetomidine had longer ICU and hospital length of stay versus those who did not (9.8 vs. 3.9 day and 18.3 vs. 9.3 days, respectively).
CONCLUSIONS: Expected completion May 31, 2016.

108. Use of acetylcysteine in non-acetaminophen induced acute liver failure. Justin Kinney, PharmD, MA[1,*], Nam Cho, PharmD, BCPS[2]; (1) Department of Pharmacy Practice, School of Pharmacy, Loma Linda University & Loma Linda University Medical Center, Loma Linda, CA; (2) Department of Pharmacy, Loma Linda University & Loma Linda Univeristy Medical Center, Loma Linda, CA
INTRODUCTION: The purpose of this study is to examine the use of acetylcysteine in patients with non-acetaminophen induced acute liver failure (NAI-ALF) and its effect on liver function. Treatment of acetaminophen toxicity with acetylcysteine is well established and is effective due to its ability to replenish hepatic glutathione. However, acetylcysteine also possesses antioxidant and vasodilating properties. There is a growing amount of evidence for the potential benefit of it in other causes of acute liver failure (ALF) as well. Our study examines this by comparing liver function markers pre- and post- acetylcysteine treatment in NAI-ALF patients.
OBJECTIVES: Primary outcome is to examine acetylcysteine's effect on the patients' liver function by comparing pre and post treatment AST/ALT, bilirubin, INR, PT, and MELD scores. Secondary outcomes also studied include patients' survival, rate of liver transplant, transplant free survival, and length of stay.
STUDY DESIGN: Retrospective chart review of patients admitted between December 5, 2012 and September 26, 2015.
METHODS: Single academic medical center generated report of all patients who received acetylcysteine using the electronic medical records system. Inclusion criteria are: adults (>18 years old), treated with acetylcysteine (oral or intravenous), and meet the American Association for the Study of Liver Diseases' (AASLD) classification of ALF; defined by evidence of abnormal coagulation (INR ≥ 1.5) and any degree of mental alteration (encephalopathy). Exclusion criteria are: acute liver failure due to acetaminophen toxicity or shock/ischemic liver.
RESULTS: 20 patients are enrolled with a goal N=45. Baseline characteristic averages and ranges, respectively, are: age (54.7, 28–86); AST (1175, 54–5473); ALT (724, 25–3305); bilirubin (12.5, 0.5–30.8); INR (3.3, 1.1–10.5); PT (32.9, 11.4–113.9); SCr (3.0, 0.8–8.9); MELD (35.2, 19–52.4).
CONCLUSIONS: Study in progress, 100% likelihood of completion by presentation date.

109. Prescribing patterns of dexmedetomidine in the intensive care unit and impact on supplemental pain and sedation medications. Eunah Cheon, PharmD[1,*], Emily Dornblaser, PharmD, MS[2]; (1) Pharmacy Department, New York Methodist Hospital, Brooklyn, NY; (2) Pharmacy Practice Department, University of New England, Portland, ME

INTRODUCTION: Dexmedetomidine use in our community-based intensive care unit (ICU) has increased since the implementation of recent Pain, Agitation and Delirium guidelines however some indications may be outside the recommendations

OBJECTIVES: The primary objective of this medication use evaluation was to describe the patient population and the indication for dexmedetomidine orders. Secondary objectives include duration of use and impact on other sedative or pain medications.

STUDY DESIGN: A retrospective chart review with prescribing indications documented concurrently.

METHODS: Adult patients admitted to the ICU between November 2014 and April 2015 with an order for dexmedetomidine were evaluated for inclusion. Patients who never received the ordered dexmedetomidine or received it outside of the ICU were excluded. Electronic medical records were retrospectively reviewed to collect patient demographics, duration of administration of dexmedetomidine and quantity of other sedative or pain medications administered. Indication was assessed from patient notes or in discussion with providers during the time of prescribing.

RESULTS: Twenty-six orders of dexmedetomidine were reviewed across 23 patients. The indications for dexmedetomidine use were failure of previous sedation therapy (34%), ventilator weaning (27%), primary agent for sedation (23%), lighter sedation for neurological evaluation (8%), alcohol withdrawal (4%), and miscellaneous (4%). Average infusion time for all patients was 23.8 ± 22.9 hours. Patients received an average of 4 doses of opioids per day and 2 doses of benzodiazepines per day during dexmedetomidine use. The average time of infusion in the failure of previous therapy and ventilator weaning subgroups were 36.81 ± 27.2 hours and 16.46 ± 8.2 hours respectively. Both subgroups received more bolus doses of opioids and benzodiazepines while on dexmedetomidine versus off.

CONCLUSIONS: Dexmedetomidine was used most commonly for the indications failure of previous therapy and ventilator weaning. The use of dexmedetomidine was consistent with the guideline suggested indications however it did not decrease the use of supplemental analgesia or sedation.

110. Evaluation of early versus late neuromuscular blockade in acute respiratory failure. Giles Slocum, Pharm.D.*, Christine M. Groth, Pharm.D., BCPS, Elaine Fosmire-Rundgren, Pharm.D., Jignesh Patel, Pharm.D., BCPS, Anthony Pietropaoli, M.D.; University of Rochester Medical Center, Rochester, NY

INTRODUCTION: In 2010, a multicenter, double-blind trial (ACURASYS) demonstrated an improved adjusted 90-day survival with administration of neuromuscular blocking agents (NMBAs) early in the course of severe acute respiratory distress syndrome. To date, this is the only pharmacologic agent tested in a large multicenter clinical trial that has been shown to improve survival.

OBJECTIVES: We sought to determine if there was a difference in 28-day ventilator-free days in patients with acute respiratory failure (ARF) receiving early administration of NMBAs compared to late administration of NMBAs.

STUDY DESIGN: A multicenter, retrospective cohort study conducted between March 2011 and July 2015.

METHODS: Adult patients admitted to an intensive care unit who received a continuous infusion of a NMBA for more than 24 hours for ARF (SpO2/FiO2 ratio or PaO2/FiO2 ratio <315 mmHg or <300 mmHg, respectively) were included. Twenty-eight day ventilator-free days, length of stay, mortality, organ failure, and complications from paralysis and mechanical ventilation were compared in patients who received early NMBA administration (≤48 hours from ARF diagnosis) versus late administration (>48 hours). Data are reported using descriptive statistics, Mann-Whitney Rank Sum test, and chi-square test as appropriate.

RESULTS: To date, 274 patients have been included (mean age 53.4 ± 15.5 years, males 62.7%) with 217 receiving early NMBA administration and 57 receiving late administration. Patients receiving early administration of NMBAs had more 28-day ventilator-free days (median [range]: 7.5 [0,19.4] vs. 0 [0,3.0] days, $p<0.001$), shorter hospital length of stay (median [range]: 18 [8,36] vs. 33 [18.25,53.5] days, $p<0.001$), and similar 28-day mortality (31.3 vs. 38.6%, $p=0.30$) compared to patients receiving late administration. Differences in organ failure and complications are yet to be determined.

CONCLUSIONS: The preliminary results appear to show that patients receiving early administration of NMBAs for ARF may have better outcomes compared to those who received late administration.

111. Pharmacist participation on adult code blue teams: a quality improvement initiative. Jennifer Empfield, Pharm.D.*, Lindsay Arnold, Pharm.D., Kelly Killius, Pharm.D., BCPS; Department of Pharmacy, Boston Medical Center, Boston, MA

INTRODUCTION: Pharmacist participation on resuscitation teams is considered by the American Society of Health System Pharmacists to be an essential service that hospital pharmacy departments should provide. There is little information available to help guide pharmacy departments regarding how to implement or expand this service.

OBJECTIVES: This quality improvement initiative will identify best practice strategies to improve pharmacist participation on adult code blue teams at our institution. Our primary aim for this initiative is to increase pharmacist participation on inpatient adult code blue teams to 100% by June 30, 2017.

STUDY DESIGN: This is a prospective, quality improvement initiative.

METHODS: Our primary intervention consists of the development of an educational training program that each of our pharmacists will complete. A survey is administered pre and post training to determine changes in confidence and competence. Pharmacist participation at an adult respiratory and cardiac arrest will then be tracked via documentation in the patient's electronic health record (EHR) to ensure that our primary aim is being accomplished.

RESULTS: Pharmacist training is ongoing. Approximately 50% (n=26) of our full-time inpatient pharmacy department has completed training so far. Baseline data show that pharmacist competence level is high prior to training, and therefore is not anticipated to change significantly after training. Preliminary analysis shows that pharmacist comfort scores improved from a mean of 3.5–4.1. A median of 13% of adult respiratory and cardiac arrests have pharmacist attendance at baseline. Over a three month period, attendance increased to approximately 40%. This outcome will continue to be monitored.

CONCLUSIONS: After several training sessions pharmacist comfort level has improved, which we anticipate will assist in improving pharmacist participation at adult respiratory and cardiac arrests.

112. Baseline experience and level of comfort with research design and implementation of current PGY1 residents in Arkansas. Janna Hawthorne, Pharm.D.*; Department of Pharmacy Practice, University of Arkansas for Medical Sciences, Little Rock, AR

INTRODUCTION: ASHP accrediting guidelines require that PGY1 residents complete a research project. These guidelines state that residents must "demonstrate ability to evaluate and

investigate practice, review data, and assimilate scientific evidence to improve patient care and/or the medication use system."[1] One problem with this implementation is that for many PGY1 residents, this may be their first experience with conducting research.
OBJECTIVES: To determine if PGY1 residents in Arkansas have similar past experience and comfort with various aspects of research.
STUDY DESIGN: Observational prospective study.
METHODS: A prospective study was undertaken of all PGY1 residents in Arkansas. Surveys were completed by 22 current residents to assess their past research experience and comfort with various aspects of research. PGY1 resident grouping was done to establish groups affiliated with the University of Arkansas for Medical Sciences (UAMS) and non-UAMS affiliated groups. Of the residents surveyed, 11 were UAMS-affiliated and 11 were not.
RESULTS: From the survey, demographic information showed that 78.3% of PGY1 residents were female with a dominant age range of 26–30. Past research experience was similar between the groups. Non-UAMS affiliated residents had greater experience in research poster creation and presentation. Survey data was divided into domains of comfort with methods, statistics, procedures, and general research knowledge. The variance between UAMS affiliated residents and non-UAMS affiliated residents was not-significant besides in the area of comfort with statistics (p-value of 0.0087).
CONCLUSIONS: PGY1 residents in Arkansas have similar past experience and comfort with various aspects of research. The similarity can be seen with UAMS affiliated and non-UAMS affiliated residents. Future research will be used to determine the efficacy of a pilot Research Certificate Program offered to UAMS affiliated PGY1 residents.
REFERENCES: 1. American Society of Health-System Pharmacists. (2015). Required competency areas, goals, and objectives for postgraduate year one (PGY1) pharmacy residencies.

113. Risk factors for adverse events during hypertension management in the emergency department: a comparison of intravenous antihypertensive therapies. Alyssa Fixl, PharmD*, Matthew Hinton, PharmD, BCPS, Kerry Mohrien, PharmD, BCPS; Temple University Hospital, Philadelphia, PA
INTRODUCTION: Initial therapy for elevated blood pressure (BP) in the emergency department (ED) is aimed at lowering BP gradually to avoid rapid changes in tissue perfusion and the development of ischemia. Drops in BP leading to hypotension should be avoided as hypotension in the ED has been shown to be an independent predictor of inpatient mortality. To date, there are no published guidelines or literature to recommend one antihypertensive agent over another in this setting.
OBJECTIVES: The primary objective is to determine the effect of individual IV antihypertensive agents on the development of adverse events during hypertension management in the ED. Adverse events are defined as the occurrence of any of the following after antihypertensive administration: decrease in mean arterial blood pressure (MAP) >25% within first 2 hours; systolic blood pressure <100 mmHg; need for vasopressor support or fluid resuscitation; or development of acute kidney injury (AKI) as defined by Acute Kidney Injury Network (AKIN) criteria. Secondary objectives include characterization of the treatment of elevated BP in the TUH ED and the incidence and type of adverse events according to antihypertensive agent.
STUDY DESIGN: This is a single center, retrospective chart review.
METHODS: Subjects included are adult patients admitted to the ED who received any IV antihypertensive agent for the treatment of elevated BP. Exclusion criteria include: age <18 years; hospital length of stay less than 48 hours; or diagnosis of aortic dissection, intracranial hemorrhage, myocardial infarction, or ischemic stroke.
RESULTS: To date, 68 patients have been screened with 20 included. The average age is 55.9 years. IV medications utilized thus far are labetalol, nitroglycerin, enalaprilat, and nicardipine. There were 13 incidences of adverse events: MAP decrease greater than 25% in 7 patients (1 requiring fluid resuscitation) and AKI in 5 patients.
CONCLUSIONS: N/A.

114. Effects of a medication history process refinement using pharmacy technicians in the emergency department. Kirbie St. James, PharmD[1,*], Candy Smith, PharmD[2], Shane Chordas, PharmD, BCPS[3]; (1) Pharmacy Practice PGY1, Sacred Heart Health System, Pensacola, FL; (2) Pharmacy Department, Sacred Heart Health System, Pensacola, FL; (3) Pharmacy Department, Sacred Heart Health System, Pensacola, FL
INTRODUCTION: A medication history should be current and comprehensive in order to minimize errors, maximize cost savings, and improve patient safety.
OBJECTIVES: The purpose of this study is to compare medication history services between a pharmacy technician and several emergency department (ED) nurses. It is hypothesized that the accuracy of the obtained information from the pharmacy technician will be improved compared to nurses, resulting in a cleaner and safer patient profile, with fewer medication errors.
STUDY DESIGN: A quality improvement study using a retrospective cohort design.
METHODS: Inclusion criteria consists of patients who are: at least 18 years of age, taking at least four home medications, admitted as an inpatient from the ED to an internal medicine floor, and remained hospitalized for at least 24 hours. A medication history questionnaire template and common medication list was created for use by the technician. Data was collected before implementing technician services from July 5, 2015 to August 25, 2015 and after technician service implementation from October 5, 2015 to November 25, 2015.
RESULTS: A total of 100 patients' medication histories will be analyzed. Of the 20 histories reviewed thus far, the pharmacy technician has outperformed the nurses by creating less medication reconciliation errors in three of the following four categories: wrong/missing drug, wrong/missing strength, wrong/missing frequency, and inpatient transfer discrepancies. A total of 711 patients' medication histories were obtained from the technician within 2 months. His interventions were categorized into one of the following groups: medications added, medications discontinued, or medication clarification.
CONCLUSIONS: Each day, the technician saw an average of 20 patients and recorded roughly 20 interventions. An estimated amount of $76 per patient intervention projects to an annual cost savings of $395,200. The results of this study will assist in justification of hiring additional pharmacy personnel in the ED.

115. Evaluation of a pharmacist managed diabetes clinic. Nadia Aneese, Pharm.D.[1,*], Alexandra Halalau, MD, FACP[2], Colleen Lauster, Pharm.D., BCPS, CDE[1], Sarah Muench, Pharm.D., CDE[1], Janna Fett, Pharm.D., BCACP[1]; (1) Department of Pharmaceutical Services, Beaumont Hospital-Royal Oak, Royal Oak, MI; (2) Department of Internal Medicine, Beaumont Hospital-Royal Oak, Royal Oak, MI
INTRODUCTION: The Healthcare Effectiveness Data and Information Set (HEDIS) is a tool used to evaluate the quality of care in chronic disease management and prevention. Attaining HEDIS measures is associated with cost-effective practice and better health outcomes. A pharmacist managed diabetes clinic (PMDC) was created to assist our institution in improving diabetes mellitus (DM) HEDIS scores. Pharmacists work under a collaborative practice agreement to provide patient-centered education and medication management, as well as to support patients in identifying self-management goals.
OBJECTIVES: The objective of this study is to evaluate the impact of a PMDC on diabetes HEDIS measures.
STUDY DESIGN: Retrospective cohort analysis of high-risk patients with type 1 or 2 DM.

METHODS: Seventy-two high-risk patients were included, 36 patients managed in the PMDC matched and compared 1:1 to patients receiving standard care. High-risk patients were defined as those with a hemoglobin A1c (HbA1c) of 9% or more. Eligible patients had a baseline HbA1c measured between January 1, 2015 and September 30, 2015. All outcomes will be evaluated at three and six months after the baseline HbA1c. The primary endpoints are the percent change in HbA1c and percent of patients who reach an HbA1c goal of 8% or less based on HEDIS measures. Secondary endpoints include: blood pressure below 140/90 mmHg, current eye exam and nephropathy screening, as well as the appropriateness of medication use with angiotensin-converting-enzyme inhibitors or angiotensin receptor blockers and statin therapy.
RESULTS: Data collection is ongoing. The PMDC group (n=36) had an average HbA1c of 11.9%±2.1%. Mean age was 51±12 years, 53% were male, and 92% had type 2 DM. Mean DM duration was 10±7 years.
CONCLUSIONS: Anticipate study to be completed by April 2016.

116. Evaluation of compliance to an intravenous insulin infusion protocol in the management of diabetic ketoacidosis. Whitney Aultman, Pharm.D.*, Maxine Ng, Pharm.D., BCPS, Rashmi Dungarani, Pharm.D., Afomia Feleke, Pharm.D., BCPS; Beaumont Hospital, Royal Oak
INTRODUCTION: The American Diabetes Association Consensus Guidelines stress the importance of fluid management, electrolyte replacement and insulin therapy for the management of diabetic ketoacidosis (DKA). In September 2012, our institution implemented a paper-based, fixed-dose insulin infusion protocol targeting a blood glucose (BG) range of 140–180 mg/dL for the management of hyperglycemia including DKA. This protocol is permitted for use on regular medical/surgical floors and intensive care units. To our knowledge, evaluation of compliance to a paper-based, fixed-dose insulin infusion protocol has not been evaluated, and few studies assessing compliance to other types of protocols exist.
OBJECTIVES: To assess compliance with a paper-based, fixed-dose IV insulin infusion protocol, and evaluate its impact on safety and efficacy outcomes.
STUDY DESIGN: Single-center retrospective chart review of DKA patients admitted between January and December 2013.
METHODS: Patients 18 years or older, admitted through the emergency center, with a diagnosis of DKA and treated with the intravenous insulin infusion protocol were included. Compliance to the protocol was defined as correct adjustment of insulin infusion rate and correct timing of BG checks (plus or minus 20 minutes from the protocol-stated timeframe). Protocol efficacy was assessed with average BG during infusion, time to target BG, and percentage of BG values within the desired range. Safety outcomes were evaluated on incidence of hypoglycemia (BG <70 mg/dL), hyperglycemia (BG >180 mg/dL), and hypokalemia (K+ <3.3 mEq/L). Descriptive statistics will be utilized to analyze data.
RESULTS: Data was collected on 72 patients. 46 had type 1 diabetes, and a majority (45.8%) were located in a progressive unit during their IV insulin infusion. To date, BG and IV insulin infusion data has been gathered encompassing a total of 1754 BG values. Compliance data analysis and its relation to safety and efficacy is ongoing and will be completed prior to March 1st, 2016.
CONCLUSIONS: [Ongoing].

117. Identifying missed opportunities for the pneumococcal conjugate vaccine (PCV13) in outpatient Veterans 65 years and older. Lauren Jindracek, Pharm.D.[1,*], Jennifer Stark, Pharm.D., BCPS[1], Jean Nelson, R.N.[2]; (1) Department of Pharmacy, Veterans Health Care System of the Ozarks, Fayetteville, AR; (2) Department of Nursing, Veterans Health Care System of the Ozarks, Fayetteville, AR
INTRODUCTION: Most pneumococcal deaths in the United States occur in adults. The most effective way to prevent pneumococcal disease is vaccination. The recommendation for use of the pneumococcal conjugate vaccine (PCV13) in adults 65 years and older is recent, and the dosing schedule of PCV13 and the pneumococcal polysaccharide vaccine (PPSV23) can be complex in this population. PCV13 administration rates have not been assessed since the recommendations were expanded to include patients 65 years and older.
OBJECTIVES: Assess the rate of PCV13 immunization in patients 65 years of age and older and identify barriers that contribute to missed opportunities for PCV13 in this population.
STUDY DESIGN: A retrospective chart review of 150 outpatient Veterans age 65 years or older who did not receive PCV13 immunization at a scheduled Primary Care appointment during March 2015.
METHODS: Computerized patient records were used to determine if a patient has received PCV13. If a patient has not received the PCV13, investigators will review electronic medical records and record any documented reason for a patient not receiving the PCV13 which will include: patient declined PCV13, medication not available for administration in clinic, vaccine not offered at appointment, not recommended to give due to timing of last PPSV23, contraindication to PCV13, or other reason.
RESULTS: The rate of PCV13 immunizations administered at Primary Care appointments during the study period was only 37% (89 out of 239 PCV13 eligible patients). The remaining 150 patient records will be reviewed further to identify opportunities for provider education and process improvement.
CONCLUSIONS: Current results demonstrate a low rate of PCV13 immunization in outpatient Veterans 65 years and older. Upon completion of this study, barriers to patients not receiving PCV13 will be identified. Current project completion goal is March 7, 2016.

118. Evaluating the effects of a pharmacist-led intervention program on blood pressure control within an employer sponsored healthcare clinic. Chelsea Hudak, PharmD[1,*], Laurel Aaberg, PharmD[1], Ronni Nemeth, PharmD[1], Kyle Hinkley, PharmD[2]; (1) Pharmacy Department, Confluence Health, Wenatchee, WA; (2) Stemilt Clinic Pharmacy, Confluence Health, Wenatchee, WA
INTRODUCTION: National goals regarding blood pressure control are not being met with only 44% of patients controlled on their current antihypertensive therapy. Those at greatest risk for remaining uncontrolled include men, those less than 40 years old, and Hispanics. These key demographics comprise much of the workforce at the Stemilt Clinic. A pharmacist at the Stemilt Clinic can serve as a key ally in guiding both patients and providers to improve blood pressure control in this primary care clinic.
OBJECTIVES: To evaluate the impact of a pharmacist-led intervention on blood pressure control by month three versus conventional physician follow-up.
STUDY DESIGN: Single center, randomized, prospective cohort.
METHODS: The study was approved by the Institutional Review Board. Non-pregnant adults prescribed at least one antihypertensive were eligible for enrollment. After informed consent was obtained, patients were randomized to monthly pharmacist follow-up or standard of care. At each pharmacist follow-up, standardized education was provided and adherence was assessed to address barriers. Clinic nurses evaluated blood pressure at baseline and with each scheduled follow-up using a scope and cuff. Adherence was calculated utilizing a manual proportion of days covered (PDC) calculation, with adherence defined as >80% based on national standards. Descriptive statistics were used to assess baseline data. Anticipated completion date is June 1st, 2016.
RESULTS: Baseline data demonstrates a mean blood pressure of 142/88 mmHg (137–149/82–91 mmHg 95% CI) in this clinic population. Approximately 43% of these patients are controlled on

their current therapy, on par with national statistics. Approximately 15.7% of these patients are on beta-blockers, a non-preferred agent per Joint National Committee (JNC) 8 guidelines and area for potential intervention.
CONCLUSIONS: The results of this study will help demonstrate the utility of pharmacists as a resource in improving blood pressure control in a primary care clinic.

119. AAT-Falls: adherence to antihypertensive therapeutic guidelines and association with falls in a long-term care facility. Kimberly Grant, Pharm.D.[1,*], Christine O'Neil, BS, Pharm.D., CGP, FCCP[1], Jordan R. Covvey, Pharm.D., Ph.D., BCPS[2], Nicholas Dominick, Pharm.D. Candidate 2016[1]; (1) Mylan School of Pharmacy, Duquesne University, Pittsburgh, PA; (2) Duquesne University Mylan School of Pharmacy, Pittsburgh, PA
INTRODUCTION: Hypertension is a prevalent condition in the aging population. Joint National Committee (JNC)-8 guidelines recommend a blood pressure goal of <150/90 mmHg for patients over 60 years. Preliminary data from the SPRINT trial suggests benefits with a more stringent systolic blood pressure goal (120 mmHg) for patients over 50 years. The influence of blood pressure on falls in older patients is an important consideration that requires further evaluation of blood pressure treatment goals in this population.
OBJECTIVES: To compare blood pressure goals for patients with hypertension in a skilled nursing home setting to current JNC 8 clinical practice guidelines and to investigate the relationship between treatment goals and falls prevalence.
STUDY DESIGN: Retrospective, observational cohort using electronic medical records.
METHODS: Data was sampled from patients who received treatment for hypertension between January 1 and June 30, 2014. Demographic and clinical data was collected, including age, renal function, comorbid diagnoses, mean systolic and diastolic blood pressures, antihypertensive medications and the presence of hold parameters. Adherence to JNC-8 guidelines and the correlation of blood pressure and falls will be described using descriptive and nonparametric statistics.
RESULTS: Ninety patients were included in the analysis. Fifty-three percent of patients were ≥85 years old. Hold parameters were identified in only 11% of patients. Ninety-five percent of patients (n=86) met JNC-8 goals with an average measured blood pressure ≤150/90 and accounted for all 45 documented falls. No falls were documented among patients with hold parameters. However, mean systolic blood pressure did not differ between patients with and without hold parameters (124 vs. 126 mmHg, p=0.695).
CONCLUSIONS: In older patients, hold parameters for antihypertensive medications may prove useful. The effect of this intervention on falls reductions is unknown. Practice guidelines coupled with clinical judgement are needed to establish appropriate blood pressure goals in the aging population.

120. Clinical pharmacy and the impact of providing smartphones to patients to manage chronic diseases: a systematic review. Natalie Weltman, Pharm D Candidate*, Annesha White, Pharm D, Mehdi Namil, Pharm D Candidate, Jason Trinh, Pharm D Candidate, Pamela Carter, Pharm D Candidate, Katrina Dsouza, Pharm D Candidate, Chloe Dang, Pharm D Candidate, Cassidy Loving, Pharm D Candidate, Stephanie Jacob, Pharm D Candidate; University of North Texas System College of Pharmacy
INTRODUCTION: Approximately, 60% of Americans own a smartphone and 15% prefer using it to go online. Chronic disease management can be addressed via smartphones focusing on quality of care and reducing costs.
OBJECTIVES: The objective of this study was to identify examples of patient use of smartphones to improve health outcomes. A secondary objective was to explore associated costs in the form of reduced hospitalizations and readmissions.
STUDY DESIGN: A systematic review was conducted using Pubmed, Medline, Cinahl Plus, Cochrane Library, Scopus, Trip and PsychInfo to identify studies between 2005 and 2015. Key search terms included "mhealth", "telehealth", "smartphone", "mobile applications", "cost savings", and "patient health outcomes".
METHODS: Abstracts were screened against inclusion criteria and selected based upon relevance and quality. The most significant eligibility criteria required was that a smartphone must have been provided to the patient. Risk of bias was assessed using the Cochrane Risk of Bias Tool. Use of Covidence facilitated the summary of selected articles. Notable characteristics were summarized in tables.
RESULTS: The search yielded a total of 20 articles for review. Findings focused on three key areas: disease and medication management, personal fitness and wellness and remote patient monitoring. Seven of the ten studies related to disease management showed improvement in clinical outcomes measured. Studies in which smartphones were provided to remotely monitor patient data had the most impact in reducing emergency room visits, hospitalizations, and readmissions. The smartphone programs that featured mobile coaching and medication reminders had high levels of patient satisfaction and reported increased behavior change and medication adherence. Clinical pharmacists must consider patient factors that affect successful implementation of smartphones.
CONCLUSIONS: Providing smartphones to patients can improve disease state management and lower overall healthcare costs in clinical pharmacy settings. Several studies point toward decreases in readmissions, but more research is needed to explore the associated benefits and costs.

121. Prevalence of pharmacy-led warfarin patient education in a community hospital: a retrospective review. Ashley Evans, Pharm.D.*, Brian Grace, Pharm.D., James Houpt, Pharm.D., BCPS, Elizabeth Englin, Pharm.D., BCPS; Pharmacy Department, CoxHealth, Springfield, MO
INTRODUCTION: For patients being discharged on warfarin, written education compliant with Centers for Medicare and Medicaid Services VTE-5 criteria is required. Pharmacists, as medication experts, are well positioned to provide education on complex monitoring, dietary restrictions, and medication interactions that accompany warfarin use. Additionally, it is established that student pharmacists can effectively provide clinical services as pharmacist extenders.
OBJECTIVES: The primary objective of this study is to determine the proportion of warfarin patients educated by the pharmacy department. The study will also determine which pharmacy personnel are providing educations by reviewing the proportion of educations provided by pharmacists, resident pharmacists, and student pharmacists respectively. Additionally, thirty and 60 day readmission rates and estimated cost associated with providing these educations will be reviewed.
STUDY DESIGN: This is a retrospective, cross-sectional review of current pharmacy warfarin patient education practices. The proportion of patients educated will be evaluated using simple percentages. Readmission rates will be evaluated using either the Chi-squared or Fischer's Exact Test depending on observed incidence. The study protocol was approved by the Western Institutional Review Board.
METHODS: Medical records of inpatient adults with warfarin orders from February 1 to March 31, 2015 will be reviewed. Patients who were discharged on warfarin will be included in the study up to a goal sample size of 150. Date of pharmacy education, pharmacy personnel providing education, and time spent providing education will be collected, as well as date of discharge and incidence of thirty and 60 day readmission.
RESULTS: Preliminary reports based on documentation show that 5.33% of patients received warfarin education from the pharmacy department. Pharmacists performed 87.5% of these sessions

and 12.5% were performed by student pharmacists. Additional chart review is needed to ensure no sessions were missed due to inconsistent documentation.
CONCLUSIONS: Conclusions pending study completion in April of 2016.

122. Prevalence of interacting herbal and alternative medicine product use in cancer patients at a single infusion center. Raquel Barrack, PharmD/MBA Candidate 2017[1,*], Megan Corsi, PharmD/MBA Candidate 2016[2], Sandra Avelar, PharmD Candidate 2017[2], Sabrina Atkison, PharmD/MBA Candidate 2017[2], Simon Pence, BS, PharmD, BCOP[3]; (1) School of Pharmacy, Roseman University of Health Sciences, South Jordan, UT; (2) Roseman University of Health Sciences; (3) Intermountain Healthcare
INTRODUCTION: A scarcity of data exists evaluating the prevalence of patient self-care as add-on therapy to established chemotherapeutic protocols.
OBJECTIVES: This study aims to identify patient groups that are at risk of self-administering Complementary/Alternative Medicine (CAM) that can potentially interact. This could help in development of a triage protocol to direct patient education and time to those at risk to more proactively avoid use of medications that could potentially interact.
STUDY DESIGN: Single-center, retrospective, non-interventional, IRB approved study.
METHODS: Inclusion criteria were those receiving chemotherapy from January 2014 – October 2015. Exclusion criteria included patients younger than 18 years and those receiving chemotherapy for reasons other than cancer treatment. Results were analyzed using descriptive statistics to identify existing relationships between parameters such as baseline characteristics, diagnoses, and CAM-use.
RESULTS: Forty-three out of 94 patients studied had recorded CAM-use. A total of 5 out of 94 patients evaluated were taking interacting CAM. CAM was used in 22 female patients and 20 male patients. Four of 5 interactions found were in the 43 total female patients with recorded CAM-use. Each patient that was recorded as taking some sort of CAM used multiple agents, as 84 supplements/herbal products were taken out of the 43 that used CAM. Fifteen patients were taking herbal therapy and 26 took vitamins.
CONCLUSIONS: Many patients taking CAM did not have significant interactions. Almost half of the patients analyzed used CAM showing the prevalence of this therapy among this population. The top 3 CAM included multivitamins, B vitamins and Magnesium supplementation. 6.4% interact with concomitant chemotherapy. Though there were fewer females included, more interactions were seen. Larger studies are needed comparing disease outcomes and survivability in those that take CAM compared with traditional treatment.

123. Incorporation of a vancomycin nomogram into a standard vancomycin dosing protocol at a community hospital: effect on vancomycin troughs and nephrotoxicity. Andy Snyder, Pharm.D.*, Melissa Steenhoek, Pharm.D., BCPS, Temitayo Bakare, Pharm.D., ALM, BCPS, J.K. Sturgeon, Pharm.D.; Pharmacy, CoxHealth, Springfield, MO
INTRODUCTION: Pharmacists are consulted to dose greater than 90% of vancomycin orders at our institution. Our current practice requires pharmacists to select initial vancomycin doses using time-consuming population-based pharmacokinetic equations. An equally efficacious but streamlined method of dosing vancomycin was desired. Nomograms have been studied as an alternative dosing method for initial regimens. We selected and modified an existing, validated nomogram to fit our current dosing practices.
OBJECTIVES: Our primary objective was to evaluate the rate of goal trough achievement before and after incorporation of the nomogram. Our secondary objective was to evaluate for any change in nephrotoxicity rates.
STUDY DESIGN: This is a retrospective cohort study which evaluated 150 patient charts prior to, and after incorporation of a vancomycin nomogram (n=300).
METHODS: The electronic medical record was reviewed to identify patients who received vancomycin therapy and had at least one vancomycin trough level drawn. Exclusion criteria were patients with a diagnosis of cystic fibrosis, a baseline creatinine clearance below 30 mL/min, or age less than 18 years. Data collection for both pre- and post-implementation included indication for vancomycin, trough level(s), therapy duration, baseline and serial serum creatinine, and exposure to concomitant nephrotoxins.
RESULTS: Pre-nomogram data suggested that initial vancomycin goal trough achievement rates were approximately 31% at our institution, with an additional 11% of patients falling within 1 mcg/mL of the goal range. The incidence of nephrotoxicity for patients receiving vancomycin without concomitant nephrotoxins was 4.5%, which is similar to the 5–7% rate described in previous studies.
CONCLUSIONS: No conclusions have been made at this time, as our research is still in progress.

124. Association between procalcitonin levels and clostridium difficile infection. Kelly Ishizuka, Doctorate of Pharmacy*; Loma Linda University, Loma Linda, CA
INTRODUCTION: Elevation in procalcitonin (PCT) has been correlated to infections caused specifically by bacteria. Therefore, procalcitonin levels have been used to assist in diagnoses and guidance of antibiotic therapy in respiratory tract infections as well as sepsis. However, data on the use of procalcitonin levels in patients with *Clostridium difficile* infection is limited.
OBJECTIVES: The objectives of this study are to determine the association between *Clostridium difficile* infection and procalcitonin, evaluate the association between severity of infection and procalcitonin, describe trends seen in procalcitonin levels based on antibiotic therapy, and determine individual severity factors associated with increased procalcitonin.
STUDY DESIGN: Retrospective chart review.
METHODS: Patient charts from October 2014 through October 2015 are currently being reviewed to compare procalcitonin levels of patients with positive *Clostridium difficile* diagnostic tests to patients with negative results. Procalcitonin levels of patients stratified based on infection severity will also be compared. Previous history of *Clostridium difficile* infection, elevated white blood count, serum creatinine, temperature, and number of bowel movements will be analyzed to determine if there is a correlation between these factors and procalcitonin levels.
RESULTS: To date, 36 patients have been included in this study; 24 patients with GDH and toxin positive results and 12 patients with GDH and toxin negative results. The average PCT level in patients with GDH and toxin positive results is 5.15 (range: 0.11–48.23) and GDH and toxin negative results is 5.70 (range: 0.07–52.26). One patient's infection categorized as severe complicated and 23 patient's infection was mild/moderate.
CONCLUSIONS: Data collection is in progress. The presentation of this study will provide further data on procalcitonin levels in the presence of *Clostridium difficile* infection and the association between procalcitonin and different levels of *Clostridium difficile* infection severity.

125. Prescribing trends of antibiotics in patients with documented beta-lactam allergy or intolerance. Michael Licari, Pharm.D.*, Michael Forman, Pharm.D.; Pharmacy, Beaumont Hospital, Troy, MI
INTRODUCTION: According to available literature, approximately 10% of patients will report a penicillin allergy. Documentation regarding the nature of the allergic reaction is absent in up

to 70% of these patient's medical records. True immediate type reactions must be distinguished from minor reactions or intolerances. Imprecise allergy documentation is associated with increased antibiotic costs, adverse events, and potential antimicrobial resistance.
OBJECTIVES: The objective of this study is to assess antibiotic prescribing habits in patients with documented beta-lactam allergy or intolerance at a 458 bed community teaching hospital.
STUDY DESIGN: Single center, retrospective chart review.
METHODS: A report utilizing the electronic medical record will be used to identify patients who are at least 18 years of age, have a documented beta-lactam allergy, and have received at least one dose of an antibiotic during the study period. Primary study endpoints include: percent of patients with previously documented beta-lactam allergy and corresponding reaction, percent of patients that received a beta-lactam antibiotic with previously documented mild/moderate, severe, or unknown reaction, and percent of patients with a beta-lactam allergy that received an alternative antibiotic.
RESULTS: A total of 100 patients were included in the study. Seventy-nine percent of patients had a previously documented beta-lactam allergy and corresponding reaction. Approximately 40% of patients that received a beta-lactam antibiotic despite having a previously documented reaction had a mild/moderate reaction, 8% had a severe reaction, and 13% had an unknown reaction. Thirty-nine patients received an alternative antibiotic during their visit.
CONCLUSIONS: The results of this study elucidated the complex nature of imprecise allergy documentation. The prescriber's decision to use a beta-lactam antibiotic is confounded with the poor documentation of allergies. Beta-lactam antibiotics may be tolerated by patients with a documented allergy.

126. Evaluation of the microbiology lab addressing physicians regarding *Clostridium difficile* testing. Katlin Pritchett, PharmD*, Shane Chordas, PharmD, BCPS; Pharmacy Department, Sacred Heart Hospital, Pensacola, FL
INTRODUCTION: Hospital acquired *Clostridium difficile* rates have increased in the past decade and through the antibiotic stewardship program at Sacred Heart Hospital, methods have been implemented to make the ordering process of *Clostridium difficile* tests more efficient.
OBJECTIVES: In order to decrease hospital acquired *Clostridium difficile* rates, the microbiology lab started calling physicians/nurses when *Clostridium difficile* tests are ordered to check for inappropriate testing.
STUDY DESIGN: Retrospective cohort study.
METHODS: Participants classified as having hospital acquired *Clostridium difficile* were included in this study. The ordering process of *Clostridium difficile* tests were analyzed based off data collected retrospectively from eligible participants between July 2015 and April 2016. In November 2015, the microbiology lab began calling physicians/nurses when *Clostridium difficile* tests were ordered to prevent inappropriate testing. Inappropriate testing was defined as being tested for the *Clostridium difficile* toxin when a prokinetic agent was administered within 24 hours before receiving the test. Data was collected before and after the implementation of this process to decrease our hospital acquired *Clostridium difficile* rates through eliminating test performance on participants who are colonized with this pathogen instead of having an active infection.
RESULTS: After 2 months since implementation of this process, inappropriate tests ordered for the *Clostridium difficile* toxin in hospital acquired participants has dropped from 58.3% to 33.3%. Data gathered between July and November showed 14/24 inappropriate tests and preliminary data for December and January show 3/9 inappropriate tests ordered thus far. There was an average of 4.8% of *Clostridium difficile* cases during the first 5 months. It is predicted to be less than this average over the second 5 month course of this study.
CONCLUSIONS: A decrease is shown in hospital acquired *Clostridium difficile* rates due to inappropriate test ordering which should also decrease our overall hospital acquired *Clostridium difficile* rates as well.

127. Follow-up of emergency department microbiological cultures in the event of organism-antibiotic mismatch. Andrew Norman, PharmD*; Department of Pharmacy, Cone Health - Alamance Regional Medical Center, Burlington, NC
INTRODUCTION: Emergency department providers usually prescribe antimicrobials before culture and sensitivity results are known, potentially resulting in a mismatch of the agent's spectrum of activity and the causative organism, increasing the chances of clinical failure. Appropriate selection of agent, dose and duration in therapy modification after ED discharge is an area suited to pharmacy intervention.
OBJECTIVES: This project will first seek to retrospectively characterize the extent of therapeutic mismatches resulting in changes to therapy.
The prospective component of the study will involve pharmacists in the culture follow-up process and evaluate outcomes compared to the retrospective study. Through increasing pharmacist involvement, we hope to improve outcomes.
STUDY DESIGN: This comparative cohort study compares a nursing-led to a pharmacist-led follow-up process. Patients were included if they were ≥18 years old, visited the Alamance Regional Medical Center ED between either 9/1/2014 – 11/30/2014 (retrospective) or 9/1/2015 – 11/30/2015 (prospective), with a culture resulting after discharge. Patients were excluded if they were <18 years of age.
METHODS: A review of retrospective and prospective patients will be conducted to gather baseline data and parameters relating to their ED visit including diagnosis and discharge antibiotic. In the event of a therapeutic mismatch, the time to follow-up and change in therapy will be recorded. Any trends noted in the resistance patterns of isolated bacteria will be noted. Admissions to either the ARMC ED within 96 hours or to an inpatient ward within 30 days will also be recorded.
RESULTS: Preliminary results show that 41.2% (45/109) of subsequent lab-confirmed UTIs were treated with fluoroquinolones. In 11% of cases, no antibiotics were given.
CONCLUSIONS: In a community hospital setting, opportunity exists to educate prescribers on narrower spectrum antibiotics in the outpatient treatment of uncomplicated UTIs. Final statistical analysis and conclusions anticipated March 2016.

128. Evaluation of angiotensin-converting enzyme inhibitors and angiotensin-II receptor blockers in patients with coronary artery disease and diabetes mellitus or left ventricular systolic dysfunction within an accountable care organization. Stacey Karl, Pharm.D.[1,*], Dawn Pettus, Pharm.D.[2]; (1) Care Management, Cone Health/Triad HealthCare Network, Greensboro, NC; (2) Care Management, Triad HealthCare Network, Greensboro, NC
INTRODUCTION: This quality improvement study will target high risk patients within Triad HealthCare Network's Medicare Shared Savings population. The network primary care physicians have quality metrics that they must meet each year. One of the quality measures is the use of ACE inhibitor or ARB therapy for patients with coronary artery disease and diabetes and/or left ventricular systolic dysfunction.
OBJECTIVES: The primary objective is to evaluate the impact of pharmacist education intervention on the use of ACE inhibitors and ARBs in patients with coronary artery disease and diabetes and/or left ventricular systolic dysfunction within an accountable care organization (ACO) and to evaluate the impact of the ACO's fulfillment of the quality metric. Secondary objectives include evaluating documentation within electronic medical record for contraindications to ACE inhibitor or ARB therapy and evaluating the number of pharmacist recommendations that are approved by providers.

STUDY DESIGN: A prospective, educational, quality improvement study of THN patients with coronary artery disease and diabetes and/or left ventricular systolic dysfunction not on an ACEI inhibitor or ARB.
METHODS: High Risk Patients have already been identified within the ACO who have not met this medication related quality metric and they will be targeted. Recommendations will be communicated to the THN provider and will include missing, harmful, or suboptimal therapy. The response to these recommendations will be monitored. The THN practices with the lowest quality metric score will be targeted for education by a pharmacist.
RESULTS: Out of 112 high-risk patients identified by a previous targeted medication review, 51 (46%) patients have an indication for ACE inhibitors or ARB therapy but are not on it. Many health care providers have cited chronic kidney disease (CKD) as the contraindication to ACE inhibitors or ARB therapy. Further data analyses in progress.
CONCLUSIONS: Study projected to be completed by March 31st, 2016.

129. Evaluation of duplicate medication orders at a tertiary care hospital. Kalyn Acker, PharmD*, Nilofar Jafari, PharmD, Ed Seidl, PharmD; Department of Pharmacy, Allegheny General Hospital, Pittsburgh, PA
INTRODUCTION: Evaluation of duplicate medication orders at an institution is important for minimizing patient risk, improving patient outcomes, and complying with regulatory standards, such as Joint Commission standards.
OBJECTIVES: The objective of this evaluation is to determine the extent to which duplicate medication orders exist and to identify key characteristics of duplicate medication orders at a tertiary care hospital.
STUDY DESIGN: Duplicate medication orders were identified using the electronic medical record. Data collection occurred on four consecutive Fridays at a pre-specified time to obtain a snapshot of duplicate medication order incidence. Duplicate medications were defined as active (i.e. verified) PRN medications without clear administration instructions, exact medication orders, and therapeutic duplications as clinically determined by the evaluator.
METHODS: A total of 18,544 orders were reviewed during the data collection period, averaging 4,366 orders per day. The total number of duplicate medication orders was collected for each hospital unit; duplicate orders as a percentage of all orders was calculated.
RESULTS: There were a total of 262 duplicate medication orders with a duplication rate of 1.4%. Analgesic medications and PRN medications without clear administration instructions consisted of the highest percentage of duplicate medication orders. Duplicate medication orders were similar for ICUs and non-ICUs, with an average of 14.8 and 15.7 duplicate medication orders per unit, respectively. Further analysis will be performed to determine the percentage of duplicate medication orders originating from an order set by February 2016.
CONCLUSIONS: This evaluation confirmed a low incidence of duplicate medication orders, relative to incidence rates found in published articles, within the hospital. PRN medication orders and analgesic agents composed the majority of the institution's duplicate medication orders. By understanding the extent and characteristics of duplicate medication orders within the institution, future educational initiatives can be implemented in targeted areas.

130. Pattern of antibiotic therapy and effectiveness in gastrointestinal surgeries. Santosh Chandrashekar, Doctor of Pharmacy[1], Ibel C. Fredy, Doctor of Pharmacy[1,*], Srinivasan Ranganathan, M.Pharm.(PhD)[2]; (1) College of Pharmacy, PES College of Pharmacy, Bangalore, India; (2) Department of pharmacy, Annamalai University, Annamalai nager, India
INTRODUCTION: Surgical site infection is one of the most common healthcare-associated infection in patients undergoing surgery and remains a major source for post-operative morbidity. This encourages surgeons to adopt a more liberal approach toward prescribing antibiotics. In practice this may seem beneficial in reducing infection rates in inpatient setting, but can potentially lead to emergence of more resistant microorganisms. Thus, resulting in worsening of patient condition as well as increased health-care costs. Appropriate antibiotic prescribing for the purpose of prophylaxis as well as post-operative purpose in surgical units is of great importance. Ensuring improved quality of care for patient, infection control as well as to prevent proliferation of multi-resistant organisms.
OBJECTIVES: The purpose of the study is to identify the pattern of antibiotic usage as prophylactic or infection control in various GI surgeries and its effectiveness.
STUDY DESIGN: Cross sectional Retrospective study.
METHODS:

1 Cross-sectional Retrospective study conducted at quaternary care hospital (Jan 2015 – Dec 2015).
2 Data was collected as case series and analyzed using Microsoft excel.
3 Appropriateness of antibiotic therapy was based on compliance with ASHP Therapeutic Guidelines.

RESULTS: Over the study period, a total of 652 patient profiles were collected. Surgical procedures performed were appendectomy (45, 6.90%), gastroduodenale procedures (141, 21.66%), laparoscopic procedures (104, 15.97%), small intestine obstruction removal (23, 3.53%), hernia repair (86, 13.21%), colorectal procedures (150, 23.04%), cancer surgery (38, 5.84%), hepatic surgeries (31, 4.75%) and other (33, 5.10%). The antibiotic therapy for the above procedures was compared with American Society of Health-System Pharmacists therapeutic guidelines.
CONCLUSIONS: Analysis for the appropriateness of antibiotic therapy in compliance with ASHP Therapeutic guidelines is currently under process.

131. Impact of pharmacy teach-back method counseling for chronic disease management in a developing country. Evan Moffitt, PharmD Candidate[1,*], Shawn Riser Taylor, PharmD[1], Robert Ashworth, PharmD[2]; (1) School of Pharmacy, Wingate University, Hendersonville, NC; (2) School of Pharmacy, Wingate University, Wilmington, NC
INTRODUCTION: Wingate University School of Pharmacy offers an Advanced Pharmacy Practice Experience elective with a medical mission trip to Honduras. On a previous trip, patients were unable to demonstrate proper inhaler technique or recall counseling points after receiving education from a pharmacist. A proposed resolution to this issue was to incorporate teach-back method counseling. Previous studies have demonstrated that when teach-back method counseling is employed, patient adherence is improved.
OBJECTIVES: The objective of the study was to assess the effectiveness of pharmacy teach-back method counseling for chronic diseases in a developing country.
STUDY DESIGN: A pre-post intervention trial.
METHODS: Demographic information was collected from charts with the following inclusion criteria: >18 years old and diagnosis or medications for asthma, chronic obstructive pulmonary disease, diabetes or hypertension. An education checklist developed by study investigators included disease state information, medication directions and counseling points and was utilized for all counseling sessions. Following education, patients were asked to recall the information from each section and a coding system was developed to record their ability to recall information. A study investigator corrected any misinformation repeated by the patient. Descriptive statistics were completed, as well as, Pearson correlation and linear regression.

RESULTS: There were a total of 21 encounters, with 14.3%, 66.7% and 9.6% of patients able to correctly repeat information regarding disease state, medication directions and additional counseling, respectively. No model, level of education or age, in the linear regression was found to be significant. The Pearson correlation revealed a negative correlation with age and duration of therapy for each section, whereas level of education had a positive correlation.
CONCLUSIONS: The majority of patients were not able to recall counseling points immediately following education. Data collection in February 2016 will reveal if patients are able to recall information 6 months after the initial sessions.

132. Evaulation of lactobacillus therapy on duration of mechanical ventilation in critically Ill adult patients. Divya Daniel, Pharm.D.[1,*], Karrie Derenski, Pharm.D., BCNSP, CNSC[2]; (1) Pharmacy, CoxHealth, Springfield, MO; (2) Pharmacy Services, CoxHealth South Medical Center, Springfield, MO
INTRODUCTION: Intestinal microbiome maintains the integrity of the gut mucosa via both the enhancement of immune functions and the prevention of opportunistic and/or pathogenic microorganism infections. Critically-ill patients often suffer the ramifications resulting from medication and/or inflammation induced suppression of these beneficial bacterial functions. Supplementing patients with probiotics, in an attempt to restore normal gut homeostasis, is thought to both assist critically-ill patients with recovery and, subsequently, decrease the duration of artificial ventilation.
OBJECTIVES: Effect/s of the probiotic Lactobacillus Rhamnosus GG (LGG), e.g., ventilator free days, length of stay (LOS) and mortality in intensive care units, administered to ventilated critically-ill patients receiving enteral nutrition (EN) in a community hospital will be evaluated.
STUDY DESIGN: This is a minimal-risk, prospective, observational study meant to examine approximately 100 patients partitioned into two groups of critically-ill patients receiving EN therapy: Group 1 (control group) and Group 2 (recipients of probiotic therapy).
METHODS: Inclusion criteria: (1) patient age (18 years), (2) EN initiated within 72 hours of ICU admission, and (3) anticipated therapy for at-least 48 hours. Exclusion criteria: (1) inability to be fed through the gastrointestinal tract, (2) contra-indication to LGG or any of the ingredients found in Culturelle®, (3) known/reported history of LGG or probiotic infection, (4) concurrent/anticipated therapy with mannitol or lactulose, (5) short gut syndrome, (6) current immunosuppressive therapy, and (7) patient not anticipated to survive past 7 days. Group 2 patients will receive LGG via capsules of the commercially available product Culturelle®.
RESULTS: To date, data has been collected for the control group. Patients (n=70) had an average APACHE II score of 19.5, and medical complications being the primary reason for admission to the ICU. Average time on ventilator was 7.7 days. Average ICU and hospital LOS were 10 and 14.4 days.
CONCLUSIONS: Anticipated completion by April 2016.

133. Should Bleomycin test dosing still be performed?. Jennifer Collier, Pharm.D.[1,*], Laura Cotiguala, Pharm.D.[2], Meredith Wills, Pharm.D.[2]; (1) Pharmacy, Saint Lukes Health System, Lee's Summit, MO; (2) Pharmacy, Saint Lukes Health System, Kansas City, MO
INTRODUCTION: The last published report of a bleomycin hypersensitivity reaction was printed approximately 27 years ago. As a result, speculation about the need for bleomycin test dosing is common fodder for debate among hematology/oncology pharmacists. Theories have promulgated that the bleomycin manufacturing process has been refined or the enhanced present-day utilization of acetaminophen, corticosteroids and diphenhydramine pre-medications may be limiting the incidence of hypersensitivity reactions.
OBJECTIVES: Our aim was to determine if the test dose was an accurate predictor of the risk of hypersensitivity reaction. The secondary endpoint was to determine if removal of bleomycin test doses resulted in any increased risk of hypersensitivity reactions to our patients.
STUDY DESIGN: A retrospective review was conducted to evaluate the incidence of hypersensitivity reactions before and after the practice change of requiring a test dose be performed.
METHODS: Patients were included in the study if they were greater than 18 years old and had received any dose of bleomycin as documented on the medication administration record (MAR). Extracted information included the bleomycin regimen, pre-medications administered before the bleomycin dose, patient demographic and the nature of the hypersensitivity reaction if one occurred. The incidence of bleomycin hypersensitivity reactions was recorded for a 12 month interval prior to the practice change and followed for a 12 month time period post practice change.
RESULTS: Pending finalization.
CONCLUSIONS: Given that bleomycin test dosing is not a reliable predictor of patients who may develop hypersensitivity reactions, bleomycin test doses should no longer be performed.

134. Progression free survival in males with metastatic castrate resistant prostate cancer treated with abiraterone acetate or enzalutamide in an academic pharmacist-staffed oncology clinic. Emily Prinz, Pharm.D.*, Jill Stein, Pharm.D., BCOP, Susan Fajardo, Pharm.D., Kimberly Spading, RPH, MBA; Department of Pharmaceutical Care, University of Iowa Hospitals and Clinics, Iowa City, IA
INTRODUCTION: The use of noninvasive oral oncology agents has increased in the recent decade shifting the prototype for treatments. Treatment strategies for metastatic castrate resistant prostate cancer (mCRPC) have evolved recently with approved oral abiraterone acetate and enzalutamide. Despite the fact that oral agents offer convenience and increased quality of life, they pose financial challenges, unique toxicities, and barriers that could impact progression free survival (PFS). With the initiation of complex regimens and monitoring, pharmacist involvement has become a vital role in cancer patient care in the outpatient setting.
OBJECTIVES: The aim of this study was to evaluate if PFS in mCRPC patients who are prescribed abiraterone acetate or enzalutamide through a pharmacist-staffed academic oncology clinic is consistent with PFS found in the literature.
STUDY DESIGN: Single center, retrospective chart review.
METHODS: This study included adult males (>18) with a diagnosis of mCRPC receiving abiraterone acetate or enzalutamide from August 2012 through September 2015. Exclusion criteria included clinical trial and non-metastatic CRPC patients. The primary outcome assessed median time to PFS. Secondary outcomes included number and type of pharmacist interventions and appropriateness of medication refills compared to treatment course. Patients were identified using an electronic medical record report.
RESULTS: This study included 68 adult patients; 34 (50%) of the patients received both therapies while 18 (26%) and 16 (24%) received abiraterone acetate or enzalutamide, respectively. Of the 34 that received both medications, 29 (85%) received abiraterone first and 5 (15%) received enzalutamide first. Outcome results pending further data collection.
CONCLUSIONS: Pending final results.

135. Effect of dose-reduced paclitaxel pre-medication regimen on rates of hypersensitivity and corticosteroid-related adverse reactions. Jagoda Misniakiewicz, PharmD*, John Szymanski, PharmD, BCOP, Kristen Rychalsky, PharmD, BCPS; Department of Pharmacy, Veterans Affairs Connecticut Healthcare System, West Haven, CT

INTRODUCTION: Paclitaxel-based chemotherapy continues to be a fundamental component in the treatment of many solid tumors.[1] Paclitaxel hypersensitivity reactions have been reported due to the solvent Cremophor-EL.[2] However, paclitaxel hypersensitivity reactions beyond the second dose have shown to be uncommon.[1]
OBJECTIVES: This study evaluated a dose-reduced pre-medication regimen in patients receiving paclitaxel-based chemotherapy at a Veterans Affairs Healthcare System in order to evaluate if a reduction or elimination of dexamethasone pre-medication reduces adverse effects without increasing the rate of paclitaxel hypersensitivity reactions.
STUDY DESIGN: Prospective study with a historical control group evaluating patients at VA Connecticut Healthcare System who were treated with paclitaxel-based chemotherapy.
METHODS: The study will compare rates of hypersensitivity reactions and corticosteroid-induced adverse reactions for a pre-medication regimen higher than FDA recommendations (control group) versus a dose-reduced pre-medication regimen (cohort group).The control group included patients who received paclitaxel between 01/01/2014 and 04/30/2014 and the cohort group will include patients who received paclitaxel between 11/01/2015 and 02/29/2016. All pre-medications will be eliminated for subsequent weekly paclitaxel doses and only dexamethasone 8 mg IV will be administered 30 minutes prior to dose for every 3 week paclitaxel infusions if no hypersensitivity reaction occurs in the cohort group. Patients' demographics, cancer history, chemotherapy regimen, number of paclitaxel infusions, average dose of dexamethasone per cycle, occurrence of hypersensitivity reaction, and adverse reactions will be collected and analyzed.
RESULTS: Paclitaxel hypersensitivity reactions did not occur in any of the 18 included patients in the control group. The average dose of dexamethasone per cycle per patient was 51.2 mg in the control group. In regards to corticosteroid-related adverse effects in the control group: 61.1% experienced hyperglycemia, 11.1% suffered from insomnia, and 5.6% gained weight. Data collection for the cohort group will be complete on 02/29/2016. The data will be analyzed at that time resulting in the completion of the project.
CONCLUSIONS: N/A.

136. Evaluating the utilization of fosaprepitant for the treatment of breakthrough chemotherapy-induced vomiting: a retrospective analysis. Lauren Dombrowski, BS, PharmD candidate[1,*], Lisa Biondo, PharmD[1], Megan Bodge, PharmD[2]; (1) School of Pharmacy, West Virginia University, Morgantown, WV; (2) WVU Medicine
INTRODUCTION: Emend¨, aprepitant and prodrug fosaprepitant, prevents emesis by inhibiting substance P/neurokinin 1 (NK1) receptors. NK-1 inhibitors are commonly used in combination to prevent nausea/vomiting from moderately- and highly-emetogenic chemotherapy. While effective in acute prevention, efficacy wanes in delayed (25–120 hours). No studies have been performed determining the effectiveness of Emend in breakthrough CINV, despite use in practice.
OBJECTIVES: The primary objective is evaluation of utilization of fosaprepitant in breakthrough CINV. Secondary objectives include evaluation of episodes of N/V prior to and after fosaprepitant administration, assessment of days of N/V before Emend administered, subjective rating N/V after administration.
STUDY DESIGN: Retrospective chart review of electronic medical records from WVUMedicine of admitted patients from 1/1/2015 to 12/31/15 receiving fosaprepitant not apart of CINV protocol. Patient data will be de-identified and stored in a secure, confidential location. Patients will not be contacted in relation to study.
METHODS: Evaluation for effectiveness based on subjective notes in physicianÕs daily report, documented PO intake and episodes of N/V prior to and after Emend administration, and analysis of additional CINV medication given. Inclusion criteria include admitted patients >18 years receiving Emend after start of chemotherapy. Exclusion criteria include use for preventative CINV or non-chemotherapy-related N/V and outpatient administration of Emend.
RESULTS: 34 patients in 41 hospital admissions met the inclusion/exclusion criteria. 29 of the 34 patients had hematologic malignancy with conditioning for hematopoietic stem cell transplantation the most common chemotherapy cycle (11 of 29). Patients on average had 3 days of N/V before Emend was administered (1–10 days). 25 admissions had Emend given during or the day after chemotherapy. Analysis is ongoing.
CONCLUSIONS: Emend is primarily being used as breakthrough therapy in patients in hematologic malignancies. Preliminary findings have demonstrated Emend does improve N/V in the breakthrough setting. Further studies, including prospective studies are needed.

137. Retrospective chart evaluation of the efficacy of hypercalcemia of management in oncology patients at the University of Chicago Medical Center. Kelly Plach, Pharm.D.[1,*], Katherine Shea, Pharm.D.[1], Randall Knoebel, PharmD[2], Rita Nanda, M.D.[3]; (1) Department of Pharmacy, University of Chicago Medical Center; (2) University of Chicago Medicine, Chicago, IL; (3) Department of Medicine, Hematology/Oncology Division, University of Chicago Medical Center
INTRODUCTION: Due to the lack of formal guideline recommendations, available primary literature was used to develop a protocol for management of hypercalcemia of malignancy at the University of Chicago Medical Center (UCMC).
OBJECTIVES: The primary objective of this study is to retrospectively validate the proposed protocol by evaluating the efficacy of current management.
STUDY DESIGN: Retrospective, single center, chart review.
METHODS: Adult patients hospitalized between July 1, 2012 and November 1, 2015 with a diagnosis of both hypercalcemia and an active malignancy were included. The primary outcome for efficacy is normalization of corrected calcium within 4 and 7 days of treatment. The protocol was retrospectively applied and results of patients who received treatment "per protocol" were compared to patients whose treatment did not follow protocol.
RESULTS: A total of 496 patients with a diagnosis of hypercalcemia were identified to be evaluated for inclusion. Preliminary results of 80 patients included demonstrate that 42 patients were managed per protocol, and 38 off protocol. When managed per protocol, 58% of patients achieved normalization of corrected calcium by day 4 and 47.6% by day 7. This is compared to 47% and 23.7% retrospectively in patients whose treatment did not follow protocol. Results are underestimated due to a lack of data for patients discharged.
CONCLUSIONS: Based on preliminary results of this study, utilization of an evidence based protocol can improve normalization rates of corrected calcium in hypercalcemia of malignancy patients. Further data collection and subgroup analysis, to be completed by the time of presentation, will determine the impact on length of hospital stay, utilization of rescue therapy, and cost savings. Ultimately, results of this evaluation will be used to implement the proposed protocol and lead to an order set in Epic. This will help streamline, and ensure safe and effective management of hypercalcemia of malignancy.

138. Opioid safety initiative: clinical pharmacy intervention. Eun Pyung Im, Pharm.D.*, June Griffith, Pharm.D., CGP, BCPP, Debora Hamilton, RPh, Pharm.D.; US Department of Veterans Affairs, Tuscaloosa VA Medical Center, Tuscaloosa, AL
INTRODUCTION: National concern over the rise in opioid overdose-related deaths has led the Department of Veterans Affairs (VA) to launch the Opioid Safety Initiative (OSI). This initiative involves efforts to promote safe opioid prescribing and monitoring within the VA.

OBJECTIVES: This project aims to educate providers to identify and reduce the amount of patients who may be inappropriately prescribed chronic opioids, based on the analysis of providers' responses to urine drug screen (UDS) results. In doing so, the final objective is that the Tuscaloosa Veterans Affairs Medical Center meet goals for certain core measures of the OSI. These goals include falling below the national average in the percentage of patients within the facility on 100 to <200 mg and 200 to <300 mg of morphine equivalent daily dose for a fiscal year quarter.
STUDY DESIGN: Retrospective, non-research, quality improvement.
METHODS: A report of the percentage of patients on 100 to <200 mg and 200 to <300 mg of morphine equivalent daily for the fourth quarter of fiscal year 2015 (Q4FY15) was generated for use as baseline data. Subsequently, a list of patients with a positive UDS for amphetamines, marijuana, cocaine, and methadone while on chronic opioid therapy was generated for Q4FY15. Retrospective chart reviews were conducted, and the findings organized into spreadsheets for analysis of providers' responses. Similarly, steps were taken to organize and analyze patients on chronic opioid therapy with a negative UDS for opioids. Findings from these chart reviews were communicated to providers. Education was also provided for providers to document and, if needed, take further action on UDS results, prior to making a decision regarding continuation of opioids. Following this educational intervention, data for Q2FY16 will be compared to baseline data to determine whether OSI core measure goals have been met.
RESULTS: In progress.
CONCLUSIONS: In progress.

140. Outcomes from implementation of rapid identification test for detection of gram-positive and gram-negative bacteria into a pharmacist-directed antimicrobial stewardship protocol for pediatric patients. Rebecca Thompson, Pharm.D.[1,*], Angel Heyerly, Pharm.D.[1], Gordon Bokhart, Pharm.D.[2]; (1) Department of Pharmacy, Lutheran Hospital, Fort Wayne, IN; (2) Research Department, Lutheran Medical Group, Fort Wayne, IN
INTRODUCTION: The rapid identification of microorganisms is paramount for targeted antibiotic treatment for serious bloodstream infections (BSI). The automated nanoparticle probe microarray-based nucleic acid test is an assay for Gram-Positive Blood Culture (BC-GP) and Gram-Negative Blood Culture (BC-GN) that identifies bacterial targets and resistance markers in 2.5 hours from positive blood cultures. These molecular technologies have significantly reduced the time to optimal antibiotics in adults, but data is lacking for pediatric population.
OBJECTIVES: To evaluate the outcomes from implementation of a rapid microarray assay for bacterial identification in combination with a pharmacist-directed antimicrobial stewardship protocol in pediatric patients in a tertiary-care hospital.
STUDY DESIGN: A multi-center, quasi-experimental study is currently being conducted in all pediatric patients with positive blood cultures that were tested with automated microarray BC-GP and/or BC-GN assay at Lutheran Hospital since the implementation on April 30, 2015.
METHODS: A clinical pharmacist was informed of the microarray assay results and effective antibiotics were recommended based on targeted treatment chart. Pediatric population included: neonatal intensive care unit (NICU), pediatric intensive care unit (PICU), and general pediatric floor. Data collection included: age, gender, length of stay, date/time of blood sample collections, date/time of rapid BC-GP and/or BC-GN assay results, date/time of final culture results, date/time of antibiotic orders, date/time of antibiotic discontinuation, physician notification, and pharmacist intervention. Outcomes were assessed for pediatric patients with positive blood cultures tested with rapid BC-GP and/or BC-GN assay compared with time to traditional culture results. The primary outcomes were mean time to optimal antibiotic therapy following assay results and mean time antibiotics were avoided before final culture results.
RESULTS: Data collection is in progress.
CONCLUSIONS: Preliminary data suggests that microarray technology and antimicrobial stewardship can decrease the time to appropriate antibiotics in pediatric patients with positive blood cultures.

141. Assessment of current prevention and treatment strategies for pediatric opioid-associated constipation in a community hospital setting. Sarah Berger, Pharm.D.*, Glenda Adams, RPh, Deb McFatridge, RPh, BCPPS; Pharmacy Department, CoxHealth, Springfield, MO
INTRODUCTION: Pediatric patients may be at risk for complications of constipation when started on opioids without laxative medications. This study will assess the need for a standardized bowel management protocol for the pediatric population within a not-for-profit community health system.
OBJECTIVES: To determine how often laxatives were prescribed with opioids in pediatric patients and compare the outcomes to patients without laxatives prescribed. Secondary objectives include assessing appropriateness of laxative dosing based on age and weight of patients and determining differences in prescribing patterns in the medical and surgical teams.
STUDY DESIGN: This is a retrospective chart review of the use of opioids and laxatives in the pediatric population within a not-for-profit community health system.
METHODS: Pediatric patients admitted from October 2011 to October 2015 were eligible for inclusion if they were between the ages of 2 and 17 years at the time of admission, were admitted for greater than or equal to 48 hours, and received greater than or equal to one dose of opioid pain medication. The target sample size is 50 patients. Exclusion criteria includes: cystic fibrosis, Hirschsprung disease, cerebral palsy, diabetes mellitus, celiac disease, impacted stool on admission, intestinal obstruction, lead poisoning, and hypothyroidism. Relevant data will be extracted from patient charts including patient's age, weight, admission reason, dose/frequency of opioid and laxative, time to initiation of a bowel agent, time to stool, and past medical history. Data will be analyzed using Chi-squared, Fischer's Exact, or Mantel-Haenszel test as appropriate.
RESULTS: The average length of stay was 4.6 days in the 15 patients analyzed thus far. Of these patients, 27% were prescribed a laxative and 73% were not. Without laxatives, 40% of patients had a bowel movement prior to discharge. No stools were documented in the patients with laxatives ordered. The surgical team ordered 75% of all laxatives.
CONCLUSIONS: Estimated completion April 1, 2016.

142. Prolonged infusion of vancomycin leads to toxicity. Komal Nadeem, Pharm.D. Candidate*, Laura Bio, Pharm.D.; Philadelphia College of Pharmacy, University of the Sciences
INTRODUCTION: Vancomycin dose recommendation in children with gram-positive infections is 15 mg/kg/dose intravenously every 6 hours. Rapid infusion of vancomycin (over <1 hour) may cause Red Man's Syndrome (RMS) that requires extension of the infusion duration, which may lead to accumulation and potential toxicity if the dosing interval remains short at 6 hours.
OBJECTIVES: This study reports the incidence of supratherapeutic vancomycin concentration (SVC, greater than 20 mg/dL) and sequelae in adolescent patients who received a prolonged infusion (PI, over 90 minutes or longer).
STUDY DESIGN: A retrospective chart review of adolescents (age 12–18 years) who received PI vancomycin between September 2012 and August 2015 was performed.
METHODS: Patients were included if they had serum concentrations obtained at steady state (after 3 doses). Urine output and serum creatinine (SCr) were evaluated for acute kidney injury (AKI): 50% increase in baseline SCr or urine output less than 1 mg/kg/hr.

RESULTS: Seven patients were included in the study with two patients aged 14, two 16, one 13, and one 18 years. Five patients received 1 gm vancomycin, one received 1.25 gm vancomycin, and one received 1.5 gm vancomycin. Similarly, two patients had a every 6 hours dosing interval, four patients had an 8-hour interval, and one patient had a 12-hour dosing interval. Two patients (28.6%) experienced SVC: one patient had four levels ranging from 28.5 to 30.1 mg/dL while receiving an empirical dose of 1 gm mg over 90 minutes every 6 hours and the second patient had a level of 22.9 mg/dL while on 1.25 gm over 120 minutes every 8 hours. No patients experienced AKI.
CONCLUSIONS: PI vancomycin caused SVC in two of the seven patients studied. Further investigation of PI vancomycin-induced nephrotoxicity is warranted.

143. Levels of sedation associated with dexmedetomidine versus midazolam in critically-ill mechanically-ventilated children. Jeff Moss, PharmD*, Claire Fung, PharmD; Lucile Packard Children's Hospital, Palo Alto, CA
INTRODUCTION: There is a paucity of data comparing dexmedetomidine to midazolam for sedation in mechanically-ventilated pediatric patients. While benzodiazepine-based regimens have been shown to provide a deeper level of sedation and are associated with a higher incidence of delirium in adults, the effects may be different in children. Only one prospective study has directly compared levels of sedation with two different doses of dexmedetomidine versus midazolam in thirty pediatric patients. While this study found that dexmedetomidine produced similar sedation scores as midazolam, the doses of both agents are not necessarily reflective of what is commonly used in our clinical practice.
OBJECTIVES: We sought to determine the levels of sedation associated with dexmedetomidine, midazolam or combination therapy for maintaining mechanical ventilation.
STUDY DESIGN: We performed a retrospective chart review of twenty-five mechanically-ventilated patients in our pediatric intensive care unit that received a continuous infusion of dexmedetomidine, midazolam or both agents for at least twenty-four consecutive hours.
METHODS: We assessed the depth of sedation through the State Behavioral Scale and frequency of 'as needed' rescue sedatives.
RESULTS: Levels of sedation and frequency of rescue or intermittent sedatives were similar between all three groups. Among the twenty-five patients there were four documented cases of delirium and one unplanned extubation.
CONCLUSIONS: Based on these results the sedative agent should be based on patient-specific factors, provider familiarity and cost. Additional research is warranted to optimize sedation practices for mechanically-ventilated critically-ill children.

144. Estimated cost impact of clinical pharmacist interventions in a pediatric primary care clinic. Parrish Carpenter, PharmD[1,*], Janesha Thomas, PharmD[2]; (1) The Children's Hospital at Sacred Heart, Pensacola, FL; [2]Sacred Heart Hospital, Pensacola, FL
INTRODUCTION: The changes within our nation's healthcare system have continued to place emphasis on primary care as the principal method to meet the ever-increasing healthcare needs of the population. Utilizing pharmacists as medication therapy experts can help improve patient care, while reducing cost and maximizing resources.
OBJECTIVES: Our project sought to establish clinical pharmacy services within a pediatric primary care clinic and identify areas of impact for a clinical pharmacist.
STUDY DESIGN: Clinical pharmacy services were provided over the course of 1 month. Patient chart reviews were conducted and therapy modifications were recommended to physicians.
METHODS: Prior to the initiation of pharmacy services, clinicians and staff were polled as to what services could be provided. The pharmacist analyzed patient charts, conducted medication reconciliations, and provided drug information and patient counseling services. Clinical pharmacist interventions were logged in a secure database.
RESULTS: Over the course of 1 month (18 business days) a total of 86 interventions were logged. Interventions included 22 asthma action plans, 20 therapy modification recommendations and 23 medication reconciliations, along with other patient counseling and drug information services. Estimated cost savings to be calculated. Research is in progress.
CONCLUSIONS: Research is in progress.

145. Comparison of antithrombin III products in patients on extracorporeal membrane oxygenation in a children's hospital: a pilot study of recombinant antithrombin III versus human antithrombin III. Nicole Hollinger, PharmD[1,*], Omayma Kishk, PharmD[1], Allison Lardieri, PharmD[2], Linda Walker, MD[3], Adnan Bhutta, M.B.B.S, FAAP[3]; (1) Department of Pharmacy, University of Maryland Medical Center, Baltimore, MD; (2) Department of Pharmacy Practice and Science, University of Maryland School of Pharmacy, Baltimore, MD; (3) School of Medicine, University of Maryland, Baltimore, MD
INTRODUCTION: The optimal therapeutic anticoagulation strategy in pediatric extracorporeal membrane oxygenation (ECMO) has not been established. Heparin has been used as the mainstay of therapy, but in an effort to reduce heparin requirements and potential hemorrhagic complications, supplementation with exogenous antithrombin III (ATIII) has become a common practice among many pediatric ECMO centers. There are two agents currently available for use, and there have been no studies comparing the two products. This pilot study comparing recombinant ATIII and human ATIII aims to increase the understanding of the role of ATIII in pediatric ECMO and provide insight into potential differences between the two agents.
OBJECTIVES: The primary objective of the study is to determine the difference between recombinant ATIII and human ATIII in terms of the reduction of heparin infusion rates at 4, 8, 12, and 24 hours post ATIII supplementation.
STUDY DESIGN: Retrospective cohort study.
METHODS: This retrospective chart review conducted at a children's hospital included all pediatric patients on ECMO that received either recombinant ATIII or human ATIII from January 2014 to September 2015. The chart review entails the comparison of heparin rates, ATIII levels, activated partial thromboplastin time, activated clotting time, antifactor-Xa levels, complications, hospital and intensive care unit length of stay, 30-day mortality, and cost of the two ATIII products.
RESULTS: Of the 24 medical records screened, 22 patients were included in the study (36.4% female and 63.6% male). One of the excluded patients never received a dose of ATIII and one patient was not receiving ECMO at the time of ATIII administration. A total of 97 doses of ATIII were administered during the study period in which 47.4% were recombinant ATIII and 52.6% were human ATIII.
CONCLUSIONS: Final results and analyses expected by the end of April 2016.

146. Delay in transitions of care in children admitted for lead chelation therapy with succimer. Natasha Pham, Pharm.D. Candidate 2018*, Laura L. Bio, Pharm.D., BCPS; Philadelphia College of Pharmacy, University of the Sciences, Philadelphia, PA
INTRODUCTION: Lead-based paints were banned for housing since 1978, but paint deterioration continues to expose children in at least 4 million households and increase risk of permanent neurological sequelae. Lead toxicity management includes chelation therapy with succimer among other modalities. If hospital admission is warranted, delays in initiation of succimer therapy or outpatient transition may affect hospital length of stay, school days missed, and cost.
OBJECTIVES: To identify presence of delays in transitions of care surrounding succimer therapy for lead toxicity.

STUDY DESIGN: Retrospective chart review of children admitted for succimer therapy.
METHODS: All children admitted between September 2, 2013 and September 2, 2015 for management of lead toxicity with succimer therapy were included. Electronic health records were reviewed to obtain data. Primary endpoint was incidence of delay in initiation upon hospital admission (≥4 hours) and delay in discharge based on difficulty obtaining succimer in outpatient setting.
RESULTS: Five children received succimer during the study period: 4 males (80%), mean age 36.4 months (± 7.45), and lead source was house paint in 4 patients (2 patients consumed paint chips), and an herbal remedy for one patient. One patient was admitted twice; 6 admissions were reviewed. Mean lead concentration at admission was 51 mcg/dL ± 15.2. Mean length of hospital stay was 3 days ± 1.94. Two patients (33.3%) experienced delays to administration of chelation therapy; 4 hours each. No patients experienced a delay to discharge. However, two patients (33.3%) had assistance with transition; succimer prescription faxed to outpatient pharmacy prior to discharge.
CONCLUSIONS: Delay in care occurred in 2 of the 6 admissions upon initiation of chelation therapy. Further investigation is warranted to evaluate delays in care associated with lead toxicity management.

147. Quality improvement project regarding posttraumatic stress disorder (PTSD) and benzodiazepines as part of the Psychotropic Drug Safety Initiative (PDSI). Joni Morgan, Pharm.D.*, June Griffith, Pharm.D., CGP, BCPP; US Department of Veterans Affairs, Tuscaloosa VA Medical Center, Tuscaloosa, AL
INTRODUCTION: Currently, there is a nationwide psychopharmacology quality improvement initiative within the VA deemed the Psychotropic Drug Safety Initiative (PDSI). One specific metric within this initiative is the proportion of patients with posttraumatic stress disorde(PTSD) and prescribed a benzodiazepine compared to patients with PTSD with no benzodiazepine prescription. The rationale for this measure is "to minimize the exposure of patients with PTSD to side effects and adverse events associated with benzodiazepines given lack of evidence supporting efficacy in treatment of PTSD symptoms."
OBJECTIVES: This project aims to decrease the proportion of PTSD patients prescribed benzodiazepines to PTSD patients not prescribed benzodiazepines at the TVAMC.
STUDY DESIGN: Prospective, quality improvement project.
METHODS: A baseline number was obtained of patients with a diagnosis of PTSD as well as a baseline number of patients with PTSD and an active prescription for a benzodiazepine. An encrypted email was sent to each identified prescribing physician with education regarding the PDSI initiative, risks associated with benzodiazepines, the lack of supporting evidence for use in PTSD, tapering strategies, alternative treatment options, as well as a list of his/her respective actionable patients. Pharmacy researcher will be available to meet with each provider for one on one consultation. Verbal and written education is also being provided to patients of PTSD and Substance Abuse groups. Four monthly reports will be generated tracking the proportion of PTSD patients prescribed benzodiazepines to PTSD patients not prescribed benzodiazepines. The final proportion will be compared to the baseline proportion to determine if the objective was met.
RESULTS: In progress.
CONCLUSIONS: In progress.

148. Implementation and evaluation of an overdose education and naloxone distribution (OEND) program. Joshua Gauthier, Pharm.D.[1,*], June Griffith, Pharm.D., CGP, BCPP[2]; (1) Tuscaloosa VA Medical Center, Tuscaloosa, AL; (2) US Department of Veterans Affairs, Tuscaloosa VA Medical Center, Tuscaloosa, AL
INTRODUCTION: The impact of opioid overdoses resulting in death or hospitalization has prompted several organizations and government agencies to implement programs aimed at reducing overdose incidence. These programs have evolved to include two components: (1) overdose education and (2) distribution of the overdose reversal medication naloxone.
OBJECTIVES: The purpose of this project is to implement and evaluate an OEND program at the Tuscaloosa VA. This program will provide overdose prevention education and dispense naloxone kits to patients at risk for overdose.
STUDY DESIGN: Naloxone distribution will be dependent upon overdose risk as assessed by individual providers in accordance with national standards. Pharmacist led overdose prevention education quality will be assessed by questionnaire. Retrospective data collection began after initiation of OEND education and will end six months after program initiation.
METHODS: Patients eligible for inclusion will receive a naloxone kit after participating in OEND education. Medical records of patients receiving naloxone kits will be reviewed and questionnaires analyzed. Outcomes assessed will include number of kits dispensed, risk factors cited for dispensation, occurrence of overdose and patient impression of education as reported by questionnaire. Data will be analyzed using descriptive statistics.
RESULTS: Preliminary interpretation of questionnaires was conducted, however no naloxone kits have been dispensed at this time. Review of 27 questionnaires revealed the most common feedback for program improvement involved excessive information detail and lack of hands on simulations. Patients frequently stated OEND education increased their awareness of opioid overdose risk and reversal agent availability.
CONCLUSIONS: Overdose education and naloxone dispensation programs have demonstrated efficacy in the prevention of death due to opioid overdose. The results of this project will be used to ensure that naloxone prescribing practices at TVAMC are in accordance with national standards and to evaluate the impact of OEND on patient outcomes.

149. Factors associated with successful downregulation of anti-HLA antibodies in heart transplant candidates. Melinda Ellis, Pharm.D.[1,*], Amanda Ingemi, Pharm.D.[1], Brittany Palmer, MD[1], Tracy McRacken, RN[1], Henry Landsheft, Pharm.D.[1], Howard Gebel, PhD[2], Robert Bray, PhD[2]; (1) Sentara Healthcare; (2) Emory University
INTRODUCTION: The presence of HLA antibodies in highly sensitized heart transplant candidates is a barrier preventing individuals from receiving a lifesaving transplant. In efforts to downregulate their HLA antibodies, many candidates are treated with intravenous immunoglobulin (IVIG; 1–2 mg/kg). While this therapeutic approach is successful in some subjects, others show no response.
OBJECTIVES: Identify factors associated with the successful downregulation of HLA antibodies in highly sensitized candidates eligible for heart transplant.
STUDY DESIGN: Retrospective chart review of highly sensitized heart transplant candidates.
METHODS: This retrospective study evaluated data including gender, age, race, ventricular assist device (VAD) type, desensitization regimen, panel reactive antibody (PRA) levels, antibodies present before/after IVIG, as well as history of blood transfusions, pregnancies, and previous transplants in efforts to see trends in desensitization. Patients were considered responders to IVIG therapy if their PRA decreased by ≥ 50%, and non-responders if the decrease was <50%, which was chosen based on potential for significant clinical implications.
RESULTS: Patients (n=15; ages 18–89) all received monthly IVIG (number doses ranging from 2 to 25) and had a VAD with a mean PRA of 83.8 prior to IVIG treatment. Efficacy was observed by lower PRAs post IVIG ($p<0.001$) in the responder group. Compared with the non-responder group, trends towards response was seen with white race ($p=0.12$), no previous pregnancy and male gender (both $p=0.08$). A total of nine patients were subsequently transplanted.
CONCLUSIONS: IVIG is an appropriate treatment in highly sensitized patients eligible for heart transplant. Male gender,

white race and no previous pregnancy may make patients more responsive to therapy.

150. Safety and efficacy of short-course linezolid for the treatment of cholangitis in liver transplant recipients. Danielle McKimmy, P4[1,*], Margaret Jorgenson, Pharm.D.[2], Jillian Fose, Pharm.D.[1], Jeannina Smith, MD[1]; (1) University of Wisconsin Hospital and Clinics, Madison, WI; (2) UW Health, Madison, WI

INTRODUCTION: Linezolid (LZD) is an oxazolidinone antibiotic with efficacy against vancomycin-resistant Enterococcus faecium (VREf), which is an important pathogen after liver transplantation (LTX). LZD has efficient biliary penetration and is orally available, thereby making it an attractive option for treating biliary infections in the outpatient setting. However, LZD has known myelotoxicity, with thrombocytopenia occurring in up to 30–48% of courses. The LTX population is at higher risk due to concomitant myelotoxic therapies as well as splenic sequestration due to hypersplenism.

OBJECTIVES: This study aims to investigate the efficacy and safety of short-course linezolid (<14 days) for the treatment of cholangitis in LTX recipients.

STUDY DESIGN: Retrospective chart review.

METHODS: Retrospective chart review of adult LTX recipients from 1/1/12–12/31/14 with confirmed or suspected cholangitis who were prescribed oral or parenteral linezolid for ²14 days.

RESULTS: Twenty-one LZD courses were identified within the study window; 62% (13/21) were targeted therapy. VREf was isolated in 47% (10/21) of courses. Ninety percent of patients received concomitant antibiotics; 31% were on concomitant quinolones, 27% on sulfonamides. Beta-lactams only accounted for 18% of concomitant courses, thereby decreasing the likelihood of potential synergy. Treatment success, defined as abatement of symptoms, occurred in 81% (17/21) of courses. Incidence of side effects was minimal; 1/19 (5%) courses were complicated by leukopenia, 1/19 (5%) courses were complicated by anemia and 2/21 (9.5%) courses were stopped due to thrombocytopenia. Serotonin syndrome and lactic acidosis did not occur, however, psychiatric serotonergic agents were held upon LZD initiation.

CONCLUSIONS: LZD appears to be effective for the treatment of cholangitis in LTX recipients as evidenced by 81% treatment success. It also appears to be safe in short courses (²14 days) as evidenced by 5% incidence of leukopenia, 5% incidence of anemia, 10% incidence of thrombocytopenia, and no incidence of serotonin syndrome or lactic acidosis.

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