Resident Research
2018–19

PittPharmacy

Mission

The School of Pharmacy is committed
to improving health through
excellence, innovation, and leadership
in education of pharmacists and pharmaceutical scientists,
in research and scholarship,
in care of patients,
and in service to our communities.

Values

Integrity guides our daily work. We foster:
Passion, commitment, and diligence;
Creativity and personal growth;
Collaboration and teamwork;
A culture of respect for the individual.

Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2019,

Each and every one of you has distinguished yourself among pharmacy practitioners by completing a residency program. I congratulate you on completing this intensive year of learning—gaining pharmacy expertise and mastering elements of teaching and research that triangulate to better prepare you for your careers. As residents, you have enjoyed the best the academic and practice worlds have to offer through the collaborations between the School of Pharmacy and its partners— The UPMC hospitals including Presbyterian, Shadyside, Western Psychiatric Hospital, Magee-Womens Hospital, St. Margaret, McKeesport, Mercy, Hamot, and Childrens' Hospital of Pittsburgh, UPMC Health Plan, Rite Aid Corporation, Giant Eagle, Inc., Asti's South Hills Pharmacy and CVS Caremark.

You also have another distinction: as a class of residents, you made a commitment to learning clinical research skills through the Pharmacy Residency Research Program. During your career, you will be faced again and again with clinically important questions. The skills you learned created a foundation on which to build answers—and to become tomorrow's leaders in pharmacy.

We celebrate your distinction as a pharmacist who is completing your residency in one of the largest and finest programs in the country. Because of that, your personal experience has been enriched by your peers from Alabama, California, Connecticut, Georgia, Indiana, Kansas, Maryland, Massachusetts, Missouri, New York, Ohio, Pennsylvania, North Carolina, Texas, Virginia, and Washington.

You have earned one more distinction! You each have just become an alumnus of our University of Pittsburgh School of Pharmacy Residency Program and will forever be a part of our community. It is my sincere hope that you carry with you fondly the rich experiences of this past year as you launch the next phase of your career. There has never been a better time for pharmacy.

Congratulations, good luck, and keep in touch!

Let the Pitt Residents Roar!

Valuing Our Partners

The University Pittsburgh School of Pharmacy values our partnerships with UPMC, UPMC Health Plan, Rite Aid, Giant Eagle, VA Pittsburgh Healthcare System, and CVS Caremark. It is through these partnerships that the Residency Program has grown in national reputation.

The University of Pittsburgh Medical Center is ranked among the top 10 of "America's Best Hospitals" according to the 2013 U.S. News and World Report rankings and is one of the leading integrated health care delivery systems in Western Pennsylvania. UPMC Presbyterian, UPMC Shadyside, UPMC Magee-Womens, UPMC Mercy, UPMC St. Margaret, UPMC McKeesport, UPMC Hamot, UPMC Children's Hospital of Pittsburgh, and UPMC Western Psychiatric Hospital of participate in our residency programs.

UPMC Health Plan, the second-largest health insurer in western Pennsylvania, is owned by UPMC, an integratedglobal health enterprise. The integrated partner companies of the UPMC Insurance Services Division — whichincludes UPMC Health Plan, UPMC WorkPartners, LifeSolutions (EAP), UPMC for You (Medical Assistance), andCommunity Care Behavioral Health — offer a full range of group health insurance, Medicare, Special Needs, CHIP, Medical Assistance, behavioral health, employee assistance, and workers' compensation products and services to nearly 3.4 million members.

Rite Aid Corporation is one of the nation's leading drugstore chains with nearly 2,600 stores in 30 states and the District of Columbia, with a strong presence on both the East Coast and West Coast, and 60,800 associates.

Giant Eagle Pharmacy is a leading regional pharmacy with departments in 216 Giant Eagle locations across five states.Customers with qualifying prescriptions benefit from programs including the Giant Eagle $4/$10 generic prescriptionprogram, free prenatal vitamins, and high-quality service from expertly trained pharmacists. Additional unique services include Specialty Pharmacy offerings, in-store immunizations, and more.

Asti's South Hills Pharmacy, located in Pittsburgh, PA, is an innovative community pharmacy providing excellent patient care in a family atmosphere. Services include comprehensive medication and chronic care management, extensive immunization services, compounding, HIV specialty care, disease state education programs, medication synchronization and specialty packaging as well as traditional dispensing services.

CVS Health is the nation's premier integrated pharmacy services provider, combining one of the nation's leading pharmaceutical services companies with the country's largest pharmacy chain. CVS Health drives value for pharmacy services customers by effectively managing pharmaceutical costs and improving health care outcomes through itsretail stores, pharmacy benefit management division, and mail service and specialty pharmacy division.

Pharmacy Residency Research Program

Sandra L. Kane-Gill, PharmD, MSc, FCCM, FCCP
Director, Resident Research Series

The Residency Research Program at the University of Pittsburgh School of Pharmacy incorporates a structured educational series with longitudinal research working groups. This approach provides a foundation for performing research, gives appropriate mentorship, fosters interactive discussions, allows peer critiques, and individual accountability for each resident project. Within the framework of the Residency Research Program, residents are responsible for the completion of all aspects of their project, from conceptualization to final manuscript preparation. Many of the projects completed this year focused on optimizing medication use in infectious diseases, behavioral health, pain management, diabetes, and anticoagulation. Projects also included application of pharmacogenomics; strategies to reduce adverse events, especially in the elderly; improving medication use during transitions of care; and opportunities for cost saving strategies. In addition, there were several assessments of opportunities in pharmacy practice for enhancing services.

The Residency Research Program requires residents to be certified in research fundamentals through the University of Pittsburgh and the Collaborative Institutional Training Initiative, participate in valuable interactive lectures geared toward the scientific development and management of their projects. They also learn to effectively communicate their project results in both verbal and written formats. Overall, our Residency Research Program contributes to the diversity of residency training with our partners in collaboration with the University of Pittsburgh School of Pharmacy, which ultimately results in well-rounded candidateseligible for a wide range of career opportunities.

Our program is highly successful with publication rates for our residents exceeding the national averageby at least three-fold. The success of this program is a result of the efforts of the working group facilitatorsand other major contributors: Alfred L'Altrelli, Amy Donihi, Stephanie Ballard, Gerard Mascara, Clayton Burke, Meaghan Voycik, Elizabeth Cassidy, Branden Nemecek, Gregory Castelli, Rebecca Morchied, Matthew Joseph, Patricia Klatt, Kristine Schonder, Ryan Rivosecchi, Ana Lupu, Kelli Lombardi, Josef Berletic, Madalyn Bates, Jennifer Heasley, Louise-Marie Oleksiuk, Marianne Koenig, Rachael Ours, Lucas Berenbrok, Amanda McQuillan, Robert Kozarian, Brad Cooper, Pamela Smithburger, Steven Ganchuk, Joni Carroll, Melissa McGivney, Jim Coons, Inmaculada Hernandez, Aaron Pickering, Sharon Connor, Lauren Jonkman, Kim Coley, Ron Campbell, Heather Johnson, Jennifer Shenk, Erica Martin, Brian Potoski, Marianne Koenig, Alex Rivosecchi, Heather Sakely, Megan Baumgartner, Chelsea Carr, Tanya Fabian, and Sarah Moffett. The efforts of the program directors and research mentors are greatly appreciated. Amy Seybert, chair of the Department of Pharmacy and Therapeutics and Bryan Yourich, Regional Director of Pharmacy Operations, must also be recognized for their dedication to the program. We greatly appreciate the continued support of Dean Patricia D. Kroboth. We would be remiss not to mention the administrative support of Metanthi Tzanakos, Matthew Freidhoff and Sherri Peterson. Most importantly, this program is successful because of the commitment of our outstanding residents.

Cost of treatment of low risk venous thromboembolism (VTE) patients with direct acting oral anticoagulants versus enoxaparin and warfarin

Asamoah BW, Kane-Gill S, L'Altrelli A, Kloet, M.

PURPOSE: Venous thromboembolism (VTE) is associated with high use of health care resources. Treatment in the outpatient setting is recommended for hemodynamically patients at low risk for adverse effects. Bridging with parental heparin and routine monitoring of warfarin present challenges to disposition of patients from the ED. Direct acting oral anticoagulants have comparable efficacy to the VKAs, with significantly lower bleeding and no routine monitoring and bridging with parenteral agents which facilitates treatment without hospital admission. However, thereare limited studies of cost outcomes in VTE patients at low risk for adverse effects with DOAC.

METHODS: A retrospective chart review design was used to compare cost of treatment of low-risk VTE patients discharged from the ED with a DOAC or heparin and warfarin or admitted for inpatient management. Patients diagnosed with VTE in the ED were stratified into low and high-risk group per simplified version of the pulmonary embolism severity index. The cohorts was stratified into discharged and admitted patients for review of their anticoagulants and healthcare utilization and charges. Primary objective was 30 days total healthcare charges. Secondary objectives included healthcare utilization, predictors of high-risk of complications and inpatient admission for low risk patients, and anticoagulant used.

RESULTS: Overall, 13,438 diagnosed with VTE met the study criteria, 1,411 of whom were positive for chronic (303), acute/indeterminate (1057) and acute on chronic VTE (52). Out of the 1057 acute/indeterminate cohort, 839 had complete data for sPESI analysis; 202 (24%) were low-risk and 637(76%) were high-risk for 30-days VTE recurrence/adverse effects. Both low and high-risk groups were further stratified into three groups: admission to inpatient unit [low-risk (162); high -risk (561)], admission to observation [low-risk (21); high -risk (37)], and discharged to home/outpatient setting from ED [low-risk (19); high -risk (40)]. Further results are pending

CONCLUSIONS: About 80% of patients with low-risk of 30 days VTE recurrence/adverse effects were admitted, in comparison to 9.4% who were discharged from the ED. Similarly, a higher proportion of high-risk patients were admitted (88%) in comparison to the discharged patients 6.27%. Predictors of inpatient admission for low-risk patients, predictors of discharge for high-risk patients and further conclusion are pending.

Benedicta Asamoah

Benedicta received her PharmD from the University Of Maryland School Of Pharmacy in 2017 and is completing a health-system pharmacy administration residency at UPMC in 2019. Upon completion of the residency, she plans to practice in a hospital setting.

Mentor(s): Sandra Kane-Gill, PharmD, MS, FCCM, FCCP; Megan Kloet, PharmD, BCPS; Alfred L'Altrelli, PharmD

Opportunities to improve HIV prevention curriculum and PrEP utilization in an urban family health center

Aurora JA, Ballard SL, Salter C, Skinker BM

PURPOSE: Pre-exposure prophylaxis (PrEP) is a method used to prevent the transmission of HIV in patients at substantial risk of infection. The FDA approved a fixed-dose combination of tenofovir disoproxil fumarate (TDF) and emtricitabine (FTC) in 2012 for PrEP. Since 2013, Shadyside family medicine residency has incorporated PrEP into patient care and medical resident training through didactic lectures, readings, and precepting, meeting 2016 AAFP curriculum guidelines. Despite the proven efficacy of PrEP, it remains underutilized in practice. This mixed-methods evaluation assessed training strategies for PrEP use and adherence to CDC guidelines with the goal of increasing PrEP utilization and improving the quality of PrEP management at Shadyside Family Health Center (SFHC).

METHODS: SFHC family medicine residents and graduates were surveyed to assess exposure to training components, self-reported confidence and competency in PrEP use, and retention of diagnostic criteria and recommended follow-up. A drug utilization evaluation (DUE) was also conducted by retrospective chart review at SFHC for patients prescribed TDF/FTC from 7/1/2012 to 6/30/2018. Patients with an HIV diagnosis or using other antiretrovirals were excluded. Charts were reviewed for adherence to CDC guidelines on prescribing and monitoring of PrEP. Adherence to prescribing practices includes proper TDF/FTC dose, directions, and quantity. Adherence to baseline and follow-up testing includes renal function, HIV, hepatitis B, STDs (gonorrhea, chlamydia, and syphilis), and pregnancy. In addition, encounter types were compared for follow-up testing. Results are reported with descriptive statistics and a chi-square analysis was used for between-group comparisons.

RESULTS: Eighty physicians were surveyed. Survey response rate was 56.3%. Of the respondents, 46.7% have prescribed PrEP and 55.5% self-assessed as competent to prescribe PrEP. Respondents exposed to all 3 training types were significantly more likely to self-assess as competent ($p<0.05$). Those self-assessed as competent were more likely to correctly identify 4+ follow-up testing guidelines ($p<0.05$). DUE identified 68 patients; 98.5% MSM. Baseline testing ranged from 79.4% (HIV screening) to <20% (hepatitis B.) Testing was less likely to be completed at follow-up vs. baseline ($p<0.05$). Follow-up testing was more likely to be completed at in-person office visits vs. non-office visits ($p<0.05$).

CONCLUSION: PrEP training resulted in self-reported competence in about half of survey respondents. Chart review revealed gaps in adherence to prescribing & monitoring of PrEP, indicating a need for increased physician training and practice supports. PrEP is underutilized at SFHC, especially in non-LGBTQ+ patients. Training efforts should include adequate patient care experience with skilled preceptors, in addition to readings and didactics.

Presented at the 1st Annual UPMC Family Medicine Scholarship Day in Altoona, PA, on May 10, 2019

John Aurora

John is from Wallingford, CT, and received his PharmD from the University of Connecticut. He completed a PGY1 community pharmacy resident at St. Vincent's Medical Center in Bridgeport, CT. His professional interests include chronic disease state management, transitions of care, and academia. Upon completion of his ambulatory care residency, he plans to practice as a clinical pharmacist in an outpatient clinic.

Mentor(s): Stephanie Ballard, PharmD, BCPS; Deanne Hall, PharmD, BCACP, CDE

Characterization of immune-mediated colitis following checkpoint inhibitor therapy in melanoma patients at a large academic medical center

Melissa L. Bastacky, PharmD; Gerard P. Mascara, PharmD, BCOP; Timothy L. Brenner, PharmD, BCOP; Diwakar Davar, MD, MBBS, MSc

PURPOSE: Immune checkpoint inhibitor (ICI) therapy has revolutionized the treatment of multiple cancer types by producing durable responses in a subset of patients. ICIs are first-line therapy for patients with metastatic melanoma and have improved overall survival and progression-free survival compared to standard chemotherapy. However, ICI therapy is associated with unique immune-related adverse events (irAEs), resulting in treatment discontinuation in 25%-58% of patients. Among various irAEs, colitis occurs in 8-27% of patients treated with ICIs and is among the most difficult to treat. We evaluated characteristics of immune-mediated colitis in patients with advanced melanoma treated with ICIs.

METHODS: We performed a chart review of 183 sequential melanoma patients at the University of Pittsburgh Medical Center Hillman Cancer Center Melanoma Program who received at least 1 dose of ICI therapy with a PD-1 and/or CTLA-4 inhibitor between 2011-2018 and who consented to a concurrent IRB approved tissue banking study. We excluded patients who did not develop immune-mediated colitis on ICIs. Data collection included demographics, ICI treatment, incidence and grading of colitis, management, colonoscopy and/or biopsy results, relevant labs, and known and exploratory predictive factors of colitis. Colitis was defined by the ASCO irAE Clinical Practice Guideline and graded per the NCI CTCAE v5.0. Steroid responders were defined as colitis resolution to $\leq$ grade 1 without additional immunosuppressive therapy. Descriptive statistics were reported for characteristics of immune-mediated colitis and comparisons utilized non-parametric statistical tests.

RESULTS: In our cohort, 23 of 183 (12.6%) patients developed immune-mediated colitis. Those receiving Ipilimumab/Nivolumab combination therapy developed higher grade colitis (grade $\geq$3: 100%) with an earlier onset (median onset: 48 days) compared with those receiving monotherapy with either Ipilimumab (grade $\geq$3: 42.9%, median onset: 106 days) or a PD-1 agent (grade $\geq$3: 11.1%, median onset: 202 days). 17 of 21 (81%) colitis events treated with systemic steroids were responsive to steroid therapy. Patients who were re-challenged with the same ICI after a delay in treatment (n=4) due to colitis did not experience recurrent colitis.

CONCLUSIONS: Consistent with irAE literature in melanoma patients undergoing ICI therapy, Ipilimumab/Nivolumab combination therapy produces a greater incidence of higher grade colitis than ICI monotherapy. Patients on combination therapy may derive benefit from closer monitoring within the first 3 months of treatment. Although the literature is inconclusive, our results suggest that those who develop colitis with resolution to grade $\leq$ 1, may be re-challenged with the same or a different ICI in the future with low risk of development of a recurrent episode of immune-mediated colitis.

Presented at Hematology/Oncology Pharmacy Association Annual Conference, Fort Worth, TX, April 3-6, 2019.

Melissa Bastacky

Melissa is a PGY2 Oncology Pharmacy Resident at UPMC-Shadyside Hospital. She completed her undergraduate and pharmacy school training at the University of Pittsburgh and her PGY1 Pharmacy Residency at UPMC-Presbyterian Hospital. Her current interests lie in oncology, immunology, and pharmacogenomics.

Mentor(s): Timothy L. Brenner, PharmD, BCOP; Gerard P. Mascara, PharmD, BCOP; James J. Natale, PharmD, BCOP

Appropriateness of Antibiotic Selection for Patients Undergoing Cesarean Section

Bevan JL, Burke CX, Zaradzki KS

PURPOSE: Cesarean Section (CS) delivery accounts for 32% of the 4 million births per year in the United States. Women who have a CS are at a greater risk for developing postpartum infections. Antibiotic prophylaxis is recommended for all women undergoing CS and has been found to reduce the risk of wound infections or infectious complications by 60-70% compared to placebo or no prophylaxis. Appropriate drug selection reduces treatment failure, development of multi-drug resistant organisms, and adverse reactions associated with antibiotic prophylaxis. This QI project is designed to evaluate if CS prophylactic antibiotics are being appropriately selected, according to The American College of Obstetricians and Gynecologists (ACOG) recommendations, at UPMC Magee Womens Hospital. Identifying the drug selection trends will help to determine interventions that should be implemented to improve antibiotic prescribing in the UPMC Magee Womens Hospital Birth Center.

METHODS: This was a single center, retrospective project in which the electronic medical records were reviewed of patients who underwent CS delivery at UPMC Magee Womens Hospital. Approval was granted by the UPMC Quality Improvement Review Board prior to beginning the project. Patient were included in the study if they underwent CS delivery at UPMC Magee Womens Hospital between January 1, 2018 and December 31, 2018. Exclusion criteria was a diagnosis of chorioamnionitis, and incomplete medication administration record information. Data collected included patient age, height, weight, allergies, length of stay, and antibiotics administered.

RESULTS: Pending

CONCLUSIONS: Pending

Jennifer Bevan

Jennifer received her PharmD from The Ohio State University in 2018 and is completing her PGY-1 pharmacy practice residency at UPMC Magee Womens Hospital. Upon completion of her residency, she will be returning to Columbus to work as a hospital pharmacist.

Mentor(s): Clayton Burke PharmD, Krystina Zaradzki PharmD, Pamela Smithburger, PharmD, MS, BCPS, BCCCP, FCCP, FCCM

Evaluation of systemwide open fracture prophylaxis practices

Bever A, Voycik M

PURPOSE: Open fractures are those in which bone is exposed to a patient's external environment via traumatic injury. In 2011, the Eastern Association for the Surgery of Trauma (EAST) published guidelines for infection prevention in this patient population. Despite these guidelines, there are a wide variety of prophylactic strategies used in the management of open fractures at our institution, many of which are more aggressive in breadth of antimicrobial coverage and treatment duration, exposing patients to adverse effects of broad-spectrum agents without evidence-based benefit. This quality improvement project is designed to characterize the variability of prophylaxis practices within the health system.

METHODS: This retrospective chart review included patients ~18 years old that presented to any UPMC facility with an ICD-10 code for long bone open fracture from January 1st, 2017 to December 31st, 2017. Information collected included patient demographics, fracture grade, antimicrobial drug selection and duration, surgical intervention, infectious disease consultation, and concomitant indications for antimicrobials. Patients were excluded from review if the fracture grade was not documented in the medical record or if the patient had another indication for antimicrobials. This information was reviewed to compare system use to the EAST practice management guidelines regarding breadth and duration of antimicrobial prophylaxis for this indication.

RESULTS: Of the 398 admissions for long bone open fracture in 2017, 192 patients met inclusion criteria. In patients with Gustilo Type I or II fractures, duration of prophylaxis exceeded the guideline-recommended duration of 24 hours post-wound closure in 109 cases (83.8%). In patients with Gustilo Type III fractures, duration of prophylaxis exceeded the guideline-recommended duration of 24 hours post-wound closure or 72 hours post-injury in 58 cases (93.5%). Further, breadth of coverage was discordant with current recommendations in 48 Type I/II fractures (33.1%) and 9 Type III fractures (14.5%).

CONCLUSIONS: System utilization of prophylactic antimicrobials in open fracture care is discordant with guideline recommendations. This retrospective review highlighted the variability of care provided at UPMC facilities in terms of antibiotic selection and duration of treatment for this indication. This data would support the development of an institutional protocol to standardize care for this patient population.

Andrew Bever

Drew received his Pharm.D. from the Duquesne University School of Pharmacy and is completing his PGY-1 at UPMC Mercy. Upon completion, Drew will continue with the Mercy team as a Lead Pharmacist. His professional interests include medication safety, pharmacy informatics, and health-system administration.

Mentor(s): Meaghan Voycik, Pharm.D., BCPS; Taylor Miller, Pharm.D.

Evaluation of a Geriatric Correctional Insulin Scale in Patients with Diabetes

E. Bobrzynski, E. Cassidy, A. Donihi, F. D'Amico

PURPOSE: Hypoglycemia is a serious adverse event of insulin therapy in hospitalized older adults (≥65 years-old). This age group is especially vulnerable due to the increased prevalence of multiple comorbidities, polypharmacy, malnutrition, and frailty. Therefore, cautious dosing of insulin is warranted in older adults. In the hospital setting, insulin correctional scale is often used in combination with scheduled basal insulin to manage hyperglycemia. Correctional scale can also be used as insulin monotherapy for a short period of time in hyperglycemic patients whose insulin requirements are unknown. Given increased susceptibility of older adults to hypoglycemia, our hospital has an order set for a lower intensity, geriatric-specific correctional insulin scale in addition to an order set for standard adult low, moderate, and high intensity scales. The goal of this quality improvement project was to assess our standardized geriatric correctional insulin protocol in hospitalized older adults with diabetes.

METHODS: Patients admitted to the hospital's geriatrics service with diabetes ordered the geriatric correctional insulin scale were retrospectively identified over a 12-month period. The geriatric correctional scale has a higher threshold for treatment of elevated blood glucose levels, delaying insulin doses until blood glucose is greater than 200 mg/dL. Patient demographics including age, comorbid conditions, concurrent use of basal or premix insulin, pre-admission diabetes regimen (if any), and reason for admission will be collected. Prevalence of hypoglycemia (blood glucose (BG) <70 mg/dL), severe hypoglycemia (BG <54 mg/dL), hyperglycemia (BG >180 mg/dL), and need to switch scales will be analyzed.

RESULTS: We anticipate low rates of hypoglycemia with the geriatric scale; however, we suspect that many patients may be switched from the geriatric to a standard scale for escalation in therapy. We anticipate determining the prevalence of hypoglycemia and hyperglycemia in this population.

CONCLUSIONS: There is a need for careful use of insulin in older adults. Next steps could include determining which older adults are most likely to benefit from use of the geriatric scale.

Emily Bobrzynski

Emily Bobrzynski is from Pittsburgh, Pennsylvania. She received her PharmD from the University of Pittsburgh School of Pharmacy. She completed her PGY1 residency training at UPMC St. Margaret. This year, she is continuing her training as a PGY2 in geriatrics at UPMC St. Margaret. After completing her PGY2, she will be an Inpatient Heart Failure Clinical Pharmacy Specialist with Allegheny Health Network at Forbes Hospital. Her professional interests include transitions of care, deprescribing, interprofessional education.

Mentor(s): Elizabeth Cassidy, PharmD, BCPS

Retrospective review of positive ascitic fluid cultures in patients with spontaneous bacterial peritonitis (SBP) and assessment for appropriateness of guideline-based empiric antibiotic selection.

Caldwell HT, Andrzejewski C, Marini R, McCreary E, Nemecek BD

PURPOSE: The purpose of this study is to investigate the percentage of bacteria identified in ascitic fluid cultures that are susceptible to third generation cephalosporins, the empiric treatment recommended by the 2012 American Association for the Study of Liver Diseases (AASLD) guidelines for SBP.

METHODS: This is a retrospective review of adult inpatients with a diagnosis of SBP and positive ascitic fluid cultures who were admitted to UPMC Mercy or UPMC Presbyterian from January 1st, 2013 – December 31st, 2018. Patients who had ascites secondary to malignancy, tuberculosis, pancreatic etiologies, pregnant women, prisoners, no ascitic fluid culture available, or no growth on ascites fluid culture, peritoneal dialysis or gastrointestinal perforation were excluded. The primary outcome was to evaluate the percentage of bacteria that were covered by empiric regimens recommended by the AASLD guidelines. Secondary outcomes include identifying the most frequent organisms growing in ascitic fluid in SBP patients.

RESULTS: A total of 1779 patients were screened; forty-four patients met inclusion criteria. Sixty-six percent were male (n=29), with mean age of 56 years, with 67 unique isolates identified from ascitic fluid. Twenty-eight patients (64%) were admitted to an intensive care unit (ICU). Top 3 organisms isolated were *Escherichia coli* (n=14, 21%), *Enterococcus* spp. (n=13, 20%), and *Klebsiella* spp. (n=8, 12%). Further analysis on susceptibility of organisms are pending.

CONCLUSIONS: Pending final analysis

Terrence Caldwell

Terrence is from West Philadelphia and received his PharmD from Philadelphia College of Pharmacy in 2018 and will be completing a pharmacy practice residency at UPMC Mercy in 2019. Upon completion of his residency, he will start work at Children's Hospital of Philadelphia.

Mentor(s): Branden Nemecek, PharmD, BCPS; Christina Andrzejewski, PharmD, BCPS; Taylor Miller, PharmD, BCPS

Safety and Efficacy of Direct Oral Anticoagulants in Extreme Body Weights

Cardinal RM, D'Addezio A, Dakers K, Yee A, D'Amico F, Castelli G

PURPOSE: Current literature on the safety and efficacy of direct oral anticoagulant (DOAC) therapy in patients who are extremely obese or underweight are limited. However, these agents are still being prescribed in these populations and often left to the family medicine physicians to monitor. The objective of this study is to describe the safety and efficacy of DOAC therapy in extremely obese and underweight patients for the treatment of venous thromboembolism (VTE) to educate family medicine physicians on appropriate prescribing and monitoring of DOACs in these patient populations.

METHODS: A multi-site, retrospective cohort design of four UPMC hospitals (McKeesport, Mercy, Passavant, St. Margaret) was used. Patients who were extremely obese (> 120 kg or BMI > 40 kg/m2), underweight (< 60 kg or BMI < 18.5 kg/m2), or average weight (60-120 kg or BMI 18.5-40 kg/m2) who experienced an initial VTE between November 2012 and August 2017 and placed on a DOAC (apixaban, dabigatran, edoxaban, or rivaroxaban) were included. Percent of patients who experienced a recurrent VTE within 12 months from the index VTE will be the primary efficacy outcome compared between body weights. Percent of patients who experienced at least one major bleed within 12 months from the index event will be the primary safety outcome. Chi-squared tests followed by logistic regressions will be utilized for analysis.

RESULTS: Research in progress; results are yet to be determined.

CONCLUSIONS: (Anticipated): The results of our study have the potential to identify patients of extreme body weight who will be at high risk for a recurrent VTE or major bleed when prescribed a DOAC. This study aims to improve the prescribing behavior of DOACs in these populations by designing an algorithm based on patient specific risk factors to educate family medicine physicians and assist in their clinical decision making when caring for patients with extreme body weights.

Presented at the 52nd Society of Teachers of Family Medicine Annual Conference, Toronto, ON, Canada 2019.

Rachael Cardinal

Rachael Cardinal is a PGY-1 Pharmacy Resident at UPMC St. Margaret. She is from Buffalo, New York, and received her Doctorate of Pharmacy from the University at Buffalo School of Pharmacy and Pharmaceutical Sciences. Upon completing her PGY-1 residency, she will continue at St. Margaret as a PGY-2 in Family Medicine. Her professional interests include chronic disease state management, transitions of care, academia, and family medicine. Rachael also enjoys traveling, hiking, and spending time with friends and family.

Mentor(s): Gregory Castelli, PharmD, BCPS, BC-ADM

Evaluation of Prescriber Strategies for the Prevention of Contrast Induced Nephropathy

Colvin BM, Kane-Gill SL

PURPOSE: Contrast-induced nephropathy (CIN) is a subset of acute kidney injury (AKI) that occurs secondary to exposure to intravenous radiocontrast media. Consequences of CIN include short-term dialysis initiation, increased length of hospital stay, and increased cost to patients. In November 2017 the results of the PRESERVE trial evaluating prevention strategies for CIN in patients at high risk for renal complications undergoing angiography indicated there were no significant differences between use of sodium bicarbonate, normal saline, or acetylcysteine. Concurrently with the release of the results of the PRESERVE trial, the nation experienced a fluid leading to conservation of intravenous solutions and oral rehydration protocols. The objectives of this quality improvement study were to evaluate the impact of the PRESERVE trial and fluid shortage on prescribing practices at UPMC Presbyterian, as well as to determine the incidence of CIN at the institution during these time periods.

METHODS: A retrospective, single center quality improvement project with a pre- post trial evaluation was completed at a tertiary academic medical center. Data was obtained from the electronic medical record from May 1, 2017 to November 1, 2018. Encounters evaluated from May 1, 2017 to November 1, 2017 represent the before-PRESERVE trial group. Encounters evaluated from May 1, 2018 to November 1, 2018 represent the after-PRESERVE trial group, which will reflect the institutions response to the PRESERVE trial results. A patient list was generated via charge data for radiocontrast dye received during admission. This list was refined to include high-risk patients using ICD 10 diagnosis codes for patients with heart failure, diabetes, or chronic kidney disease. Data was analyzed to evaluate which prevention strategy, if any, was utilized. Additionally, patients were evaluated for changes in serum creatinine and urine output from 48 to 168 hours after dye exposure.

RESULTS: Overall 728 patients met the study criteria, 359 in the 2017 arm and 369 in the 2018 arm. These patients were further randomized to include 20% per arm with 72 in 2017 and 74 in 2018. The median age was 69 ±19 years in 2017, and 70 ±18 years in 2018. In the 2017 arm 22, 37, and 45 patients had a diagnosis of chronic kidney disease, diabetes, and heart failure, respectively. In the 2018 arm 16, 50, and 36 patients had a diagnosis of chronic kidney disease, diabetes, and heart failure, respectively. Further results are pending.

CONCLUSIONS: Pending

Bailey Colvin

Bailey received her Doctor of Pharmacy and Bachelor of Science degrees from the Philadelphia College of Pharmacy at the University of the Sciences. She is completing her PGY1 residency at UPMC Presbyterian hospital. This year she will continue her training at UPMC Presbyterian as a PGY2 pharmacy resident in cardiology.

Mentor(s): Sandra L. Kane Gill, PharmD, MS, FCCM, FCCP

Evaluating Care for Sepsis at a Community Hospital

Dadey LP, Morchied RJ, Reynolds R

PURPOSE: Since 2002 the surviving sepsis campaign has been attempting to combat the high-risk disease state of sepsis and septic shock for patients. Most recently in 2018 the campaign has updated their bundles to include 2016 guideline practices and to hopefully attempt for even more rapid interventions. The purpose of this QI project is to describe changes of practice in the care of septic patients at a community hospital.

METHODS: This was a two-part analysis which included retrospective chart review of patients from February 2018 to December 2018 deemed septic via 3rd party chart abstracters. The analysis included various forms of care including more than the initial fallout for patients. The chart review included pharmacy interventions such as a fake order placed to indicate to staff pharmacists to send antibiotics immediately, and implementation/education of order sets for providers. The second part included changes in aspects of pharmacy such as placing antibiotics in the automated dosing cabinet in the emergency department.

RESULTS: While results are unavailable at the time of the publication of this abstract the sample of patients included in initial analysis totaled 123 patients and the implementation of other practices has yielded preliminary positive results.

CONCLUSIONS: Results are not currently available that the time of publication, but what is expected is that patients that have are designated may have multiple fallouts. These may pose further information into practice changes.

Liam Dadey

Liam received his PharmD from the University of Pittsburgh School of Pharmacy in 2018 and is currently the PGY1 pharmacy practice resident at UPMC McKeesport hospital. Over the course of the year Liam developed a better understanding for HIV and Ambulatory care and wishes to continue this practice in the future.

Mentor(s): Rebecca Morchied, PharmD Robert Reynolds PharmD

Evaluating impact of a pharmacist-led intervention on prescribing and administration of as needed psychotropics for acute agitation in older adults

Dean TA, Joseph MP, Carr CN, Kirisci L, Fabian TJ

PURPOSE: Older adults with major neurocognitive disorder (MNCD) admitted to a psychiatric hospital are often prescribed psychotropic medications as needed "PRN" to manage acute agitation. The objective of this study is to compare psychotropic PRN prescribing and administration patterns, appropriateness, and safety before and after a pharmacist-led intervention.

METHODS: An intervention consisting of in-services and one-on-one meetings with psychiatrists, nurses, and milieu therapists (MTs) was implemented on the geriatric unit at UPMC Western Psychiatric Hospital in December 2018. Patients at least 65 years old with an ICD-10 diagnosis of MNCD, and who received at least one PRN for agitation were divided into a pre-intervention cohort (August 2018 to October 2018) and post-intervention cohort (December 2018 to February 2019) based on discharge date. PRN prescribing and administration patterns, Pittsburgh Agitation Scale (PAS) and PRN effectiveness documentation, as well as incidence of falls 24 hours after PRN administration were compared.

RESULTS: Pre-intervention, 13 patients were administered 90 PRNs (6.9 PRNs per admission) and post-intervention, 12 patients were administered 39 PRNs (3.25 PRNs per admission). The most common PRNs administered were olanzapine, haloperidol, and lorazepam. Nursing PAS documentation increased from 0% to 33.3%. Compared to MTs, there were more nurse-documented PAS scores with a highest agitation domain of at least 3 points (69% vs 32%). Additionally, one patient had at least one fall pre-intervention, and two patients fell post-intervention.

CONCLUSIONS: In older adults with MNCD, prescribing and administration patterns of PRN psychotropic medications for acute agitation were positively impacted by a pharmacist-led educational intervention. Nurse-documented PAS scores increased post-intervention and reflected higher agitation at time of PRN administration. Ongoing pharmacist-led education of nurses and MTs is necessary to increase documentation and promote judicious use of PRN psychotropic medications.

Presented at the CPNP Annual Meeting in Salt Lake City, UT, 2019.

Taylor Dean

Taylor received her PharmD from the University of Texas at Austin in 2017. Following graduation, she started a PGY-1/PGY-2 combined residency at UPMC Western Psychiatric Hospital in order to gain an early focus in psychiatry. Her professional interests include geriatric psychiatry, acute psychosis, mood disorders, and underserved care. After completion of residency training, she plans to earn Board Certified Psychiatric Pharmacist credentials and will become a clinical psychiatric pharmacist at The University of Kansas Health System.

Mentor(s): Matthew P. Joseph, PharmD, BCPS, Chelsea N. Carr, PharmD, BCPP, Levent Kirisci, PhD, Tanya J. Fabian, PharmD, PhD, BCPP

The prevalence of AKI in the use of Vancomycin plus Zosyn in ICU patients

Fawzy JH, Kane-Gill SL

PURPOSE: Acute Kidney Injury (AKI) refers to a sudden decrease in kidney function, resulting in the retention of urine, and in the dysregulation of extracellular volume and electrolytes. The definition for AKI used in clinical and epidemiologic studies is based on specific criteria that have been sequentially developed. The Kidney Disease: Improving Global Outcomes (KDIGO, released in 2017) definition and staging system is the most recent and preferred definition. Other criteria include the RIFLE criteria (Risk, Injury, Failure, Loss of kidney function, and End-stage kidney disease).

AKI can result from a variety of etiologies, but it is generally multifactorial. Prerenal azotemia is a direct result of reduced renal perfusion, such as hypovolemia, hemorrhage, sepsis, third spacing of fluid (such as in severe pancreatitis) or heart failure. Intrinsic AKI may be due to acute tubular necrosis, rapidly progressive glomerulonephritis, and interstitial nephritis. Finally, Postrenal injury results from mechanical obstruction of the urinary outflow tract, such as fibrosis or tumors.

AKI is a severe health risk, especially in the inpatient setting where patients are more susceptible. In fact, 7%-18% of all hospitalized patients acquire AKI and up to 50% of critically-ill patients acquire it. Length of stay (LOS) in a hospital increases from 5 days to 16 days in severe cases. With an increase in LOS, the hospital cost increases almost 3-fold in severe cases. The 30-day readmission rates increases by 3-fold in severe cases as well. Lastly, hospital mortality rates are increased dramatically by 5-11-fold in severe cases. It is very important to decrease as many AKI cases as soon as possible which is why we need up-to-date kidney function testing that does not lag behind 24-48 hours.

METHODS: Vancomycin and Piperacillin/Tazobactam is a commonly used antibiotic combination especially in the Intensive care units (ICU). Assessing trends based on dosing in ICU floors can provide an insight regarding the actual impact on renal function. The use of Serum Creatinine in this setting could be effective in following trends however moving forward, the use of this marker might show results after the insult has happened. Using trends recorded in ICU patients can provide an insightful understanding of this patient population's need as well as proper dosing based on historic data collected. Recording basic demographics as well as other contributors to AKI can modify utilizations of these medications as well.

RESULTS: Currently still in-progress to assess and analyze the impact of these medications as well as other possible contributors of AKI that these patients might have had. Contributors such as other medications and disease states will allow for clearer data analysis of the patient population

CONCLUSIONS: We currently hope to assess the data in a way to be able to change the standard of care practice for patients in the ICU settings. While this is still in-progress, the patient pool shows promising information to come and a good sub-group analysis.

John Fawzy

John Fawzy received his PharmD from Long Island University Brooklyn Campus in 2018. He is now completing his PGY1 Pharmacy Administrative residency in UPMC Presbyterian and will continue to go into a PGY2 Pharmacy Administrative position.

Mentor(s): Sandra Kane-Gill PharmD, MS, FCCM, FCCP

REFRAME – TOC: PhaRmacists Enhancing Follow up, Reducing and Assisting with Medication Errors through Transitions of Care

Ferdock A, Castelli G, Klatt T

PURPOSE: Medication discrepancies made during transitions of care (TOC) are common and can result in potentially preventable adverse drug events, leading to drug-related readmissions. Family Medicine pharmacists have strived to improve transitions of care discrepancies through a formalized protocol implemented in 2012, however, it is unknown the current impact this protocol has on patient outcomes. This study aims to determine the effectiveness of this protocol on readmission rates, primary care physician (PCP) follow up and medication errors.

METHODS: This study is a retrospective chart review from January 2018 – August 2018, identifying adult patients admitted to the UPMC St. Margaret inpatient family medicine service, who belong to one of the three academic Family Medicine Patient Centered Medical Homes (PCMH). The current TOC protocol begins with a sign-out email from the pharmacist on the inpatient service to the outpatient pharmacy team, listing any medication changes or follow up plans for the patient. The outpatient pharmacist will then follow up via telephone within 2-4 days of discharge; reinforces discharge plans, reconciles pre- and post-hospitalization medications, updates outpatient medication records, provides medication education, and emphasizes the importance of prompt PCP follow-up. This project aims to determine the rate of effectiveness of this protocol on 30-day readmission rates and PCP follow up. Various descriptive statistics will be calculated to describe the study groups. The primary hypothesis (comparing the rates of readmission) will be tested using a Z-test.

RESULTS: Results are preliminary, as statistics are still in progress. A total of 214 patients were admitted to the inpatient family medicine service during January 2018-August 2018. Of those, 104 were patients belonged to one of the three family medicine PCMHs. The outpatient pharmacists were able to get in contact with 31% of the discharged patients. This group had less readmissions than the non-contacted group [21% v. 26%; 95%CI -14.5% - 20.1%].

CONCLUSION (ANTICIPATED): Having a pharmacist-lead team to ensure accuracy of medications and assist with follow up plans may lead to improved outcomes, when patients transition during their care.

Ariel Ferdock

Ariel Ferdock is a PGY-2 Ambulatory Care Pharmacy Resident at UPMC St. Margaret. She received her PharmD from Nova Southeastern University in Palm Beach Gardens, FL; and she attended Towson University in her home state of MD, where she received her Bachelor of Science in Chemistry. She plans to pursue being a clinical faculty member in a primary care setting after graduation.

Mentor(s): Patricia Klatt, PharmD, BCPS

Safety and efficacy of direct oral anticoagulants in abdominal transplant recipients

Fredrick SR, Schonder KS, Rivosecchi RM

PURPOSE: Anticoagulation is indicated for treatment and prevention of venous thromboembolism (VTE) in a variety of patient populations. Many clinicians are comfortable using warfarin and other vitamin K antagonists due to their longevity of use and the abundance of literature surrounding them. However, warfarin comes with many pitfalls including unpredictable pharmacokinetics, drug-drug and drug-food interactions, and a narrow therapeutic index. Standardized dosing and minimal laboratory monitoring make direct oral anticoagulants (DOACs) an attractive option for anticoagulation. While there is evidence of the safety of DOACs in patients with renal and hepatic impairment, there is a paucity of literature surrounding their use in patients who have undergone abdominal organ transplantation. The purpose of this evaluation was to investigate, safety, efficacy, and prescribing patterns of DOACs in abdominal transplant recipients during the immediate post-transplantation period.

METHODS: This was a retrospective chart review of patients who received a kidney, liver, or pancreas transplant between October 2010 and October 2017 and who were prescribed a DOAC within 6 months of transplantation. Baseline characteristics including transplanted organ, anticoagulation indication, demographics, laboratory values, and medication regimens were collected. Safety and efficacy were assessed by incidence of bleeding events and incidence of breakthrough VTE events, respectively. Bleeding events were classified as major or minor, whereas breakthrough VTEs included deep vein thromboses (DVT), pulmonary embolisms (PE), and ischemic strokes. Outcomes data was collected for 6 months following the initiation of a DOAC. The DOAC regimen and interacting medications were reassessed at initiation and at the time of any bleeding or clotting event to determine whether the dose was appropriate according to the manufacturers' labeling.

RESULTS: Thirty-six patients who received a kidney, liver, or pancreas transplant were prescribed a DOAC within 6 months of transplantation. Of these, 89% were prescribed apixaban, while the remainder were prescribed rivaroxaban. Transplanted organs included 24 kidneys, 9 livers, 2 simultaneous kidneys/pancreases, and 1 simultaneous kidney/liver. The median time from transplantation to DOAC start was 33 days. Bleeding events that were identified included hematoma, abnormal vaginal bleeding, and gastrointestinal bleeding. VTE events that were identified included DVT and ischemic stroke.

CONCLUSIONS: The results of this study will add to the existing literature regarding anticoagulation in abdominal organ transplant recipients.

Stacy Fredrick

Stacy is a PGY-1 Pharmacy Resident at UPMC Presbyterian. She is from Buffalo, NY, and received her PharmD and MBA from the University at Buffalo School of Pharmacy and Pharmaceutical Science. Her clinical interests include solid organ transplant and infectious disease. Upon completion of her PGY-1 residency, she will continue at UPMC Presbyterian as a PGY-2 pharmacy resident focusing in Solid Organ Transplant.

Mentor(s): Full names with credentials: Kristine Schonder, PharmD; Ryan Rivosecchi, PharmD, BCCCP

Optimization of medication regimens in patients with serious mental illness

Goulding H, Lupu A, Chengappa R, Kirisci L, Fabian T

PURPOSE: Patients with serious mental illness (SMI) are at increased risk of medication-related problems due to complex regimens, comorbidities, and cognitive impairment. Polypharmacy, lack of care coordination, and inappropriate medication use can lead to non-adherence, adverse events, and poor clinical outcomes. Forbes Pharmacy fills weekly pillboxes for patients identified by their psychiatrists or PCPs to need assistance managing their medications. The objective of this project was to evaluate medication regimens of patients enrolled in the Pillbox program and identify opportunities for medication optimization.

METHODS: Prescription data for 121 Pillbox patients from FY17 and FY18 was analyzed and a chart review of current patients was performed to assess actionable areas for intervention including deprescribing, dose optimization, and provider education. Chronic proton pump inhibitor (PPI) use and docusate monotherapy for constipation were chosen as the first two evidence-based interventions to be implemented. Educational materials for patients and physicians were created and used for targeted interventions. Outcomes to be measured include number of recommendations made and accepted, time spent on interventions, and patient attitude towards medication changes as assessed through the Patient Attitudes Towards Deprescribing questionnaire.

RESULTS: Pillbox patient prescriptions filled in 2017 and 2018 included antipsychotics and anxiolytics (12%); antidepressants and lithium (8%); laxatives (6%); PPIs (4%); and other medications including antihypertensives, antihyperglycemics and analgesics. On average, patients had 41 unique prescriptions during the two-year study period. Of the 75 patients currently in the Pillbox program, 23 (31%) were on a PPI and 13 (17%) were on docusate monotherapy. After medication education was provided, 19 of 23 patients (83%) identified for interventions were amenable to having their prescriber contacted with recommendations.

CONCLUSIONS: Opportunities to optimize medication regimens for patients with SMI were identified including deprescribing PPIs and optimizing docusate monotherapy. The majority of patients were amenable to pharmacist-recommended medication changes. Results of the interventions are pending. Forbes Pharmacy will continue to assist patients in the management of complex medication regimens and will use educational materials developed for targeted interventions to educate patients and make recommendations to prescribers.

Presented At: ASHP Midyear Clinical Meeting and Exhibition, Anaheim, CA, December 2018 and University of Pittsburgh, Department of Psychiatry Research Day, Pittsburgh, PA, June 2019

Hannah Goulding

Hannah Goulding is a PGY-1 Pharmacy Resident at UPMC Western Psychiatric Hospital. She is a 2018 graduate of the University of North Carolina Eshelman School of Pharmacy and her professional interests include psychiatry and pediatrics, especially the combination. After completing her residency, she will continue her career at UPMC Western Psychiatric Hospital providing care for patients with autism and intellectual and developmental disabilities and expanding ambulatory clinical pharmacy services in child and adolescent psychiatry.

Mentor(s): Ana Lupu, PharmD; Tanya Fabian, PharmD, PhD, BCPP

Incidence of hypoglycemia in the setting of acute kidney injury in general medicine patients receiving basal insulin

Gray VC, Lombardi K

PURPOSE: According to the 2019 American Diabetes Association guidelines, patients with renal insufficiency should be treated with lower insulin doses than those without renal insufficiency. Presently, our institution does not have protocols in place to adjust insulin doses based on renal function, nor does current practice routinely account for this recommendation. The objective of this study is to determine the rate of hypoglycemic episodes in patients receiving basal insulin with acute kidney injury compared to those without acute kidney injury.

METHODS: A retrospective chart review was conducted to determine the incidence of hypoglycemia, defined as a blood glucose of less than 70 mg/dL, in patients with acute kidney injury (AKI). AKI was defined as an increase in serum creatinine of 0.3mg/dL or greater within 48 hours. Patients were identified for screening if they had received basal insulin (i.e. insulin glargine, insulin detemir, or insulin degludec) between February 1st, 2017 and April 30th, 2017. Inclusion criteria were patients admitted to a general medicine service, aged 18 years or older, and who received basal insulin during admission. Patients were excluded if they had an endocrinology consult, received an insulin drip, or received hemodialysis during hospitalization. Data collected included patient demographic information, home insulin regimen, inpatient insulin regimen, and blood glucose and serum creatinine values during admission.

RESULTS: A total of 404 patients were screened, with 103 patients being included. The most frequent reason for exclusion was patients who were admitted under services other than general medicine. The majority of patients in all four groups received insulin glargine as basal insulin during admission. Of the included patients, 33/103 patients (32%) did not meet criteria for AKI or hypoglycemia, 37/103 patients (36%) met criteria for AKI but did not experience hypoglycemia, 19/103 patients (18.5%) did not meet criteria for AKI but did experience hypoglycemia, and 14/103 patients (13.5%) met criteria for AKI and experienced hypoglycemia.

CONCLUSIONS: Based on the results of this retrospective review, the unadjusted rate of hypoglycemia while receiving basal insulin was lowest in general medicine patients with acute kidney injury. The effect of insulin dose on this result is pending further analysis. Additional studies with a larger number of patients could be helpful to determine the impact of total insulin dose on hypoglycemia in the setting of AKI.

Victoria Gray

Victoria received her PharmD from The Ohio State University College of Pharmacy in 2018 and is currently completing her PGY-1 residency at UPMC Mercy. Upon completion of her residency, she plans to practice in a hospital pharmacy setting.

Mentor(s): Kelli Lombardi, PharmD, BCPS; Taylor Miller, PharmD

Evaluation of apixaban and rivaroxaban effectiveness for stroke prevention in morbidly obese patients with atrial fibrillation

Berletic JD, Hassen HA

PURPOSE: Direct-acting oral anticoagulants (DOACs) were introduced as alternatives to warfarin for stroke prevention in patients with nonvalvular atrial fibrillation (AF). Clinical trials for the four DOACs, including the factor Xa inhibitors (apixaban, edoxaban, and rivaroxaban) and direct thrombin inhibitor (dabigatran) did not include sufficient patients with morbid obesity to guide their use in this patient population. The International Society on Thrombosis and Haemostasis (ISTH) recommends to avoid use in this patient population due to lack of clinical data, however, despite that recommendation, use persists. The purpose of this study was to evaluate the effectiveness of apixaban and rivaroxaban in morbidly obese patients with AF for primary or secondary stroke prevention.

METHODS: All patients presenting to UPMC Mercy between July 2016 and July 2017 that received apixaban or rivaroxaban were eligible for review. Inclusion criteria included patients with obesity (weight >120kg or BMI > 40 kg/m2) who were receiving apixaban or rivaroxaban for primary or secondary stroke prevention for atrial fibrillation. Data collection included patient demographics, risk of stroke (as determined by CHA2DS2VASc score), and history of stroke during or prior to apixaban or rivaroxaban therapy. The primary outcome of the study was the incidence of stroke while patients were on either apixaban or rivaroxaban.

RESULTS: A total of 814 patients were screened, with 62 patients meeting criteria for inclusion. Of the 62 patients evaluated, 40 (65%) of them received apixaban and 22 (35%) received rivaroxaban. Apixaban and rivaroxaban were used for primary stroke prevention in 53 (85%) patients and for secondary stroke prevention in 9 (15%) patients. Among the nine patients receiving anticoagulation for secondary prevention, 2 (22%) of them were receiving one of the DOACs before the first incidence of stroke. DOACs were initiated after the incidence of stroke in 6 (67%) patients and it was unclear whether stroke occurred during or prior to therapy in 1 (11%) patient.

CONCLUSIONS: The review indicates the continued use of DOACs in morbidly obese patients with atrial fibrillation even with limited evidence supporting their effectiveness. Due to the overall low number of event rates as well as the limitations of a retrospective review, we were unable to determine the effectiveness of DOACs in obesity. Until data is available from a large randomized controlled trial, routine use of DOACs in this patient population should be discouraged.

Presented at ASHP Midyear Clinical Meeting and Exhibition, Anaheim, CA, December 2018.

Hayat Hassen

Hayat Hassen is a PGY-1 Pharmacy Resident at UPMC Mercy. She attended the University of Minnesota Twin Cities for her Bachelor of Science. Hayat received her PharmD from the University of Missouri Kansas City. Upon completion of PGY-1 residency, Hayat will be continuing her PGY-2 training in ambulatory care in Minnesota. Outside of pharmacy, Hayat enjoys traveling, exploring new coffee shops, and spending time with family and friends.

Mentor(s): Josef D. Berletic, PharmD; Miller J. Taylor, PharmD

Nursing satisfaction improvements through automated medication tracking

Hoffman TD, L'Altrelli A, Bates M, Kane-Gill SL

PURPOSE: Nursing satisfaction with pharmacy services is associated with medication turn-around time and frequency of missing or late medications. UPMC Presbyterian uses automated dose dispensing cabinets in patient care areas to provide immediate access to high use medications. When these cabinets stock out of medications, there are delays in patient care. Implementation of new software technology to prevent or reduce stockouts in automated dose dispensing cabinets is expected to result in increased improvement in nursing satisfaction with pharmacy services.

METHODS: Nursing leadership takes a quarterly satisfaction survey as a measure of hospital departmental quality. The survey scaling ranges from 1 to 10, with 10 representing optimal service to meet nursing needs. The pharmacy automation team implemented new software to track the stock of cabinets in real time and utilize a usage algorithm to optimize cabinet stock based on an average use of day's supply of medication, rather than static par numbers. Following the implementation and rollout of this software, we will trend the results of the nursing satisfaction surveys to look for improvement in relation to pharmacy service scoring.

RESULTS: The initial results of the implementation of new cabinet software resulted in a decrease in cabinet stockouts of >60%. Initial rounding reports from nursing have shown higher levels of satisfaction with the decrease in stockouts, but the hospital-wide survey results are currently unavailable for the most recent quarter.

CONCLUSIONS: The conclusions of this study are still pending as the most recent hospital-wide survey is not available for analysis.

Tyler Hoffman

Tyler received his PharmD from the University of Pittsburgh School of Pharmacy in 2017 and is currently a PGY2 resident in the Health System Pharmacy Administration track. He remains at UPMC Presbyterian as a Pharmacy Administrative Fellow next year.

Mentor(s): Alfred L'Altrelli, PharmD; Madalyn Bates, RPh; Sandra Kane-Gill, PharmD, MS, FCCM, FCCP

Impact of a Medicare Part D compound strategy on member spend and utilization

Hospodar A, Heasley J, Ni D, Jose A

PURPOSE: Medicare Part D spending for compounded topical medications grew by 2,353% from 2010 to 2016, for a total annual cost of $323.5 million. Compounded medications are not approved by the U.S. Food and Drug Administration (FDA). According to the FDA, compounded medications do not have the same safety, quality, and effectiveness assurances as approved drugs, and unnecessary use exposes patients to potentially serious health risks. To manage the utilization of compounded topical products, CVS Caremark® offered a new compound strategy for Medicare Part D clients in 2018. This strategy considered compounds non-formulary if the final dosage form was topical (i.e., cream, ointment, lotion, and shampoo). Non-topical compound claims continued to process based on formulary status of the most expensive ingredient (MEI). The objective of this study was to evaluate the impact of the new compound strategy implemented by Medicare Part D clients on cost and utilization of compounded prescription products.

METHODS: We performed a retrospective claims-based analysis of Medicare Part D plans who opted in to the new compound strategy. Plans were excluded if a different compound strategy was implemented or if the plan was not a CVS Caremark client for 2017 and 2018. Ointment, cream, lotion, and shampoo were considered topical dosage forms. Claims data was compared from the year before the compound strategy was implemented on January 1, 2018 to the year after. Total costs and total number of claims for all compounds were evaluated. For 2018, compound claims were evaluated for rejected topical claims resulting in a paid non-topical claim. The primary outcome was gross compound cost per 10,000 members per year for plans before and after implementation. Secondary outcomes include percent change in gross cost, number of claims per 10,000 members per year, percent change in claims, and number of topical compound claims changed to a different dosage form.

RESULTS: Total compound gross cost decreased from $301,038 to $175,826 per 10,000 members per year (-42.7%). The gross cost per 10,000 members per year decreased by -85.0% for topical compounds and increased by +57.5% for non-topical compounds. Claims per 10,000 members per year for all compounds decreased by -25.6%. Claims per 10,000 members per year decreased by -83.1% for topical compounds and increased by +32.5% for non-topical compounds. Emulsions had the largest increase in cost and claims, with an 8,024% cost increase and 5,164% increase in claims. Powders had the second largest increase, with a 326.0% cost increase and 164.7% increase in claims.

CONCLUSIONS: For topical compounds, the total cost and the total number of claims decreased for each dosage form. For non-topical compounds, some dosage forms showed an increase in the total cost and/or number of claims, while others showed a decrease. Although it was found that some claims were switched from a topical to a non-topical dosage form, switching contributed minimally to the increase in claims for non-topical dosage forms. The compound strategy can be an effective tool to help Medicare Part D clients control spend and utilization of topical compound products.

Presented At the AMCP Managed Care & Specialty Pharmacy Annual Meeting 2019, San Diego, CA, 2019.

Alexa Hospodar

Alexa received her PharmD from the University Of Pittsburgh School Of Pharmacy in 2018. She will complete a managed care residency at CVS Health in 2019. Upon completion of residency, she plans to practice in a managed care/pharmacy benefit management setting.

Mentor(s): Jennifer Heasley, MS, PharmD; Danfeng Ni, PharmD; Abraham Jose, PharmD

A Review of Non-Emergent Drug Induced Hyperkalemia Management- Patiromer

Hylwa, KT, Kane-Gill SL, L'Altrelli A

PURPOSE: This quality improvement project will investigate the treatment of non-emergent drug induced hyperkalemia at our institution and whether the newer generation polymer-based absorbers are being managed during transitions of care to avoid possible 30-day readmissions.

METHODS: The patient population will be identified through TheraDoc alerts for retrospective chart review. The alerts will capture drug-induced hyperkalemia, critical K values (K>6 mmol/L), SPS, and Patiromer. All potassium lab values will be documented as well as time to corrected potassium below 5mmol/L. Minimally, laboratory results will be collected for 24, 48, 72, and 96 hours after critical K event. The patient's remaining length of stay will be evaluated for subsequent critical K events. Upon discharge, patient readmission will be monitored for 30 days for all cause readmission and 30 days for hyperkalemia readmission.

RESULTS: Total alerts for critical K were 5560, 3960 for drug-induced hyperkalemia, 338 for Patiromer, and 240 for SPS. After initial review of total alerts, 53 patients met requirements for inclusion for retrospective chart review from the Patiromer group, 22 from SPS, and 12 for both Patiromer and SPS. Final analysis of these patients is currently ongoing.

CONCLUSIONS: The conclusion of this quality improvement project are still pending.

Keith Hylwa

Keith received his PharmD from the Albany College of Pharmacy and Health Sciences and his MBA from Clarkson University in 2018. He is currently a PGY1 resident in the Health System Pharmacy Administration track at UPMC Presbyterian. Keith will be staying at UPMC Presbyterian to complete his PGY2 in the Health System Pharmacy Administration track.

Mentor(s): Sandra Kane-Gill, PharmD, MS, FCCM, FCCP; Alfred L'Altrelli, PharmD

Skin and soft tissue infections treatment practices in the emergency department and corresponding 30-day hospitalization rate

Kim, D., O'Brien, C., Amesh, A., Weber, D., Volosky, R., Guyette, M., Pacella, C., Brown, A., McCreary, E., Baum, B., Marini, R, Oleksiuk, L.

PURPOSE: Skin and soft tissue infections (SSTIs) result from microbes invading the skin or soft tissues below it. Limited guidance is currently available to help guide outpatient versus inpatient management of SSTI. The aim of this quality improvement project was to identify areas for improvement in the treatment of SSTIs by formally describing current treatment practices in the emergency department (ED) and evaluating corresponding outcomes.

METHODS: A retrospective cohort study was conducted of patients who were discharged from the UPMC Presbyterian Shadyside ED in January, April, July, and October of 2018 following evaluation for SSTIs. Patients were identified using ICD-10 codes (L02 and L03). Patients who were less than 18 years old, were diagnosed with deep-seated infections, or had a history of hidradenitis suppurativa were excluded. The primary objective was to describe the current SSTIs treatment practices for patients discharged from the UPMC Presbyterian Shadyside ED. The secondary objectives were to quantify the rates of all-cause and SSTI-related unplanned ED visits or hospitalization within 30 days of discharge. The results were analyzed via descriptive statistics and Chi-Square test.

RESULTS: One hundred-twelve patients were included, with 56 (50%) presenting with nonpurulent SSTIs. Mild infection (Eron I) was present in 49 (88%) and 52 (96%) of nonpurulent and purulent SSTIs, respectively. Forty-three (78%) patients with purulent SSTIs had abscesses, with 40 (93%) undergoing incision and drainage. Overall, guideline concordant antibiotic selections were utilized in 68 (61%) patients. The median duration of therapy was 7 days, with 32/98 (33%) receiving greater than 7 days of therapy. All-cause and SSTIs related unplanned ED visits or hospitalizations to the hospital within 30 days were 33% and 18%, respectively.

CONCLUSIONS: The results of this study suggest that the majority of patients who present to UPMC Presbyterian Shadyside ED with SSTIs receive guideline-concordant antibiotic therapy. Opportunities exist to limit unnecessarily prolonged courses of antibiotic therapy exceeding 7 days.

Didi Kim

Didi Kim is originally from Mesa, Arizona. She received her Doctor of Pharmacy from University of Maryland in Baltimore. Her professional areas of interest include ambulatory care and transitions of care. After completion of her PGY1 residency, she plans to pursue a clinical position in a hospital.

Mentor(s): Louise-Marie Oleksiuk, PharmD, BCPS

Improving Interprofessional Collaboration: Diabetes and Behavioral Health Referrals in a Family Health Center

Kirpekar PA, Koenig M, D'Amico F, Farrah R

PURPOSE: Depression co-occurring with chronic medical conditions is common in the primary care setting. Co-occurrence of psychiatric disorders in patients with diabetes are correlated and may lead to a decreased quality of life, increased cost of medical care, poor treatment adherence, elevated hemoglobin A1c, and hospitalizations. This project is a needs assessment for the UPMC St. Margaret Lawrenceville Family Health Center to improve coordinated healthcare within the medication management, behavior health team, and primary care providers at the health center. The main study outcomes include: 1) determining the prevalence of co-occurring behavioral health disorders and uncontrolled diabetes, 2) determining the prevalence of patients receiving integrated care, 3) determining the number of opportunities to screen patients for behavioral health disorders, and 4) determining opportunities to refer patients to the behavioral health team, medication management team or to their primary care provider.

METHODS: A retrospective chart review will be conducted of patients with uncontrolled diabetes, defined as having a hemoglobin A1c greater than or equal to 9% on two consecutive occasions, at a patient-centered medical home (PCMH) family health center. Patients will be identified from an existing quarterly diabetes report. The family health center utilizes a behavioral health team led by social workers and a medication management team led by a pharmacist. It serves as a teaching facility for family medicine residents and pharmacy residents. The study period will span from July 1, 2017 through July 1, 2018. Various descriptive statistics (means, medians, standard deviations, frequency distributions, etc.) will be calculated to describe the study population and determine prevalence.

RESULTS: Data collection and analysis is currently in progress. Chart review will be conducted on forty patients that have met inclusion criteria.

CONCLUSIONS: The results of this study will be the first step in improving the referral process to the various teams in the family health center. Future directions will be to propose and implement an automatic referral process for patients identified as having potentially uncontrolled behavioral health issues to be seen or have follow-up by the behavioral health team, primary care provider, or medication management team.

Presented at: 52nd Annual Society of Teachers of Family Medicine (STFM) Spring Conference, Toronto, Ontario, Canada 2019.

Pooja Kirpekar

Pooja received her PharmD from Virginia Commonwealth University in 2017 and is completing a PGY-2 in Ambulatory Care with focus in Family Medicine at UPMC St. Margaret's Lawrenceville Family Health Center. Upon completion of residency training, she plans to practice as an outpatient clinical pharmacist in the primary care setting and hopes to serve as a preceptor to pharmacy students.

Mentor(s): Marianne Koenig, PharmD, BCPS, Roberta Farrah, PharmD, BCPS, BCACP

Utilizing Area Under the Curve for Inpatient Vancomycin Dosing – Saving Kidneys and Cost

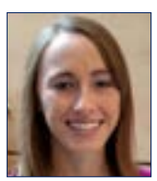
Korlinchak AN, Ours RL

PURPOSE: Vancomycin is a glycoprotein antibiotic commonly used for the treatment of methicillin-resistant *Staphylococcus aureus.* Due to its pharmacokinetic properties, physicians have frequently looked upon pharmacists to properly dose vancomycin based on patient specific factors including renal function and clinical status. Previously, a trough goal of 15 – 20 mcg/mL had been used as a marker to signify efficacy. Additional research is now demonstrating that the ratio of the area under the concentration versus time curve to the minimum inhibitory concentration (AUC24/MIC) greater than 400 is now a better marker of vancomycin monitoring. This new marker is predicted to decrease the cost of vancomycin therapy and reduce the risk of nephrotoxicity while still providing infection resolution. The goal of this study is to assess the rate of attaining the goal AUC24 between 400 – 600 mg*h/L with initial vancomycin regimens and incidence of AKI before and after protocol implementation.

METHODS: This is a retrospective chart review consisting of 100 patients treated with vancomycin at UPMC Hamot. Patients included were pharmacy consults who were dosed using the AUC24-based vancomycin protocol until at least two vancomycin serum levels were able to be drawn at steady state. Incidence of AUC target attainment and AKI rate were compared with data from a prior vancomycin QI study. A hypothetical regimen was also created to estimate the cost and quantity of vancomycin necessary using the trough-based vancomycin protocol which was previously utilized at UPMC Hamot. The two dosing strategies were then compared in terms of cost, milligrams of vancomycin, and AKI.

RESULTS: Preliminary results were obtained from 33 patients who qualified thus far. The target AUC24 of 400 – 600 mg*h/L was attained 46% of the time. This target attainment is essentially unchanged from prior trough-base data. The preliminary results show a decrease in vancomycin-associated AKI rate for AUC24-based dosing compared to trough-based dosing, 9% versus 28.8% respectively. Secondary endpoints showed a larger quantity of vancomycin used in milligrams for AUC24-based dosing compared to trough-based dosing, but there was no statistical difference in cost between the two regimens.

CONCLUSIONS: pending



Ariel Korlinchak

Ariel received her PharmD from the Lake Erie College of Osteopathic Medicine School of Pharmacy in 2018. She is currently completing the PGY1 Pharmacy Residency at UPMC Hamot. Her professional interests include infectious disease and critical care. Upon completion of residency, she will work as an emergency medicine clinical pharmacist.

Mentor(s): Rachael Ours, PharmD, BCIDP

Comparison of hydromorphone versus fentanyl-based sedation in extracorporeal membrane oxygenation (ECMO)

Authors: Landolf KM; Rivosecchi RM, Sappington PL

PURPOSE: Data comparing sedatives in patients receiving ECMO is sparse. However, it is known that the ECMO circuit alters the pharmacokinetics of medications via sequestration of lipophilic agents and increased volume of distribution. Commonly used sedatives ECMO patients include fentanyl, a lipophilic agent, and hydromorphone an agent with intermediate lipophilicity/hydrophilicity. This study aims to evaluate the difference in quality of sedation, and sedative requirements in ECMO patients receiving fentanyl versus hydromorphone continuous infusion.

METHODS: This was a retrospective, chart review of ECMO patients at UPMC Presbyterian from 2016 to 2018. Adult patients identified utilizing the institutional ECMO database receiving ECMO for greater than 48 consecutive hours were included. Those cannulated greater than 24 hours prior to transfer to Presbyterian and those who received continuous infusion paralytics were excluded. The hydromorphone cohort included patients receiving continuous infusion hydromorphone for 6 or more hours. All others were included in the fentanyl cohort, if receiving 6 or more hours continuous infusion fentanyl. Patients were followed starting 12 hours after cannulation until de-cannulation or for 14 days, whichever occurred sooner. Primary outcomes included days delirium free/coma free and median narcotic use. Continuous variables were reported using median and interquartile range (IQR) or means ± standard deviations. The Wilcoxon rank sum test and chi-squared tests will be used as appropriate. Logistic regression will be used for propensity score estimation.

RESULTS: A total of 163 patients with 73 (44.8%) in the hydromorphone group and 90 (55.2%) in the fentanyl group were included from the ECMO database. In the hydromorphone cohort 28/73 (38.4%) received veno-arterial (VA) ECMO, and 41/90 patients (45.6%) in the fentanyl cohort received VA ECMO. The average ECMO run time was 235 hours for included patients. Data regarding total days delirium free, coma free and exposure to sedatives and CNS depressants will be analyzed and compared between the 2 cohorts.

CONCLUSIONS: The results of this study will add to the existing literature regarding sedation practices in patients receiving ECMO and contribute to optimizing therapy in this patient population.

Kaitlin Landolf

Kaitlin completed her undergraduate and pharmacy school training at the University at Buffalo School of Pharmacy and is currently a PGY1 at UPMC Presbyterian. Her current interests lie in critical care and neurology. She will be continuing her training next year as a PGY2 at the University of Maryland Medical Center to specialize in critical care.

Mentor(s): Ryan Rivosecchi, PharmD, BCCCP

Identification of early implementation strategies used by Pennsylvania community pharmacists to begin the National Diabetes Prevention Program at their pharmacy.

Lapping A, Coley K, Carroll J, Antinopoulos B, Richardson R, Doong K, McGivney M, Berenbrok LA.

PURPOSE: There is limited data surrounding pharmacists' experiences with implementing and engaging patients in the National Diabetes Prevention Program (NDPP), a national initiative created by the Centers for Disease Control and Prevention to utilize diet and exercise to prevent or delay Type 2 Diabetes. The primary objective of this research is to identify early implementation strategies utilized by Pennsylvania community pharmacists to conduct the NDPP at their pharmacy. These strategies will then be used to create a guide to be disseminated to pharmacists interested in starting the NDPP at their pharmacy.

METHODS: The study was approved through the University of Pittsburgh Institutional Review Board. A semi-structured interview guide was created using the Consolidated Framework for Implementation Research, a framework developed to identify factors that may influence implementation in a variety of settings. Seventeen pharmacies that received grant funding to begin the NDPP were identified by the Pennsylvania Pharmacists Association. The primary investigator conducted all interviews by telephone starting in February 2019 and continuing through April 2019. Interviews were transcribed for fidelity of meaning and were then mapped to Expert Recommendations for Implementing Change (ERIC) project implementation strategies. The ERIC project provides a list of 73 implementation strategies that have been proven to serve as successful building blocks for implementing change.

PRELIMINARY RESULTS: A total of 7 interviews were conducted. Interviews lasted an average of 15 minutes. Five ERIC implementation strategies were identified by community pharmacists to help them successfully implement the NDPP: (1) involve patients and family members; (2) intervene with patients to enhance uptake and adherence; (3) use mass media; (4) prepare patients to be active participants; and (5) build a coalition. Data collection and analysis is ongoing.

CONCLUSIONS: Results in Progress

Presented at the American Pharmacists Association Annual Meeting in Seattle, WA, 2019

Amber Lapping

Amber D. Lapping, PharmD, CTTS received her PharmD from Duquesne University in 2018. Amber is currently completing a PGY1 Community-Based Pharmacy Residency with the University of Pittsburgh and Giant Eagle Pharmacy. Following residency, Amber plans to pursue a career in clinical community pharmacy, focusing on expanding the role of the community pharmacist in providing patient care services.

Mentor(s): Lucas A. Berenbrok, PharmD, MS, BCACP, CTTS; Kim C. Coley, PharmD, FCCP; Brandon Antinopoulos, PharmD; Joni Carroll, PharmD, BCACP, CTTS; Renee' Richardson, PharmD; Melissa A. Somma McGivney, PharmD, FCCP, FAPhA

Reducing Antidepressant Polypharmacy in Patients with Treatment-Resistant Depression

Maline J, McQuillan A, Kozarian R

PURPOSE: Major depressive disorder is a disabling illness that is associated with frequent relapses, incomplete recovery between episodes, and persistent psychosocial and functional impairment. Often times patients do not have adequate trials of antidepressants due to not reaching a therapeutic dose or based on the duration of the trial. The objectives of this drug use evaluation are to analyze prescribing patterns of psychotropics in patients with treatment-resistant depression at Veteran Affairs Pittsburgh Health Care System (VAPHS) and identify if there is a need for academic detailing outreach to educate providers on inappropriate prescribing patterns and other treatment modalities for depression.

METHODS: For this retrospective analysis, a random sample of 100 Veterans from the VAPHS were selected from the Psychotropic Drug Safety Initiative to include those concomitantly prescribed three or more antidepressants. Local databases and the Computerized Patient Record System (CPRS) were used to extract the following data elements: demographics, co-morbid psychiatric conditions and psychotropic medication history, antidepressant agents prescribed including indication, dose, duration, history of allergy or intolerance to first-line agents, pharmacological and non-pharmacological augmentation strategies, scheduled vs. as needed, consults for electroconvulsive therapy (ECT), history of non-adherence, measurement based care completions (PHQ-2 or -9), and service line of the prescribing provider. Patient charts were reviewed to evaluate appropriateness of antidepressant therapy.

RESULTS: From the PDSI dashboard, 33 patients met the above criteria for treatment resistant depression. The average number of antidepressants on a patient's current medication regimen was 3.06. The average number of failed antidepressants was 3.03. There was a total of 79 first-line agents prescribed. Of those 79 first-line antidepressants, 26 (32.9%) were selective-serotonin reuptake inhibitors (SSRIs), 13 (16.4%) were serotonin-norepinephrine reuptake inhibitors (SNRIs), 28 (35.4%) were bupropion, and 12 (15.1%) were mirtazapine. For measurement based care, 29 patients (87.8%) had a PHQ-2 or -9 completed. The number of ECT consults placed was 0.

CONCLUSIONS: The results of this drug use evaluation provide evidence that there is a further need to provide adequate trials of antidepressants, increase utilization of measurement based care to help guide medication therapy, and employ all treatment modalities when managing treatment-resistant depression in our Veteran population. VAPHS is exploring implementation of an intranasal esketamine protocol and clinic to further increase treatment options for patients with treatment resistant depression.

Presented at the 22nd Annual College of Psychiatric and Neurologic Pharmacists (CPNP) Meeting, Salt Lake City, UT, 2019.

Joshua Maline

Joshua is from Omaha, NE, and received his PharmD from the University of Nebraska Medical Center in 2017. He completed his PGY1 pharmacy residency at the Tuscaloosa VA Medical Center in Tuscaloosa, AL. He will complete the PGY2 Psychiatric Residency Program at VAPHS, which has collaborated with the Western Psychiatric Institute & Clinic of UPMC, in July 2019. Joshua plans to pursue a clinical pharmacy specialist position in psychiatry.

Mentor(s): Amanda McQuillan, PharmD, BCPS, BCPP; Robert Kozarian, PharmD, BCPP

Impact of Pharmacist Intervention on Stress Ulcer Prophylaxis Utilization

Martin M, Cooper B

PURPOSE: Stress ulcer prophylaxis (SUP) is commonly used in critical care patients that are at high risk for gastrointestinal bleeds (GIB). Current guidelines recommend the use of histamine-2 receptor antagonists (H2RAs), or proton-pump inhibitors (PPIs) for SUP. These medications inhibit gastric acid secretion, resulting in protection of the gastrointestinal mucosa. However, this mechanism can result in severe adverse effects such as fractures, *Clostridium difficile* associated diarrhea, hypomagnesemia or pneumonia with long-term continuation. SUP is unnecessary when risk factors have resolved therefore it is recommended to be discontinued after risk factors have resolved. A recent study has shown that SUP is not being discontinued appropriately, leading to longer hospital stays and unnecessary continuation with discharge. The purpose of this study is to analyze the impact of implementing a protocol to prevent unnecessary utilization of SUP.

METHODS: This study was a concurrent review of stress ulcer prophylaxis usage and pharmacy intervention. A list of all patients on H2RA or PPI medications was run daily and using a random calculator 10-20 patients were selected to be evaluated. Patients were identified for stress ulcer prophylaxis indication and appropriateness based on risk factors. Patients that qualified for stress ulcer prophylaxis were followed daily until risk factors resolved. If started on stress ulcer prophylaxis but did not qualify, the medication was discontinued. The pharmacist also discontinued SUP if the care team did not discontinue stress ulcer prophylaxis after risk factors resolved. Cost comparison was performed by extrapolating the days after discontinuation by the pharmacist until patient discharge.

RESULTS: Of the 727 patients reviewed, 104 (14%) qualified for stress ulcer prophylaxis. Two patients (2%) were discharged on a H2RA or PPI for stress ulcer without any risk factors. Six patients (6%) were discharged with stress ulcer prophylaxis due to still receiving mechanical ventilation. Three patients (3%) were made comfort measure only (CMO). Ten patients (10%) expired while risk factors present for stress ulcer. A total of 21 patients' (20%) stress ulcer prophylaxis was discontinued by a pharmacist due to risk factors resolved without medication discontinuation. A total of 62 patients (60%) had their stress ulcer prophylaxis medication discontinued appropriately by the care team.

CONCLUSIONS: Stress ulcer prophylaxis is correctly discontinued once risk factors are resolved in approximately 60% of patients. Pharmacist intervention prevents approximately 20% of patients being continued on stress ulcer prophylaxis medications inappropriately. Cost analysis showed pharmacist intervention saves approximately $70 per 100 patients on stress ulcer prophylaxis.

Meghan Martin

Meghan is from Delmont, PA. She received her bachelor's degree in chemistry from Thiel College in 2016 and her PharmD from LECOM in 2018. She is currently a PGY1 pharmacist practice resident at UPMC Hamot in Erie, PA. Upon completion of her PGY1 pharmacy residency in 2019, she plans to practice in a clinical setting.

Mentor(s): Brad Cooper, PharmD, MBA, FCCM

The Impact of Age on ICU Delirium

McHugh C, Kane-Gill SL, Kirisci L, Smithburger PL

PURPOSE: Intensive care unit (ICU) delirium is defined as an acute and fluctuating disturbance in cognition and consciousness that occurs in approximately 80% of patients in the ICU. It is recommended that all ICU patients be screened for delirium daily with a valid, reliable delirium assessment tool such as the Intensive Care Delirium Screening Checklist (ICDSC). The ICDSC aims to capture the waxing and waning nature of delirium at the bedside through 8 domains: altered level of consciousness, inattention, disorientation, hallucination-delusion- psychosis, psychomotor agitation or retardation, inappropriate speech or mood, sleep/wake cycle disturbance, and symptom fluctuation. The ability to characterize the presentation of delirium according to a patient's age, would aid in identifying ICU delirium, especially hypoactive delirium which is the most difficult to detect. The aim of this project is to evaluate the qualities and characteristics of delirium stratified by age group, and to identify if certain domains of the ICDSC predict antipsychotic prescribing.

METHODS: This IRB approved, prospective, observational study reviewed the electronic medical record of patients admitted to a 24 bed medical ICU (MICU) at UPMC Presbyterian from August 2018 – April 2019. Patients were excluded if they were admitted to another ICU prior to MICU admission, had an ICDSC score of ≥ 4 within 4 hours of admission, were comatose at any point during ICU admission or at a Riker score of ≤ 2 (RASS ≤-4), experiencing alcohol withdrawal, or paralyzed. The primary end point was the frequency of individual domains of the ICDSC score stratified by age group (≤ 49 years, 50-64 years, and ≥65 years). Secondary end points included the prescribing of antipsychotic medications based on individual domains of the ICDSC score as well as the incidence of delirium, time to first delirious episode, and percent time delirious stratified by age group.

RESULTS: Using multivariate analysis of variance (MANOVA), a sample size calculation determined 70 patients in each group (210 patients total) would be required to achieve 80% power assuming a type I error rate of 0.05 with 3 groups and 8 dependent variables. Results are pending and were not available at the time of abstract submission.

CONCLUSIONS: No conclusions can be drawn until results of the research are analyzed.

Caitlin McHugh

Dr. McHugh received her PharmD from Duquesne University in 2017, completed her PGY1 Pharmacy Practice Residency at UPMC Mercy, and is currently completing her PGY2 Critical Care Pharmacy Residency at UPMC Presbyterian. Prior to pharmacy school, she received a Bachelor of Science degree in Health Sciences from James Madison University is Harrisonburg, VA, where she was a member of the division I women's lacrosse team. Dr. McHugh is pursuing a clinical specialist position in the area of critical care and emergency medicine.

Mentor(s): Sandra Kane-Gill, PharmD, MS, FCCM, FCCP; Pamela L. Smithburger, PharmD, MS, BCPS, BCCCP, FCCP, FCCM

Use of adjunctive ketamine in resistant alcohol withdrawal: impact on symptom severity

Meyer AL, Ganchuk S, Miller T

PURPOSE: Resistant alcohol withdrawal (RAW), often defined as alcohol withdrawal requiring greater than 40 milligrams of diazepam per hour or when a second class of sedative agents is needed within 24 hours, can be challenging to manage. Recent studies have analyzed the use of ketamine for the management of RAW. Ketamine, an N-methyl-D-aspartate (NMDA) receptor antagonist, appears to provide added benefit when used with gamma-aminobutyric acid (GABA) agonists. At our institution, use of the withdrawal assessment scale (WAS) dictates management of patients presenting with alcohol withdrawal. The purpose of this study was to assess the effect on the WAS in patients presenting with RAW receiving adjunctive ketamine.

METHODS: A retrospective chart review included patients admitted to UPMC Mercy between January 1, 2016 and August 31, 2018. Patients must have been admitted to the intensive care unit (ICU) for management of RAW. Patients in the treatment group received adjunctive ketamine within 48 hours of admission while patients in the comparator group received therapy for RAW excluding ketamine. Usage of benzodiazepines and phenobarbital, expressed as diazepam equivalents, as well as need for additional agents, propofol and/or dexmedetomidine, were recorded and compared between groups. The primary outcome was change in the baseline WAS and change in mean daily WAS between groups. Secondary outcomes included amount of diazepam equivalents required, ICU length of stay, and hospital length of stay.

RESULTS: A total of 34 patients were included in this study. The mean baseline WAS in the treatment group was 16.3 (range 8-33) vs. 17.9 (range 0-37) in the comparator group. Mean daily WAS was higher in the comparator group on days 1-3, with day 3 showing the greatest difference between groups (21.2 vs. 14.2 in the treatment and comparator groups, respectively). No patients in the treatment group required adjunctive propofol or dexmedetomidine while 46.7% of patients in the comparator group required adjunctive agent(s) (8/30 patients received propofol, 10/30 patients received dexmedetomidine). Analysis of diazepam equivalent requirements is ongoing.

CONCLUSIONS: Patients receiving ketamine for RAW may have a higher mean daily WAS than patients treated for RAW without ketamine.

Presented at the 76th Annual ASHP Midyear Clinical Meeting, Anaheim, CA, 2018.

Abby Meyer

Abby is from Saint Marys, PA and received her PharmD from the University of Pittsburgh in 2018. She is currently a PGY-1 Pharmacy Resident at UPMC Mercy. Upon completion of PGY-1, she will complete a PGY-2 in Critical Care at UPMC Presbyterian.

Mentor(s): Steven Ganchuk, PharmD; Taylor Miller, PharmD

Community pharmacist-provided comprehensive medication management services: a case series

Doong K, Mitra S, Carroll JC, Jukic S, Rosikiewicz C, Coley KC, McGrath SH, McGivney MS

PURPOSE: Community pharmacy practice is evolving rapidly with the expansion of patient-centric, medication management services (MMS), which include comprehensive medication management (CMM) nationwide. Through these clinically integrated community pharmacy networks, community pharmacists are providing enhanced MMS to patients. Currently, research and resulting publications from clinically integrated community pharmacy networks have not included detailed case descriptions of the patient care that is delivered within these network pharmacies. The objective of this project is to identify a breadth of patient cases to fully describe the complexity of patient care currently provided by community pharmacists in an enhanced service network in Pennsylvania.

METHODS: Forty-three pharmacists participating in regularly scheduled quality improvement calls as part of the Pennsylvania Pharmacist Care Network were eligible for this project. Key informant, telephonic interviews and verbal surveys were conducted with Network pharmacists. Participants were asked to provide information about their most complex CMM patient case. Interviews were audio-recorded and transcribed. To ensure a robust data analysis, only patient cases that incorporated detailed information on patients' drug therapy problems and pharmacist interventions were included. Patient case complexity was categorized from Level 1 (least complex) to Level 5 (most complex) using the Minnesota Health Care Programs Medication Therapy Management Services Current Procedural Terminology (MTMS CPT) code. This categorization includes assessment of drug related needs, identification of drug therapy problems, complexity of care planning, and follow-up evaluation. The research team will conduct an iterative analysis of interview and survey data to uncover themes and to classify case complexity.

RESULTS: Seven pharmacists provided 10 patient cases that met the inclusion criteria. Based on the Minnesota MTMS CPT codes, preliminary results show that four patient cases were level 5, two patient cases were level 4, two patient cases were level 3, and two patient cases were level 2. Data analysis is ongoing.

CONCLUSIONS: This will be the first statewide purposeful gathering of patient cases that illustrate the complexity of patients for whom community pharmacists provide medication-related care. Preliminary data demonstrate Pennsylvania Pharmacists Care Network community pharmacists provided care to a variety of patients who have varying complexities. The resulting descriptive case series can be 1) utilized for training pharmacists or other health care professionals and 2) shared with health payers and policymakers to better describe the role community pharmacists play in value-based healthcare models.

Presented at the American Pharmacists Association Annual Meeting and Exposition, Seattle, Wa., 2019 and the Pennsylvania Pharmacists Association Midyear Meeting, Gettysburg, Pa., 2019.

Sneha Mitra

Sneha Mitra is from Allentown, PA, and earned her PharmD at the University of Pittsburgh School of Pharmacy. She is the current PGY-1 Community-Based Pharmacy Resident with Pitt Pharmacy and Rite Aid. Sneha has a interest in public health, providing healthcare for underserved populations, and advancing patient care services. Upon completion of residency, she hopes to practice as a clinical community pharmacist at Rite Aid.

Mentor(s): Katie Doong, PharmD; Joni C. Carroll, PharmD, BCACP

Defining Factors of P2Y12 Inhibitor Therapy De-escalation from Ticagrelor or Prasugrel to Clopidogrel with Pharmacogenomic Guidance at a Large Academic Medical Center

Lindsay N. Moreland, PharmD, James M. Stevenson, PharmD, MS, BCPP, Philip E. Empey, PharmD, PhD, BCPS, James C. Coons, PharmD, FCCP, BCCP

PURPOSE: Pharmacogenomic programs have been initiated throughout the country and have recognized the importance of escalating therapy based on loss of function alleles for CYP2C19 post-percutaneous coronary intervention (PCI) with stenting. However, limited literature focuses on characterizing patients whose P2Y12 inhibitor therapy is de-escalated with pharmacogenomic data. This study aims to provide insight into characteristics of patients successfully de-escalated P2Y12 inhibitor therapy post-PCI.

METHODS: This was a single center, prospective, observational study including patients undergoing PCI with stenting and CY2C19 genotyping. Patients with CYP2C19 genotypes of *1/*1, *1/*17, and *17/*17, were included. Patients were followed for 6 months to gather information on baseline demographics, continued antiplatelet therapy and any changes that occur with rationale for the change, major adverse cardiac events, and bleeding events. Data was collected at the index PCI, 7 days, 30 days, and 6 months.

RESULTS: Preliminary results include 165 patients with a CYP2C19 genotypes of *1/*1, *1/*17, and *17/*17. Of the 165 patients, 27 (16%) were de-escalated from ticagrelor to clopidogrel during the current follow up period. 108 of 165 patients (66%) were originally started and kept on clopidogrel. Of the 165 patients, 30 (18%) were initially placed and kept on ticagrelor or prasugrel. Over half of the patients included, 89/165 (53.9%) had a history of revascularization at baseline. Final results to be completed by the end of May 2019.

CONCLUSIONS: Upon analyzing data, we hope to provide insight into characteristics and data outcomes of those de-escalate and identify potential opportunities to further individualize care based on pharmacogenomics.

Presented at the Annual American College of Cardiology Meeting, New Orleans, LA, 2019.

Lindsay Moreland

Lindsay Moreland is from Evansville, IN, and received her Doctorate of Pharmacy from Purdue University College of Pharmacy. She completed her PGY1 at UPMC Presbyterian and is currently a PGY2 cardiology pharmacy resident there. Following her PGY2, Lindsay will be taking a position as a clinical pharmacist as a part of the Mechanical Circulatory Device Support Team at Mayo Clinic.

Mentor(s): James C. Coons, PharmD, FCCP, BCCP

Restarting Oral Anticoagulation in Patients with Atrial Fibrillation after an Intracranial Hemorrhage

Terri V. Newman, PharmD, Nemin Chen, MPH, Meiqi He, MS, Samir Saba, MD, and Inmaculada Hernandez, PharmD, PhD

PURPOSE: In atrial fibrillation patients receiving oral anticoagulation (OAC) for stroke prevention, it is unclear how to manage OAC after an intracranial hemorrhage (ICH). While OAC does decrease the risk of stroke and systemic embolism it also increases the risk of bleeding. Due to the occurrence of an ICH, atrial fibrillation patients who survive are at an increased risk for both a recurrent ICH and ischemic stroke and systemic embolism; therefore, the decision to restart OAC in this patient population presents a clinical conundrum. In this study, we evaluate the safety and effectiveness of OAC re-initiation in atrial fibrillation patients who survive an ICH.

METHODS: Using 2010-2016 Medicare claims data, we identified patients with non-valvular AF who experienced an OAC-related ICH and survived at least 6 weeks after the ICH (n=1,502). The primary outcomes included the composite of ischemic stroke and transient ischemic attack (TIA), thromboembolism (TE), a composite of ischemic stroke/TIA and TE, recurrent ICH, and all-cause mortality. We constructed Cox proportional hazard models to evaluate the association between post-ICH OAC resumption, which was measured in a time-dependent manner, and the risk of primary outcomes while controlling for a comprehensive list of covariates.

RESULTS: Among patients who survived an ICH, 69% reinitiated OAC within 6 weeks of the event and among those who resumed OAC, 83% restarted warfarin. There was no significant difference in the risk of ischemic stroke/TIA [hazard ratio (HR) 0.87; 95% CI 0.62–1.21], TE (HR 0.84; 95% CI 0.54-1.31), and ischemic stroke/TIA/TE (HR 0.81; 95% CI 0.61-1.07) between post-ICH OAC use and non-use. Post-ICH OAC use was associated with a lower risk of recurrent ICH (HR 0.62; 95% CI 0.41-0.95) and all-cause mortality (HR 0.48; 95% CI 0.39-0.60) compared to non-OAC use.

CONCLUSIONS: In AF patients who survived an ICH, restarting OAC did not confer a greater risk of recurrent ICH. Randomized controlled studies should be conducted in order to provide further evidence of the clinical benefit of restarting OAC in this high-risk population. Further evaluation of which individuals benefit from restarting OAC is also needed to provide more clinical guidance.

Terri Victoria Newman

Terri earned her PharmD from Butler University. Currently she is completing a fellowship in Pharmacoeconomics and Health Outcomes Research jointly provided by the University of Pittsburgh School of Pharmacy and UPMC Center for High-Value Health Care. As part of her training she is completing a Master of Science in Health Services Research and Health Policy from the University of Pittsburgh School of Public Health.

Mentor(s): Inmaculada Hernandez, PharmD, Phd; Natasha Parekh, MD, MS.

A comparison of extended release metformin formulations

Nystrom HG, Ballard SL, Hall DL

PURPOSE: Metformin extended release (ER) products are touted for better tolerability than immediate release (IR). However, there are three different metformin ER formulations with different release technologies and extreme differences in price (range: $4-$750/month.) There is a gap in literature for the comparison of these agents. This study aims to pragmatically compare the three formulations of metformin ER to determine any differences in adverse effects, adherence, and A1c reduction between the formulations.

METHODS: This is a retrospective chart review in patients with type 2 diabetes who failed therapy with metformin IR and were switched to metformin ER in calendar years 2014-2017 at five associated family residency practices. Outcomes of interest include rate of adherence to each agent, documented adverse effects (including financial adverse effects), maximum metformin dose, A1c reduction, discontinuation rate and discontinuation reason. Data will be reported in descriptive statistics, where applicable. Adherence will be reported in proportion of days covered and analyzed by linear regression. Logistic regression will be used to evaluate adverse events, and a mixed model design will compare changes in A1c%. This project was reviewed by the UPMC institutional quality improvement board.

RESULTS: Data collection and final analysis are in progress.

CONCLUSIONS: Research in progress

Hannah Nystrom

Hannah Nystrom is a PGY-2 Ambulatory Care Resident at UPMC Presbyterian Shadyside. She received her PharmD from Ohio Northern University in 2017 and completed her PGY1 residency at ProMedica Toledo Hospital in 2018. Her practice interests include primary care, diabetes, hepatitis C, and cardiology. Upon completion of residency, she hopes to manage chronic disease states in an outpatient setting and plans to pursue board certification.

Mentor(s): Stephanie L. Ballard, PharmD, BCPS

A Strategy to Improve Broad Spectrum Antibiotic Overuse at a Community-Teaching Hospital

Sehrish Panjwani, PharmD, Aaron Pickering, PharmD

PURPOSE: Patients are often started on multiple antimicrobial agents empirically to cover for numerous possible infecting organisms, and many times these agents are used inappropriately. With increasing overuse of these agents, this study aims to determine the effect of implementing an automatic infectious disease (ID) consult on the length of broad spectrum antimicrobial therapy, specifically vancomycin (VAN) and piperacillin/tazobactam (TZP).

METHODS: This was a retrospective observational study conducted at UPMC St. Margaret Hospital, a 249-bed community-teaching hospital. Patients older than 18 years of age on the combination of VAN and TZP from February 2017 to July 2018 were included in this study. Data was collected pre and post implementation (November 2017) to determine the change in length of combination VAN and TZP. Major secondary outcomes included change in prescribing characteristics, rates of acute kidney injury, *Clostridium difficile* infection rates, length of stay, and readmission rates. Categorical variables were analyzed using a chi-square test and continuous variables were analyzed using an independent t-test.

RESULTS (PENDING): It is anticipated that compared to the pre-intervention period, the post-intervention period will show a decrease in days of combination broad spectrum antibiotic therapy with VAN and TZP.

CONCLUSIONS: Pending.

Sehrish Panjwani

Sehrish is from Coppell, Texas. She received her PharmD from Texas Tech University Health Sciences Center School of Pharmacy in Abilene, TX in 2018. She is currently completing an ASHP-accredited PGY-1 pharmacy practice residency at UPMC St. Margaret, where she will go on to complete her PGY-2 geriatric pharmacy residency. She is also concurrently completing a Faculty Development Fellowship at UPMC St. Margaret and hopes to pursue a career in academia in the future.

Mentor(s): Aaron Pickering, PharmD

Impact of lidocaine utilization management strategy on drug utilization and cost

Patel N, Heasley J, Jose A, Ni D

PURPOSE: A large national pharmacy benefits manager (PBM) identified a trend of increased cost and quantity per claim for topical lidocaine or lidocaine-containing products. In an effort to help commercial clients manage this trend, a topical lidocaine utilization management (UM) strategy was offered in April 2017. This strategy consisted of a quantity limit with a prior authorization (PA) requirement for quantities exceeding the limit. The intent of the limit and PA was to provide coverage that reflects U.S. Food and Drug Administration guidance, standards of medical practice and evidence-based drug information. The objective of the study was to evaluate the impact of UM strategies implemented by a large national PBM on the utilization and cost of topical lidocaine-containing products within a commercial employer population.

METHODS: A retrospective claims-based analysis of lidocaine-containing products affected by the UM strategy was performed. Five commercial employer groups that implemented the UM strategy were compared to five that did not. Data was analyzed for the quarter preceding and year following the April 2017 implementation of the UM strategy. The primary endpoint was the percent changes in average daily dose for each lidocaine-containing product following the implementation of the UM strategy. Secondary outcomes analyzed the change in gross cost per 10,000 members per month. Additional secondary outcomes identified number of episodes exceeding quantity limit, number of post-limit PA episodes initiated, number of post-limit PA approvals, number of post-limit PA denials, number of post-limit PA episodes where reduced quantities were filled, number of post-limit PA episodes where the product was not filled, and estimated client cost savings.

RESULTS: All products, except lidocaine 4% solution, had statistically significant lower average daily doses for employer groups that implemented the UM strategy when comparing pre- and post-implementation. Employer groups that implemented the UM strategy showed an 81.9% decrease in gross cost per 10,000 members per month compared to a 29.3% increase for employer groups that did not. Only 2.4% of episodes exceeding the quantity limit resulted in an initiation of a post-limit PA. Of the post-limit PA episodes initiated, 36.3% were approved, 63.7% were denied, 41.0% resulted in reduced quantities filled, and 33.1% resulted in the product not being filled. Estimated client cost savings was $53,029.

CONCLUSIONS: Commercial employer groups who implemented the UM strategy had decreased quantities and decreased cost per 10,000 members per month for lidocaine-containing products when comparing the post-implementation period to the pre-implementation period. Quantity limits and post-limit PAs can be an effective intervention for decreasing topical lidocaine utilization and costs.

Presented at the AMCP Managed Care & Specialty Pharmacy Annual Meeting 2019, San Diego, CA, 2019.

Nishta Patel

Nishta is originally from Phoenix, Arizona and completed her undergraduate coursework at University of Arizona before receiving her PharmD from University of California, San Francisco in 2018. Upon completion of her managed care residency at CVS Health, she hopes to continue practicing within a managed care organization.

Mentor(s): Jennifer Heasley, PharmD, M.S.; Abraham Jose, PharmD; Danfeng Ni, PharmD

Patient perspectives on missed appointments among patients with poorly controlled hypertension, diabetes, or asthma at an urban free clinic: A qualitative evaluation

Pham TT, Jonkman LJ, Ingram JM, Ricciuti D, Connor SE

PURPOSE: Missed appointments are associated with poorer chronic disease state control and higher rates of avoidable hospitalizations and emergency department visits. Patients with low clinic attendance rates are more likely to have hospital admissions for preventable causes including asthma exacerbations, severe hyperglycemia, and heart disease. Medically underserved patients, including ethnic minorities and patients with low socioeconomic status, are particularly prone to barriers to healthcare access, yet there is limited information characterizing patient perceived barriers to access within this population. The purpose of this study is to identify perceived attitudes to missed appointments and perspectives on barriers to health care access among patients attending an urban free clinic.

METHODS: This is a qualitative, cross-sectional study of patients at the Birmingham Free Clinic (BFC) in Pittsburgh, Pennsylvania with uncontrolled hypertension, diabetes, or asthma. Semi-structured interviews will be conducted with eligible participants using the framework of the Integrated Behavior Model and Health Belief Model to understand behaviors and beliefs related to missed appointments and their impact on health. Interviews are audio-recorded and transcribed verbatim. Thematic analysis will occur through a series of stages. First, a codebook will be developed to identify and define concepts from the transcripts. Then each interview will be coded by two independent reviewers and discrepancies will be resolved by a third reviewer. Next the codes will be connected and expanded to identify larger themes related to patient perceived control over their chronic diseases and attendance to clinic appointments. Interviews will continue until saturation is achieved, meaning that no new concepts emerge from further interviews.

RESULTS: A total of eight interviews have been completed to date. Further interviews and data analysis are ongoing.

CONCLUSIONS: Pending

Theo Pham

Theo received their Bachelor of Science in Biology in 2013 and Doctor of Pharmacy in 2017 from the University of Washington. They completed a PGY1 Pharmacy Practice residency at Mount Sinai St. Luke's and West Hospitals in New York City. Theo is currently completing a PGY2 Ambulatory Care/Global Health residency at UPMC Presbyterian/Shadyside Medical Center.

Mentor(s): Sharon Connor, PharmD; Lauren Jonkman, PharmD, MPH

Impact of a medication adherence packaging service on patient-centered outcomes at an independent community pharmacy

Phi C, Berenbrok LA, Firm A, Meston L, Carroll JC, Doong K, McGivney MS, Coley KC

PURPOSE: Medication adherence services at community pharmacies frequently couple medication synchronization with convenient medication packaging. Outcomes of medication adherence packaging have traditionally focused on evaluating surrogate markers of adherence such as proportion-of-days-covered, but this provides limited insight into the true, patient-centered experience. Asti's South Hills Pharmacy is a high-volume independent pharmacy that integrates adherence packaging with targeted conversations, monthly medication review, extensive delivery and mailing services, and home visits to patients of greatest need. The objective of this project is to identify how these medication adherence services, which include adherence packaging, impact patient-centered outcomes.

METHODS: Patients currently enrolled in the prescription medication adherence packaging (RxMAP) service at Asti's South Hills Pharmacy were eligible for participation in a 13-item telephonic survey. Additional eligibility requirements included patients who managed their own medications and have received, at minimum, 2 consecutive monthly cycles of packaged medication. Surveys included 6 Likert questions assessing patient self-efficacy, as well as 7 open-ended questions to elicit patient stories and experiences. Surveys were audio-recorded and transcribed verbatim. Transcriptions were coded and a thematic analysis will be conducted by the investigators. Quotations supporting identified themes will be selected. Data collection is ongoing.

RESULTS: Twenty survey responses have been collected to date. Preliminary themes that are emerging on the impact of the RxMAP service are: (1) prevention of hospitalization, (2) increased patient convenience, (3) decreased caregiver burden, (4) improved patient safety, and (5) heightened engagement in patient's own care. Thematic analysis is ongoing.

CONCLUSIONS: Preliminary data suggest the RxMAP service is positively impacting patients' medication-taking experiences. Final results and conclusions are pending.

Presented At: American Pharmacists Association Annual Meeting in Seattle, WA, 2019.

Catherine Phi

Catherine Phi is from Huntington Beach, CA and received her PharmD at MCPHS University in Boston. She is currently a PGY-1 Community-based Resident with University of Pittsburgh and Asti's South Hills Pharmacy. She plans to pursue a position that will allow her to continue working within community practice, with an interest in expanding the rising opportunities for delivering clinical patient care services at the community level.

Mentor(s): Kim C. Coley, PharmD, FCCP; Lucas A. Berenbrok, PharmD, MS; Joni Carroll, PharmD, BCACP; Katie Doong, PharmD; Ashley Firm, PharmD; Lindsey Meston, PharmD; Melissa S. McGivney, PharmD, FCCP, FAPhA

A multi-disciplinary approach to improving penicillin allergy documentation and peri-operative antibiotic prescribing in surgical patients

Raghavan A, Campbell RJ, Pickering AJ

PURPOSE: Patients with a reported penicillin allergy often receive second-line antibiotics for peri-operative prophylaxis, which is associated with higher rates of surgical site infection (SSI) compared to first-line, beta-lactam antibiotics. A multidisciplinary approach to penicillin allergy review prior to surgery will increase the number of patients placed on preferred antibiotics.

METHODS: All patients receiving total hip or total knee replacement, and hysterectomy surgeries at UPMC St. Margaret were retrospectively reviewed (Nov 2017-Feb 2018/ Pre-period). Prospectively (Nov 2018-Feb 2019/ Post-period) all patients satisfying inclusion criteria were audited daily for correct antibiotic prescription. The intervention included education to surgical services followed by an algorithm created for pharmacists to guide appropriate peri-operative antibiotic selection. The main outcome was the number of patients placed on preferred peri-operative antibiotics.

RESULTS: In the pre-period, 307 patients underwent qualified surgeries, of which 255 patients (83%) were placed on preferred antibiotics, versus in the post-period, out of 300 patients, 274 patients (91%) received the correct antibiotics ($p<0.01$), 95% CI for difference in proportions 8% [3%-14%]. For patients with non-severe penicillin allergies, in the pre-period, 6/34 (18%) versus post-period 9/16 (56%) were placed on preferred antibiotics ($p<0.01$), 95% CI for difference in proportions 38% [11%-61%]. Statistical analyses consisted of both testing and estimating the difference between two binomial proportions. $P<0.01$ was considered statistically significant.

CONCLUSIONS: A multidisciplinary peri-operative penicillin allergy review increased the number of patients placed on preferred antibiotics.

Archana Raghavan

Archana received her PharmD from Virginia Commonwealth University and completed her pharmacy pre-requisites from the University of Arizona. She will complete her PGY1 residency program at UPMC St. Margaret in June. This year she will be continue her training as a PGY2 in geriatrics at UPMC St. Margaret. Archana's current professional interests include chronic disease state management of older adults. Other interests include exploring new restaurants and sites in Pittsburgh.

Mentor(s): Ronald J. Campbell, PharmD, BCPS, Aaron J. Pickering, PharmD

Association of Antidementia Therapies with Time to Skilled Nursing Facility Admission and Cardiovascular Events Among Elderly Adults with Alzheimer Disease

San-Juan-Rodriguez A, Zhang Y, He M, Hernandez I

PURPOSE: To date, no study has compared time to skilled nursing facility (SNF) admission and cardiovascular events across medications available to treat Alzheimer disease. This study aimed to compare time to SNF admission and cardiovascular events between acetylcholinesterase inhibitor (AChEI) monotherapy, memantine hydrochloride monotherapy, and combination therapy with an AChEI and memantine in treating elderly adults with Alzheimer disease.

METHODS: Using 2006-2014 Medicare Part D data, we identified all patients newly diagnosed of Alzheimer´s disease in 2007-2013 and selected those who initiated antidementia treatment after diagnosis. Our sample included 44,424 participants initiating monotherapy with an AChEI (36,463 donepezil, 6,950 rivastigmine, and 1,011 galantamine), 11,809 monotherapy with memantine, and 17,242 combination therapy with an AChEI and memantine. The primary outcome was the composite of acute myocardial infarction, bradycardia, syncope, atrioventricular block, QT interval prolongation, and ventricular tachycardia; secondary outcomes included the risk of each of these events. We constructed Cox proportional hazard models adjusted by multiple covariates to compare outcomes between groups. We used Bonferroni correction to control for the increased rate of Type I error associated with 3 pairwise comparisons.

RESULTS: There was no difference in time to SNF admission across treatment groups. The risk of any cardiovascular side effect was higher for AChEI monotherapy (hazard ratio [HR] 1.07; 95%CI 1.02-1.12) and for combination therapy (HR 1.07; 95%CI 1.01-1,12) compared to memantine monotherapy. Results for the composite outcome were mostly driven by differences in the risk of bradycardia and syncope, which were higher for AChEI monotherapy (HR 1.14; 95%CI 1.05-1.22 for bradycardia and 1.09; 95%CI 1.03-1.16 for syncope) and for combination therapy (1.12; 95%CI 1.03-1.22 for bradycardia and 1.14; 95%CI 1.06-1.21 for syncope)

CONCLUSIONS: Time to SNF admission did not differ across treatment groups, but memantine monotherapy was associated with a 7% lower risk of cardiovascular events compared with both AChEI monotherapy and combination therapy with an AChEI and memantine.

Alvaro San-Juan-Rodriguez

I earned my PharmD from the University of Navarra (Spain) in 2017. Following my graduation, I was appointed as Research Fellow at the University of Pittsburgh. This fellowship, jointly offered by the UPMC Center for High Value Health Care and the University of Pittsburgh School of Pharmacy, aims to train future pharmacoeconomics and outcomes research experts. As part of my fellowship, I am also pursuing a MSc in Health Services Research and Policy at the University of Pittsburgh Graduate School of Public Health. My research interests include outcomes research, pharmacoepidemiology, pharmacoeconomics, and pharmaceutical policy.

Mentor(s): Inmaculada Hernandez, PharmD, PhD

Inpatient treatment of skin and soft tissue infections and corresponding 30-day readmission rate

Schoenle MK, Adalja AA, Weber D, Volosky R, Zisko J, Marini R, McCreary E, Oleksiuk LM

PURPOSE: Skin and soft tissue infections (SSTIs) result from microbes invading the skin or soft tissues below it. If a patient is readmitted to the hospital within 30 days due to an SSTI, the institution's 30-day risk-standardized readmission rate increases. This event can negatively affect Medicare and Medicaid reimbursement. The aim of this study is to describe current inpatient SSTI treatment practices at UPMC Presbyterian Shadyside and to identify areas for improvement.

METHODS: A retrospective chart review was conducted on patients admitted to UPMC Presbyterian Shadyside in January, April, July, or October of 2018 with an ICD-10 code indicating abscess (L02) or cellulitis (L03). Patients were excluded if they were less than 18 years old, were diagnosed with septic shock, diabetic foot infection, necrotizing infection, bacteremia, fungemia, osteomyelitis, septic arthritis, prosthetic joint infection, Morel-Lavallee lesion, infective endocarditis, chronic maxillary sinusitis, myositis, mycobacteria infection, intraabdominal infection, or perforated abdominal ulcer during admission, had a history of hidradenitis suppurativa, or whose cellulitis was miscoded. The primary objective of this study was to describe current treatment practices for patients who are hospitalized with SSTIs at UPMC Presbyterian Shadyside. The secondary objectives were to determine the rates of all-cause and SSTI-related 30-day emergency department (ED) visits and hospital readmissions. The results were analyzed via descriptive statistics and Chi-Square test.

RESULTS: A total of 113 patient encounters were included. Seventy-seven (68%) and 36 (32%) patients presented with nonpurulent and purulent SSTIs, respectively. Twenty-seven (24%) patients had an Eron classification score of 1 without documented failure of prior outpatient antibiotic therapy. The most common antibiotic regimens were vancomycin monotherapy (33%) and cefazolin monotherapy (20%). The median total duration of antibiotic therapy was 12 days (range 1-25). Total antibiotic duration was > 14 days in 32 (28%) patient encounters. The rates of 30-day all-cause (SSTI-related) ED visits and hospital readmissions were 9% (4%) and 17% (12%), respectively.

CONCLUSIONS: The results of this study suggest that patients admitted to UPMC Presbyterian Shadyside with SSTIs often received extended antibiotic treatments beyond the 14 days recommended by the IDSA guidelines. The calculated SSTI-related readmission rate is comparable to the 2010 national average. Quality improvement interventions are likely needed to help curb unnecessary antibiotic utilization and decrease readmissions in this patient population.

Marilyn Schoenle

Marilyn Schoenle is originally from Ann Arbor, Michigan. She received her Doctor of Pharmacy from Butler University in Indianapolis, Indiana. Her professional areas of interest include ambulatory care, geriatric medicine, and interprofessional education. Next year, Marilyn will continue her training in the UPMC Presbyterian-Shadyside PGY-2 ambulatory care program's family medicine track.

Mentor(s): Louise Oleksiuk, PharmD, BCP

Evaluation of prospective G6PD assessment on incidence of dapsone-induced methemoglobinemia in abdominal transplant recipients

Sheridan ER, Johnson HJ, Rivosecchi RM

PURPOSE: Sulfamethoxazole-trimethoprim is recommended as the first-line agent for prevention of *pneumocystis jirovecii* pneumonia (PJP) in solid-organ transplant recipients. However, it is estimated an average 3% of the population has an allergy or intolerance to drugs containing sulfonamide moieties. Dapsone, the recommended alternative, is metabolized to acetylated and hydroxylated metabolites thought to be responsible for the high incidence of hematologic adverse effects, namely methemoglobinemia. Risk for developing methemoglobinemia increases with decreased glucose-6-phosphate-dehydrogenase (G6PD) levels, which result from an inherited genetic mutation in the red blood cell enzyme G6PD. The purpose of this study was to determine the utility of prospective G6PD testing in predicting the incidence of methemoglobinemia in abdominal transplant patients receiving dapsone for prevention of PJP.

METHODS: This was a retrospective, observational quality improvement project of abdominal transplant recipients, including kidney, liver, pancreas, small bowel, or any combination thereof, transplanted between January 1, 2010 and September 30, 2018. Patients who had an order for dapsone and, in a separate analysis, patients who had results from G6PD testing, were analyzed for development of methemoglobinemia (methemoglobin > 1.5%) during the course of PJP prophylactic therapy. The association of G6PD level or dapsone treatment and incidence of methemoglobinemia was assessed using a Fisher's exact test.

RESULTS: Of 345 patients, 273 (79%) underwent G6PD testing and 240 (70%) patients received dapsone for PJP prophylaxis. The median G6PD level was 9.0 (4.6-13.5), with three patients considered G6PD enzyme deficient. Transplanted organs included 204 kidneys, 105 livers, 2 pancreases, 11 kidney/liver, 16 kidney/pancreas, 2 liver/pancreas, and 1 liver/pancreas/small bowel. Determination of the relationship between G6PD result and the incidence of methemoglobinemia is pending.

CONCLUSIONS: Pending

Erica Sheridan

Erica is a PGY-1 pharmacy resident at UPMC Presbyterian. Originally from Cleveland, OH, Erica received her PharmD and MBA from the University of Toledo College of Pharmacy and Pharmaceutical Sciences. Her professional areas of interest include cardiology, anticoagulation, and academia. Upon completion of her PGY-1, Erica will complete a PGY-2 cardiology pharmacy residency at the University of Kentucky in Lexington.

Mentor(s): Heather J. Johnson, PharmD, BCPS; Ryan M. Rivosecchi, PharmD, BCCCP

Evaluation of Parenteral Nutrition at UPMC Children's Hospital of Pittsburgh

Sparks MK, Shenk J, Martin E, Sevilla W

PURPOSE: Ensuring adequate nutrition in pediatric patients is important, and it is associated with better clinical outcomes. Although enteral nutrition is preferred, parenteral nutrition (PN) may be appropriate when caloric needs cannot be met enterally. Parenteral nutrition is associated with complications including catheter infection and parenteral nutrition-associated liver disease. According to the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) standards for nutrition support in pediatric hospitalized patients, there is a critical need for an organized interdisciplinary nutrition support team, which may lead to increased use of enteral nutrition, decreased use of PN, and decreased mortality rate. The objective of this study is to assess the current use of PN at UPMC Children's Hospital of Pittsburgh (CHP) and to determine the feasibility of a separate multidisciplinary nutrition support team comprised of a physician, pharmacist, and dietician.

METHODS: This project was approved by the CHP quality improvement committee. A retrospective review of PN orders at CHP from August 2018 through January 2019 was conducted. The primary outcome was to determine the rate at which PN was used for appropriate indications. Indications for PN in each patient were reviewed for appropriateness based on CHP institutional PN guidelines. Secondary outcomes included lipid product use, cost of PN, rates of CLABSIs, and PN error rates. The cost to produce PN was estimated based on purchasing data, and was categorized into drug, supply, and labor costs. Errors were categorized by severity and where in the process the error occurred. Descriptive statistics and Microsoft Excel were used to analyze data. All outcomes were analyzed to determine the feasibility of a nutrition support team at CHP.

RESULTS: Pending completion

CONCLUSIONS: Pending completion

Meredith Sparks

Meredith Sparks received her PharmD from the University of Pittsburgh in 2018. She is currently a PGY1 resident at UPMC Children's Hospital of Pittsburgh. Upon completion of her residency, she has accepted a pharmacist position at the Levine Cancer Institute in Charlotte, NC. In her spare time, Meredith enjoys playing trivia, singing, traveling, and spending time with family and friends.

Mentor(s): Jennifer Shenk, PharmD, BCPPS, Erica Martin, PharmD, BCPS, Wednesday Sevilla, MD

Risk factors associated with enzyme-mediated carbapenem-resistance in Enterobacteriaceae

Sarah L. Spitznogle, PharmD and Brian A. Potoski, PharmD, BCPS-AQID

PURPOSE: Carbapenems have traditionally been employed as "last line of defense" therapy against gram-negative multi-drug resistant organisms. Recently, there has been an increase in carbapenem resistance worldwide, which significantly limits antimicrobial treatment options and poses a direct therapeutic threat. Carbapenem-resistant *Enterobacteriaceae* (CRE) hastily spreads amongst hospitalized patients and carries a high mortality rate. These characteristics illustrate the necessity for prompt identification of individuals at risk for CRE infection. Several studies have investigated risk factors for CRE acquisition, however, current literature lacks the assessment of risk factors in CRE bacteremia. This study aims to identify risk factors for enzyme mediated CRE bacteremia, using the case-case control study design. Prompt characterization of these risk factors may help to decrease the mortality burden accompanied with CRE infection and may revolutionize the clinical use of novel antimicrobials.

METHODS: This was a single center, retrospective, case-case control study which evaluated patients with first time positive blood cultures for CRE. The Institutional Review Board approved this study prior to data collection. Patients were included if they presented to the UPMC Presbyterian campus from 01/01/2008 - 06/30/2016, with a first-time positive blood culture for carbapenem susceptible *Enterobacteriaceae* (*Klebsiella* spp. *or E. coli*), or a first-time positive blood culture for carbapenem-resistant *Enterobacteriaceae*. Patients with negative blood cultures at UPMC Presbyterian during that time frame were matched to the CRE arm based on age, gender, and certain comorbidities. Patients were excluded if they had prior episodes of *Enterobacteriaceae* bacteremia. Deidentified data were collected by an honest broker and recorded in a password protected file.

RESULTS: Results in progress.

CONCLUSIONS: pending

Sarah Spitznogle

Sarah is originally from Buffalo, NY and received her PharmD from the University at Buffalo School of Pharmacy and Pharmaceutical Sciences in 2018. She is a current PGY-1 pharmacy resident at UPMC Presbyterian and will be completing a PGY-2 in Infectious Diseases next year at the University of Texas MD Anderson Cancer Center in Houston, TX.

Mentor(s): Brian A. Potoski, PharmD, BCPS-AQID

Antithrombotic use and outcomes among genotyped post-PCI patients

Uber RB, Empey PE, Stevenson JM, Coons JC

PURPOSE: Patients who undergo percutaneous coronary intervention (PCI) are prescribed aspirin and a P2Y12 inhibitor following stent placement. Due to comorbid conditions, some patients receive anticoagulation with warfarin, low molecular weight heparin (LMWH), or direct oral anticoagulants (DOACs) as well. At UPMC Presbyterian, CYP2C19 genotype is used in clinical care to identify patients with high risk of major adverse cardiac events (MACE) on clopidogrel. Previous research has demonstrated that CYP2C19 genotype may also predict risk of bleeding with clopidogrel. Research concerning the effect of CYP2C19 genotype on bleeding in anticoagulated post-PCI patients has not been previously been published.

METHODS: Patients who presented to UPMC Presbyterian for PCI who had a genetic result returned for CYP2C19, had at least 90 days of follow-up post-PCI, and were prescribed clopidogrel were included. Electronic health record (EHR) data was utilized for all outcomes. Bleeding was determined using modified Thrombolysis in Myocardial Infarction (TIMI) and Global Use of Strategies to Open Occluded Coronary Arteries (GUSTO) defining criteria. The primary analysis compared 90-day bleeding rates between individuals on anticoagulation and those who were not. For our pharmacogenetic analysis of anticoagulated patients, we compared bleeding incidence between those who were CYP2C19 gain of function (GOF) allele carriers and non-GOF allele carriers. The secondary outcome was 90-day MACE incidence. Chi square tests were used for nominal data and unpaired t-tests were used for continuous data.

RESULTS: 413 patients met selection criteria. Of these, 73 received anticoagulation and 340 did not. 90-day bleeding rates among anticoagulant users and non-users were 32.8% and 13.8%, respectively (p=0.0002). 90-day MACE rates were 8.2% and 5.9% (p=0.63). In patients who received anticoagulation, bleeding incidence was not associated with GOF carriers status (35.5% and 31%, among carriers and non-carriers respectively; p=0.88).

CONCLUSIONS: Among post-PCI patients treated with clopidogrel, those who are placed on anticoagulation have higher bleeding rates compared to those not receiving anticoagulation. MACE rates appear to be comparable in those who are anticoagulated than those who are not. Although not statistically significant, CYP2C19 GOF allele carriers trended toward bleeding more than non-GOF allele carriers when on anticoagulation.

Ryley Uber

Ryley Uber is a 2015 Bachelor of Science in Pharmaceutical Sciences graduate and a 2018 PharmD graduate of Cedarville University. He is the first-year clinical pharmacogenomics fellow at the University of Pittsburgh. He wishes to continue using his knowledge of pharmacogenomics to research and develop treatment strategies for patients with unmet medical needs.

Mentor(s): Philip Empey, PharmD, PhD; James Coons, PharmD, BCPS; James Stevenson, PharmD, MS

Statin Therapy Assessment and Team-based Integrative partNership (STATIN)

Weinstein, SD, Koenig, ME

PURPOSE: Quality measures are tools which assist in ensuring patients receive the highest level of care. These measurements are associated with reimbursement. Pharmacists in primary care are in a unique position to optimize medication for patients to improve health care quality and performance measures, however the ideal workflow for implementation has not been determined. This project will determine if an interprofessional, team-based, population health focused collaboration can improve percentage of patients with diabetes (DM) and/or coronary artery disease (CAD) to be appropriately on statin therapy.

METHODS: All patients within an outpatient family health center, who have the diagnosis of DM or CAD and who currently do not have a statin medication on their medication list will be identified. An interprofessional team consisting of a family medicine resident and a pharmacy resident will determine appropriateness of statin initiation using current guidelines. Patients eligible for statin initiation will be called by the team. If the patient is not able to be reached after three attempts, a letter will be sent. If initiation is not appropriate, reasoning will be documented in the patient's chart. Various descriptive statistics will be used to describe the impact of the population health collaboration. This project was approved by the medical center's Quality Improvement Review Committee.

RESULTS: In progress

CONCLUSIONS: Pending

Sara Weinstein

Sara is from Tucson, Arizona, and received her PharmD from the University of Arizona School of Pharmacy in 2017. She completed at PGY-1 Pharmacy Residency at UPMC St. Margaret and continued her training as a PGY2 in family medicine at UPMC St. Margaret. Her professional interests include family medicine, chronic disease state management and academia.

Mentor(s): Marianne E. Koenig, PharmD, BCPS

Supporting Patient Educators to Reduce Patient Harm

Anne Williams, PharmD

PURPOSE: The reduction of harm associated with anticoagulation therapy has been a focus of the Joint National Committee's National Patient Safety Goals (JNC NPSG) over the past decade. The JNC NPSG also highlights face-to-face patient education and standardized practices to reduce this harm. To address these goals, UPMC St. Margaret launched a bed-side pharmacy anticoagulation education consult service in January 2018. Through this service pharmacists have provided over 800 patient education sessions. However, there lacks a standardized protocol for providing inpatient anticoagulation education. This project aims to standardized inpatient, pharmacist-led patient education regarding anticoagulation therapy to improve intra-pharmacist consistency and pharmacist comfort as educators.

METHODS: This study is a quality improvement initiative conducted in an inpatient orthopedic unit at UPMC St. Margaret. Pharmacists' comfort providing education was assessed via anonymous surveys. Data regarding consistency of education was collected via direct observation. Surveys and observations were conducted prior to and after education standardization. Education standardization was developed according to pre-standardization results and the Michigan Anticoagulation Quality Improvement Initiative (MAQI) Toolkit. The primary objective is to compare pharmacists' perspectives and consistency of patient education prior to and after protocol standardization.

RESULTS: Research is in progress.

CONCLUSIONS: The results of this study have the potential to demonstrate the importance of providing standardized protocols to support patient education. In doing this, it may serve as a model for other institutions.

Anne Williams

Anne received her PharmD from the University of Maryland, School of Pharmacy and is currently at UPMC St. Margaret completing a PGY-1 Pharmacy Practice Residency and Faculty Development Fellowship. Upon completion, Anne will continue her training at St. Margaret, completing a PGY-2 Ambulatory Care Pharmacy Resident.

Mentor(s): Alex Rivosecchi, PharmD

High-Risk Medications in Older Adults with a History of Falls

Wilson E, Leman K, D'Amico F, Sakely H

PURPOSE: Approximately a third of community-dwelling people aged 65 years and older fall at least once per year. Injurious falls such as falls leading to hip fractures are devastating and significantly impact patients' quality of life. Medication burden is a significant contributor to patients' fall risk. An updated Beers Criteria was released this year and highlights potentially inappropriate medications older adults, outlining specific medication classes that may pose a risk in patients with a history of falls or fracture. Orthostatic hypotension (OH) has also been shown to be an independent risk factor for falls in older adults, upwards of 20% of the population over age 65 have OH. Risk factors for OH include medications such as antihypertensives. The purpose of this study is to describe the current practice of an outpatient geriatrics primary care center in terms of high-risk medication use in patients who have been hospitalized for a fall.

METHODS: Patients were identified through admission ICD-10 billing codes for a fall. Inclusion criteria includes primary care physician (PCP) within the geriatric practice and hospital admission within the hospital system for a fall between October 1, 2015 and December 31, 2017. Medications upon admission and discharge were collected as well as orthostatic vitals and demographic information. Patients were noted to have a PCP office visit 6 months prior to and/or following the admission, and medication changes and vitals at these visits were also collected.

RESULTS: The average age of patients included in this analysis was 84 years old and 76% were female. 51.7% of patients had changes to high-risk medications during their hospital stay, and 29.3% of patients had changes to anti-hypertensive medications. Orthostatic vitals were checked on 22.4% of patients during hospital admission. 63.8% of patients hospitalized for a fall were discharged to a skilled nursing facility. Ongoing data analysis will include evaluating specific medication classes used during hospitalization and outpatient office visits, as well as outcomes such as recurrent falls and death.

CONCLUSIONS: Pending ongoing data collection

Presented At: American Geriatrics Society 2019 Annual Scientific Meeting; Portland, OR; May 3, 2019

Erica Wilson

Erica is from Frederick, MD, and attended the University of Pittsburgh for both her B.S. in Bioengineering and her PharmD. She completed her PGY1 residency at UPMC St. Margaret and continued on to her PGY2 residency in Geriatrics. Her professional interests include transitions of care and deprescribing. She enjoys spending time with her husband and children, cooking, and exploring Pittsburgh.

Mentor(s): Heather Sakely, PharmD, BCPS, BCGP; Krista Leman, DO

Impact of Education and Communication on Pain Reassessment in the Emergency Department

Wissman KM, Cassidy EA, Hoy CA, Vissari T, Baumgartner, MA

PURPOSE: The Joint Commission has emphasized the importance of pain score reassessment for optimal pain management. However, supporting evidence to identify and improve pain score reassessment rates in the emergency department is limited. The purpose of this project was to improve pain score reassessment rates for emergency department patients with extremity pain.

METHODS: This project was a pre-post interventional design that took place in a community hospital emergency department. Pain reassessment rates were observed for adult patients (age, ≥18 years) who presented to the emergency department with extremity pain. Patients were excluded if they presented with chest pain, received analgesic medication for antipyretic purposes, or were discharged prior to scheduled pain reassessment. Three interventions were implemented to improve pain score reassessment rates. 1) Focus groups were completed to identify nursing barriers and educate nurses on the importance of pain reassessment to improve pain management. 2) Daily audits were utilized to communicate positive reinforcement and constructive feedback to individual nurses. 3) Weekly newsletters provided a source of ongoing education and continuous staff feedback on the department-wide rates of pain re-assessments. The frequency of pain score reassessment documentation by individual nurses was collected for three months prior to and three months after implementation of these interventions.

RESULTS: Pending

CONCLUSIONS: This quality improvement project will be used to promote communication, improve documentation of pain score reassessment rates, and provide patients enhanced pain management in the emergency department. It will also facilitate future research on improving pain control with the possibility of minimizing opioid use.

Presented at the 52nd Annual Society of Teachers of Family Medicine Meeting, Toronto, Canada, 2019

Kevin Wissman

Kevin is from Albert, KS. He received his PharmD from the University of Kansas and bachelor's in science degree in psychology from Kansas State University. He is currently training as a PGY1 in pharmacy practice at UPMC St. Margaret. Next year he will complete a PGY2 in family medicine at UPMC St. Margaret. His professional interests include family medicine, global health, serving the underserved and uninsured population, and interprofessional collaboration. Outside of pharmacy Kevin enjoys cycling, hiking, backpacking, trail running, and volunteering.

Mentor(s): Megan Baumgartner, PharmD, BCPS

Long-acting injectable antipsychotics in the treatment of early psychosis: a naturalistic study

Yabs MC; Carr CN; Sarpal DK; Kirisci L; Fabian TJ

PURPOSE: Developed to improve adherence, long-acting injectable antipsychotics (LAIA) are biweekly, monthly, or tri-monthly injections that allow for patients to consistently receive their medication when they may be otherwise non-adherent on an oral antipsychotic. The objective of this naturalistic study is to evaluate the time course of LAIA initiation in early psychosis and to determine the impact of LAIA therapy on illness progression and clinical outcomes.

METHODS: Included in this naturalistic study were patients that were enrolled in the Services for Treatment of Early Psychoses (STEP) clinic between the years of 2013 and 2016 and filled prescriptions for antipsychotics at Forbes Pharmacy. Retrospective data on patient demographics, medications, dosages, dates of prescription fills and dates of psychiatric hospital admissions were extracted. Patients that received LAIAs were then matched with patients maintained on oral antipsychotics based on sex, age, and race. The number of psychiatric hospital admissions was compared between the two groups.

RESULTS: There were 286 patients that filled prescriptions for antipsychotics at Forbes Pharmacy from 2013 to 2017, 42 of which received LAIAs. The average age of those receiving LAIAs was 22.8 years for males (n=24) and 23.8 years for females (n=18). The most common LAIA prescribed was paliperidone palmitate (n=18, 43%), most often prescribed at the highest dose of 234 mg monthly (n=11). The average number of psychiatric hospital admissions per patient prior to LAIA initiation was 0.93, and after LAIA initiation was 0.31. The average number of psychiatric hospital admissions for patients maintained on oral antipsychotic therapy was 1.2.

CONCLUSIONS: LAIA initiation in early psychosis may correlate with better outcomes as measured by psychiatric hospitalization admissions when compared to those maintained on oral antipsychotic therapy.

Presented At: University of Pittsburgh, Department of Psychiatry Research Day, Pittsburgh, PA, June 2018.

Melanie Yabs

Melanie is from Dallas, Texas. She received her MS in Applied Cognition and Neuroscience from the University of Texas at Dallas, and her PharmD from the University of Texas at Austin. Currently a PGY-1 pharmacy resident at UPMC Western Psychiatric Hospital, Melanie has had a long-standing interest in mental health, particularly the treatment of eating disorders and schizophrenia. In her spare time, Melanie enjoys hiking, traveling with friends, and attending festivals around town.

Mentor(s): Chelsea N. Carr, PharmD, BCPS; Deepak K. Sarpal, MD; Levent Kirisci, PhD; Tanya J. Fabian, PharmD, PhD, BCPP

Evaluation of Antibiotic Duration for Early Onset Sepsis Rule Out in a Neonatal Intensive Care Unit

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BACKGROUND: Sepsis in neonates is classified as either early or late onset; early-onset sepsis typically refers to infants with sepsis onset within the first four days of life. When neonates present with risk factors or signs of early onset sepsis, antibiotics are promptly initiated due to the high morbidity and mortality associated with this disease state. Although the need for antibiotics is justified, prolonged courses are associated with risks. There is increasing data demonstrating that the majority of blood cultures that result positive during early-onset sepsis evaluation will do so within 24 to 36 hours of specimen collection.

METHODS: A retrospective review of neonates admitted to the NICU at UPMC Hamot that received antibiotics for early onset sepsis rule out was performed. Demographic data was collected for each patient in addition to specific blood culture, laboratory, and antibiotic data. The primary outcome for this analysis was the number of excessive doses administered to early onset sepsis rule out patients. Secondary outcomes included the number of patients being treated past 36 hours that ended up having a negative blood culture report at 48 hours, the number of additional blood culture draws between 36 and 48 hours, and the financial impact of these extra doses from pharmacy's point of view.

RESULTS: 200 neonatal charts were randomly reviewed for this study. 907 doses of antibiotics were administered to patients who met inclusion criteria. 90 excessive doses of antibiotics were administered to neonates that underwent the early-onset sepsis rule out and had antibiotics discontinued after the rule out period. Of the neonates that met inclusion criteria, none had a positive blood culture and none had additional blood cultures drawn between 36 and 48 hours. From a cost standpoint, $1,243.45 was spent on doses of antibiotics administered during the rule out period; 10% of this total cost consisted of antibiotic doses administered in excess.

CONCLUSIONS: Based on the findings of this study, it appears that the number of antibiotic doses could safely be decreased during the 48 hour, early onset sepsis rule out period. An expected cost savings would be seen from decreased hospital length of stay and antibiotic cost savings. Additionally, there would be an overall decrease in neonatal antibiotic exposure.

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Christine is from Erie, Pennsylvania. She received her PharmD from Duquesne University in 2018 and is currently a PGYI pharmacy resident at UPMC Hamot. She has accepted a decentralized, clinical pharmacist position at UPMC Hamot to begin after residency and plans to pursue BCPS certification.

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