

Resident Research

2020–21



University of
Pittsburgh

School of Pharmacy

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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.

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Message from the Dean

Patricia D. Kroboth, PhD

Dear Members of the Resident Class of 2021,

Congratulations! Each and every one of you has distinguished yourself among pharmacy practitioners by completing a residency program at one of the country's finest and largest residency programs. What an intensive year you have had—gaining practice expertise and mastering elements of teaching and research.

As residents, you have enjoyed the best that the academic and practice worlds have to offer through the collaborations between the School of Pharmacy and each of its partners — The UPMC hospitals including Children's Hospital of Pittsburgh, Hamot, Magee-Womens Hospital, McKeesport, Mercy, Presbyterian, Shadyside, St. Margaret, and Western Psychiatric Hospital, UPMC Health Plan, Rite Aid Corporation, Giant Eagle, Inc., Asti's South Hills Pharmacy, RxPartners, Chartwell and CVS Caremark.

You also have three other distinctions. First, you committed to learning and demonstrating clinical research skills, which will serve you well during your career as you are faced again and again with clinically important questions. These skills created a foundation on which to build answers—and to become tomorrow's leaders. Second, you have shown that you are pioneers in what we hope is a once-in-a-century pandemic. You have had to care for and educate patients in new and sometimes creative ways.

And finally, you have each just become an alumnus of our PittPharmacy 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 the past year and network of colleagues and friends 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!



Patricia D. Kroboth, PhD, Dean
Dr. Gordon J. Vanscoy Distinguished Service Professor

Valuing Our Partners

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

UPMC is consistently ranked among the nation's top hospitals according to the 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 Hospital, UPMC Mercy, UPMC St. Margaret, UPMC McKeesport, UPMC Children's Hospital of Pittsburgh, and UPMC Western Psychiatric Hospital participate in our residency programs. Additionally, Chartwell Pennsylvania, LP and RxPartners, Inc have recently joined in our partnership of residency programs.

UPMC Health Plan, the largest medical insurer in western Pennsylvania, is owned by UPMC, an integrated global health enterprise. The integrated partner companies of the UPMC Insurance Services Division – which includes UPMC Health Plan, UPMC WorkPartners, LifeSolutions (EAP), UPMC for You (Medical Assistance), and Community 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 4 million members.

Rite Aid Corporation is one of the nation's leading drugstore chains with nearly 2,500 stores in 19 states with a strong presence on both the East Coast and West Coast, and 51,000 associates.

Giant Eagle Pharmacy is a leading regional pharmacy with more than 400 Giant Eagle locations across five states with more than 32,000 team members. Customers with qualifying prescriptions benefit from programs including the Giant Eagle \$4/\$10 generic prescription program, 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 its retail 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, diabetes, and anticoagulation. Projects also included application of pharmacogenomics; strategies to reduce adverse events; 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 candidates eligible for a wide range of career opportunities.

Our program is highly successful with publication rates for our residents exceeding the national average by at least three-fold. The success of this program is a result of the efforts of the working group facilitators and other major contributors: Alfred L'Altrelli, Joni Carroll, Amy Donihi, Breana Goscicki, Tanya Fabian, Joshua Hendrickson, Carlo Iasella, Ariel Korlinchak, Pam McCormick, Melissa McGivney, Taylor Miller, Cody Moore, Rachael Ours, Aaron Pickering, Ryan Rivosecchi, Heather Sakely, Melissa Saul, Jennifer Shenk, Joseph Welch, Anne Williams, Christine Zdaniewski.

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.

Local Risk Factor Analysis of Surgical Site Infections at a Community Teaching Hospital

Beathard WA, Pickering AJ, D'Amico, F, Montgomery T

PURPOSE: Surgical procedures carry inherent risks for surgical site infections (SSI). These resultant infections have a significant impact on morbidity, mortality, and increased healthcare expenditure. In 2015, it was estimated that 110,800 inpatient procedure related SSIs were associated with approximately 1 million additional inpatient days and over \$3 billion in fiscal expenditure. Certain modifiable risk factors predispose surgical patients to developing SSI and can be optimized to reduce infectious risk. Factors historically associated with SSI include diabetes, tobacco use, increased length of procedure and longer operative times. The literature suggests many of these risk factors are shared between a variety of procedures. This study aimed to demonstrate the presence of significant SSI risk factors with spinal fusions (FUSN), peripheral vascular bypass surgery (PVBY), and hip (HPRO) and knee (KPRO) arthroplasties at a community teaching hospital.

METHODS: This study is a retrospective chart audit compared with a systematic review of the literature conducted at UPMC St. Margaret (SMH). A patient profile and risk factor analysis performed from August 2020 to June 2021 included 65 subjects who developed an SSI out of 4,679 FUSN, PVBY, HPRO, and KPRO procedures. Patients were included if they were greater than 18 years of age, underwent one of the four procedures between June 2017 and June 2020, and developed an SSI within 30 days as defined by the National Healthcare Safety Network (NHSN). The primary outcome of this study is to identify and compare infection rates and modifiable risk factors of surgical patients to those published in primary literature (n=15) to determine those significant at SMH. Risk factors will be identified by comparison of pooled weighted estimates abstracted from the literature to local rates. Variables that cannot be compared statically will be described.

RESULTS: The estimate of infection rate for SMH equals 0.019 [95% CI 0.015,0.023]. When compared to the weighted estimated infection rate of the literature (0.035) the difference is significantly lower (p = 0.019). Complete analysis and comparison between risk factors currently pending.

CONCLUSIONS: Pending.

Accepted for presentation at the 2021 Annual STFM (Society of Teachers of Family Medicine) Conference.



William Beathard, PharmD

William received his both his B.S. and PharmD from Texas Tech University Health Sciences Center in Lubbock, Texas. He is currently a PGY-1 Pharmacy Resident at UPMC St. Margaret and will stay to complete his PGY-2 in Geriatrics. His areas of interests include chronic disease state management, deprescribing, and geriatric psychiatry.

Mentor(s): Aaron Pickering, PharmD, BCPS

Time to norepinephrine initiation in septic shock patients with peripheral versus central venous access

Bullard TN, Groetzinger LM, Barbash IJ

PURPOSE: Septic shock is associated with hospital mortality rates exceeding forty percent. Early initiation of vasopressors, fluid resuscitation, and timely initiation of appropriate antimicrobial agents are key components to improving outcomes for these patients. Specifically, delayed initiation of norepinephrine in patients with septic shock has been associated with increased mortality. Generally, norepinephrine infusions are administered only through central lines due to concern for extravasation. The placement of central venous catheters (CVC) in patients who do not have this existing access could potentially delay the initiation of norepinephrine. After implementation of a peripheral norepinephrine (pNE) protocol in the medical intensive care unit (MICU), we aimed to compare the time to vasopressor initiation in patients who received peripheral versus central norepinephrine infusions.

METHODS: We completed a retrospective, single-center study over a two-year period. We examined a historical control group who received norepinephrine through CVCs from September 1st, 2018 to February 28th, 2020. These patients were compared to a group who received pNE after implementation of a pNE protocol from March 1st, 2020 to August 31st, 2020. Patients were included if they had a diagnosis of septic shock and received continuous norepinephrine while admitted to the MICU. For both groups, patients were excluded if they experienced cardiac arrest immediately prior to admission, were comfort measures only within six hours of inclusion, transferred from an outside hospital on vasopressors, or enrolled in the CLOVERS trial. The primary endpoint was time to vasopressor initiation in patients who initially received norepinephrine via a peripheral line compared to those who had a CVC. Additionally, we evaluated volume of fluid administered, ICU length of stay, and extravasation events.

RESULTS: Complete results and analysis are pending.

CONCLUSIONS: Pending.



Tia Bullard, PharmD

Tia is originally from Oswego, NY and is currently a PGY1 pharmacy resident at UPMC Presbyterian. She received a bachelor's degree in biochemistry from SUNY Oswego and her PharmD from the Wegmans School of Pharmacy in Rochester, NY. Upon completion of her PGY1, Tia will continue her training through a PGY2 in critical care at Massachusetts General Hospital in Boston, MA.

Mentor(s): Lara Groetzinger, PharmD, BCCCP

Evaluation of Early Rejection Rates in Patients Receiving Induction Therapy with Alemtuzumab versus Basiliximab

Burroughs KM, Iasella CJ, Moore CA, Rivosecchi RM, Sacha LM

PURPOSE: Acute cellular rejection (ACR) is a common complication post-lung transplant. Patients are most at-risk for ACR during the first year post-transplant, with 28% of lung transplant recipients experiencing at least one treated episode. The use of an induction agent in lung transplant to mitigate the risk of early ACR have been increasingly more utilized in the past several years, with 68.9% using an interleukin-2 receptor antagonist and 9.1% using a T-cell depleting agent in 2018. Selection of an induction agent is patient and center-specific, with no first-line agent yet identified. To date, there have been few studies comparing the rate of early ACR between alemtuzumab and basiliximab within a large patient population. The primary objective of this retrospective cohort study is to evaluate incidence of ACR within six months post lung transplant between patients who received alemtuzumab versus basiliximab for induction.

METHODS: Lung transplant recipients 18 years and older who received induction with either alemtuzumab or basiliximab between January 2017 and January 2020 were identified using inpatient charge data. Patients who received multi-organ transplants or a bone marrow transplant after lung were excluded. The primary outcome was incidence of A grade 2 or higher ACR on transbronchial biopsy within 6 months of transplant. Secondary outcomes included time to first grade rejection, freedom from rejection, incidence of infections, graft failure, and mortality at 6 months post-transplant.

RESULTS: 277 patients were identified as receiving alemtuzumab or basiliximab for induction during the specified study time period. After exclusions, 266 patients were included in the final analysis, with 115 patients in the alemtuzumab group and 151 patients in the basiliximab group. Final results are pending at this time.

CONCLUSIONS: Pending.



Kristina Burroughs, PharmD

Kristina is from Tampa, Florida, where she earned her Doctorate of Pharmacy from the University of South Florida. She completed her PGY1 training at Inova Mount Vernon Hospital in Alexandria, Virginia, and is currently completing a PGY2 Pharmacy Residency specializing in Solid Organ Transplant at UPMC Presbyterian. Her professional interests include immunology, transplant infectious disease, patient education, and transitions of care.

Mentor(s): Cody A. Moore, PharmD, MPH, BCPS; Carlo J. Iasella, PharmD, MPH, BCPS; Lauren M. Sacha, PharmD, BCPS; Ryan M. Rivosecchi, PharmD, BCCCP

Evaluation of early remdesivir initiation in COVID-19 patients from time of laboratory-confirmed diagnosis

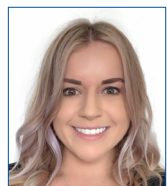
Campagna ML, Ganchuk S, McCreary E, Hendrickson J, Arbulu RD

PURPOSE: Several therapeutic agents have been evaluated for the treatment of coronavirus disease 2019 (COVID-19), but most have failed to exhibit any clinical benefit. Agents that have demonstrated benefit only apply to specific patient populations. Remdesivir is a novel nucleotide analog that was granted FDA-approval for the treatment of COVID-19 in hospitalized patients after demonstrating superiority over placebo in shortening time to recovery. Literature released following the FDA-approval questions the utility of remdesivir and whether it has a place in therapy for the treatment of COVID-19 in hospitalized patients. Further evidence and analysis of remdesivir is needed to provide consensus on whether or not remdesivir should be used for COVID-19 patients, or if it may only provide benefit to a specific subset of patients. The objective of this retrospective study was to investigate whether early initiation of remdesivir therapy from time of laboratory-confirmed diagnosis demonstrates an improved time until recovery.

METHODS: A retrospective analysis approved by the University of Pittsburgh IRB included a system-wide review of adult COVID-19 patients with a discharge date between August 1, 2020 and October 31, 2020. Patients were eligible if they had a documented positive SARS-CoV-2 PCR and received remdesivir therapy. Patients were excluded if they died or were discharged within 24 hours of initial presentation or were transferred to another hospital that was not a study site within 72 hours. Data collection included review of progress notes, patient demographics, comorbidities, microbiology, oxygen requirements and concomitant therapies for the treatment of COVID-19. The primary endpoint was time to clinical stability from date of positive PCR utilizing the following study arms measuring time from positive PCR to remdesivir loading dose: 0-3, 4-6, 7-10, and 11+ days. The secondary aim was to explore patient and treatment-related factors that may demonstrate a greater utility from remdesivir treatment.

RESULTS: Pending.

CONCLUSION: Pending.



Marissa Campagna, PharmD

Marissa is from Bridgewater, NJ and received her PharmD from the University of Pittsburgh School of Pharmacy in 2020. She is currently completing a PGY1 Pharmacy Practice Residency at UPMC Mercy. Following completion of her PGY1 residency training, Marissa will complete a PGY2 Pharmacy Residency specializing in Critical Care at UPMC Presbyterian. Aside from critical care, Marissa's professional interests include emergency medicine, clinical research, and infectious disease.

Mentor(s): Steve Ganchuk, PharmD; Erin McCreary, PharmD, BCPS, BCIDP; Josh Hendrickson, PharmD; Ricardo Arbulu, MD

Impact of Pharmacist-Led Transitional Care Management Services in an Interprofessional Outpatient Practice

K. Chatellier, PharmD; H. Sakely, PharmD, BCPS, BCGP; A. Grimes, PharmD, BCPS, BCGP; E. Kryger, PharmD, BCGP; C. Shatley, BSN; E. Mohan, MD

PURPOSE: Transitions of care are periods during which patients are vulnerable to medication-error related harm, potentially leading to hospital readmission. Transitional care management (TCM) services were introduced by the Centers of Medicare and Medicaid Services (CMS) in 2013 to aid in reducing hospital readmission rates and healthcare costs. TCM services include initial interactive contact, often by the primary care physician office, within 48 hours of acute care discharge and certain non-face-to-face or a face-to-face visit within 7-14 calendar days. A medication reconciliation takes place either at initial outreach or provider visit. Pharmacist involvement in this process can be valuable to reduce medication-error related harm. This project is a pre-post study evaluating the effect of these services on hospital readmissions for our patients.

METHODS: Pharmacist-led TCM services were initiated within our interprofessional geriatric practice in July 2019. The intervention population includes patients who received TCM services after hospital discharge within the first 12 months that TCM services were implemented at our practice. The control group includes patients who were discharged from the hospital to home within the 12 months prior to implementation of TCM services at our practice. Intervention and control hospital readmission rates at 30, 60, and 90 days of initial hospital discharge will be compared. Other characteristics that will be compared across both groups include patient demographics, time to face-face-visit post-discharge, discharge diagnosis, and reason for readmission if applicable. Provider engagement post-hospital discharge for patients in the pre-TCM group will also be taken into consideration.

RESULTS: Patients who received TCM had a non-statistically significant lower rate of readmission within 0-30 and 31-60 days of discharge. Pending results to be collected includes baseline patient demographics, discharge and readmission diagnoses, and provider engagement after hospitalization in the pre-TCM group.

CONCLUSIONS: The lower readmission rate within 30 days of discharge is consistent with previous literature demonstrating the benefit that TCM has on readmission rates. Future project direction may include reviewed readmission after shorter intervals from discharge such as 7-14 days. Pharmacist-led TCM remains a valuable method of connecting patients with care after hospitalization.

Presented At: American Geriatric Society Annual Meeting 2021



Kristel Chatellier, PharmD, BCPS

Kristel was born and raised in Pittsburgh and attended the University of Pittsburgh for both my undergraduate and pharmacy school education. My professional interests include geriatrics and medication safety. Outside of pharmacy, Kristel enjoys climbing, hiking and cooking.

Mentor(s): Heather Sakely, PharmD, BCPS, BCGP

Evaluation of the Perception of Burnout and Work-Life Balance Among UPMC PGY1 and PGY2 Pharmacy Residents

Christner, J., O'Brien, C., Sisco, K.

INTRODUCTION: Burnout, described as a combination of emotional exhaustion, diminished feeling of accomplishment, and depersonalization, is associated with inefficiency at work. Within the medical profession, burnout is frequently reported amongst professionals and correlated to an increase in medication errors. However, information lacks concerning factors that influence the causes of burnout, specifically amongst pharmacy residents. Burnout occurrence and influencing factors among pharmacy residents is an area for investigation. The purpose of this study is to assess former UPMC post graduate year one (PGY1) and post graduate year two (PGY2) pharmacy residents' perception of burnout, work-life balance, and specific stress factors that influence their perceptions during residency within a single healthcare system.

METHODS: The retrospective, single center, cross-sectional survey, cohort study was approved through the University of Pittsburgh Investigational Review Board. The survey was developed using the Qualtrics platform and included questions based on demographics, the residency site, and hours spent on various activities. Inclusion criteria consisted of pharmacy residents who completed their PGY1 or PGY2 residency at a UPMC site within the June 2018-June 2020 time frame or pharmacy residents who completed both a PGY1 and a PGY2 residency at a UPMC site within the June 2018-June 2020 time frame. The survey was distributed via email and was available for five weeks for completion. The primary outcomes that will be assessed are perceptions of burnout, work-life balance, and associated stress factors that influence residents' perceptions during residency. Secondary outcomes include medication error occurrence and the presence of resiliency training within individual residency programs.

PRELIMINARY RESULTS: The survey was distributed to a total of 82 email recipients. Of the 82 possible participants, 44 (53.7%) completed the survey. At least one participant responded from each UPMC residency site. A total of 27 (61.4%) were PGY1, 14 (31.2%) were both PGY1 and PGY2, and 3 (7.4%) were PGY2 residents at UPMC. A descriptive analysis is to be completed concerning the stress factors, self-reported medication errors, timeline of burnout and stress throughout the year, and free response answers.

CONCLUSIONS: The results of this study will provide insight regarding the specific trends and stress factors that influence burnout and work-life balance among pharmacy residents at UPMC.

Presented in poster format at the Annual ASHP Midyear Clinical Meeting, Virtual platform, 2020.



Jenna Christner, PharmD

Jenna is from Belle Vernon, Pa and earned her PharmD at Duquesne University with a concentration in acute care. She is a current PGY1 Pharmacy Resident at UPMC Shadyside Hospital. Her professional interests include critical care, professional development and mentoring, and oncology. Upon completion of her PGY1 residency, she will be joining the pharmacy team at UPMC Magee-Womens Hospital and plans to advance her skillset in the areas of her interests.

Mentor(s): Casey O'Brien, PharmD, BCPS

Evaluating heparin anti-Xa monitoring in the treatment of atrial fibrillation

Cohan DM, Miller TJ, Simonelli RJ

PURPOSE: Despite widespread use of direct-acting oral anticoagulants (DOACs) for the prevention of stroke in atrial fibrillation, patients are frequently started on continuous heparin infusions in place of DOACs when hospitalized due to the shorter duration of effect, which may be advantageous in the setting of procedures or patient instability. Across the UPMC Health System, heparin infusions are monitored via anti-Xa levels, which can be falsely elevated in the setting of recent DOAC use, and as a result these patients are managed with fixed dose protocol. The purpose of this evaluation is to determine dosing, safety, and efficacy 24 hours after initiation for patients who were managed via the traditional atrial fibrillation protocol using anti-Xa levels, and to compare the traditional heparin protocol with the fixed dose IV heparin DOAC interference protocol for atrial fibrillation.

METHODS: Patients who were ordered the traditional IV heparin atrial fibrillation protocol from October 1, 2018 – November 30, 2019 were included in the retrospective chart review. The primary outcome of this evaluation was heparin dose at 24 hours. Secondary outcomes included heparin dose at 24 hours compared to dose at first therapeutic anti-Xa value, time to therapeutic anti-Xa value for both bolus and non-bolus heparin atrial fibrillation protocols, new thrombosis, and bleeding. The results of this cohort were then compared to data from a previous DOAC interference study.

RESULTS: The evaluation included 180 patients. With the traditional atrial fibrillation nomogram, average heparin dose at 24 hours was 1199 units/hr and average dose at first therapeutic anti-Xa value was 1255 units/hr. Average time to first therapeutic anti-Xa level with the bolus and non-bolus protocol was 16.7 and 28 hours respectively. Thromboses occurred in two patients within seven days of heparin initiation in both the bolus and non-bolus protocols. A new bleed was noted in five patients (2.8%) within three days of heparin initiation; three occurring with the non-bolus protocol. Compared to the previous analysis of the DOAC interference protocol which showed an average dose of 911 units/hr at 24 hours, heparin dose was 24% higher with the traditional atrial fibrillation nomogram ($p=0.0001$). Rates of thrombosis and bleeding in the DOAC interference cohort were 3.1% ($p=0.58$) and 4.2% respectively ($p=0.42$).

CONCLUSIONS: Patients required a higher dose to achieve therapeutic anti-Xa values under the traditional IV heparin atrial fibrillation protocol than what they received under the DOAC interference protocol. Patients achieved first therapeutic anti-Xa value sooner under the bolus protocol than the non-bolus protocol, with similar rates of bleeding or thrombosis. Rates of new thrombosis and bleeding were similar in patients that received the DOAC interference protocol.



Dana Cohan, PharmD

Dana received her Doctor of Pharmacy degree from St. John Fisher Wegmans School of Pharmacy in Rochester, New York and is completing her PGY1 residency at UPMC Mercy. Upon completion, Dana will continue residency training at Allegheny General Hospital as the PGY2 pharmacy resident in cardiology.

Mentor(s): Taylor Miller, PharmD; Robert Simonelli, PharmD

Inappropriate dosing of drugs at hospital discharge for patients with impaired kidney function

Day G, Kane-Gill SL

PURPOSE: Around 20-47% of drugs that require dose adjustment are mismanaged at the time of hospital discharge likely due to fluctuating kidney function throughout a patient's hospitalization and a need for repeated evaluation. The purpose of this study is to assess appropriateness of drug dosing based on recommendations for patients with kidney impairment at the time of discharge in our institution.

METHODS: Retrospective cohort study of 13,000 patients discharged from a medical-surgical care ward at UPMC Presbyterian Hospital. Theradoc, a clinical surveillance system, was used to identify patients from January 1, 2019 to January 1, 2020 who were receiving a medication from a selected list within 48 hours of hospital discharge. The medication list included agents requiring dose adjustment based on kidney function and was curated from UPMC's own renal dosing protocol, 2020 Beers list, Hanlon et al publication, and Taji et al publication. Additionally, the identified patients were evaluated if their clearance < 50 ml/min using Cockcroft Gault formula. Appropriate dose was determined by the recommendations in the aforementioned references and if not specified the package insert was used.

RESULTS: A total of 946 patients taking a total of 1496 medications that required renal dosage adjustment were identified. In total, 239 (18.1%) medications were over dosed based on the most recent CrCl at the time of discharge. Additionally, 35 (2.7%) medications were underdosed and 94 (7.1%) should have been avoided based on current renal function. Overall, 27.9% of medication doses were not optimized at the time of patient discharge. Secondary assessments of other nephrotoxic medications at discharge and post discharge dose adjustment are still ongoing.

CONCLUSIONS: There is an opportunity to improve drug dosing at hospital discharge to be consistent with recommendations, but this requires an understanding of the barriers to providing appropriate prescribing and a modification to the current process.



Garrett Day, PharmD

Garrett received his PharmD degree from the University of Pittsburgh School of Pharmacy in 2020. He is currently a PGY1 Health-System Pharmacy Administration and leadership resident (HSPA) at UPMC Presbyterian. His current professional interests include pharmacy automation, sterile products preparation, leadership, and investigational drug research. Upon completion of his residency, he will pursue a hospital pharmacist leadership position within a health system.

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

Medication Assisted Treatment Education in Patients with Alcohol Use Disorder

DeLorme DL, Joseph MP, Fabian TJ

PURPOSE: Medications are often used in conjunction with therapy and counseling to provide a “whole patient” approach to treating substance use disorders. Despite evidence to support the use of medications in the treatment of alcohol use disorder (AUD), prescribing rates of medications for AUD (MAUD) are reportedly less than 4%. Results of a medication use evaluation (MUE) conducted on our inpatient dual diagnosis unit in 2020 showed similar prescribing trends with only 46 of 284 patients (16.2%) prescribed MAUD at discharge. The purpose of this study was to implement a pharmacist-led intervention which consisted of patient education and follow up with the prescriber regarding patients who were interested in MAUD.

METHODS: This was a prospective, single center study focusing on patients admitted to a dual diagnosis unit with a diagnosis of AUD. The pharmacist-led intervention was conducted from January 8, 2021 through March 23, 2021. Patients with AUD were identified, and individualized education was provided twice weekly. The pharmacist inquired about previous medication trials, prescription insurance, and outpatient transportation to identify potential barriers to continuation of MAUD. Outcomes included number of patients agreeable to talk with the pharmacist, number of patients interested in MAUD, number of patients initiated on MAUD, and number of patients discharged on MAUD. In addition, barriers to initiation of inpatient MAUD were identified.

RESULTS: During the study period, 69 patients with AUD were admitted to the dual diagnosis unit. Of those 69 patients, 44 (64%) were asked if they were willing to meet with the pharmacist about MAUD. A total of 31 patients out of 44 (70%) were agreeable and met 1:1 with the pharmacist. After receiving MAUD education, a total of 24 (77%) were interested in either initiating or continuing MAUD. Of these 24 patients, 16 (66%) were prescribed MAUD while inpatient and continued at discharge in all but one patient. Moreover, 13 of the 16 patients (81%) were new initiations of MAUD.

CONCLUSION: Pharmacist-provided patient education on MAUD was an effective strategy to identify patients who were interested in MAUD as well as identifying potential barriers to MAUD continuation. Subsequent follow up with treatment team and attending psychiatrist resulted in a significant increase in inpatient MAUD compared to baseline, 52% vs 16.2%, respectively.



Dante Delorme, PharmD

Dante is currently a PGY1 pharmacy resident at UPMC Western Psychiatric Hospital. He completed his Doctor of Pharmacy from Duquesne University in 2020. Next year, he will be continuing to a PGY2 in psychiatric pharmacy at UPMC Western Psychiatric Hospital. His professional areas of interest include schizophrenia, transitions of care, underserved care, and interprofessional collaboration.

Mentor(s): Matthew Joseph, PharmD; Tanya J Fabian PharmD, PhD, BCPP

Potential Cost Savings from an Infliximab Dose-Rounding Protocol in Outpatient Infusion Delivery

Della Grotta LC, Cassidy EA, Thompson B

PURPOSE: Dose-rounding has become a common practice at many institutions for expensive monoclonal antibodies (mAB) to decrease vial waste and costs without sacrificing efficacy or safety. Current literature supports rounding mABs to the nearest vial size if the calculated dose falls within 10% of the established dose. Cost analyses performed by single institutions after dose-rounding estimate savings ranging from tens of thousands to millions of dollars, depending on the drug and dispenses per year. To reduce drug waste, a dose-rounding protocol was approved by UPMC St. Margaret's Pharmacy and Therapeutics Committee for the drug infliximab. Infliximab was identified as an ideal candidate for dose-rounding because it is one of the top drugs by expenditure in the United States and is supplied in preservative-free, single-use vials which yield costly drug waste. The objective of this study is to assess the impact of infliximab dose-rounding on cost savings and waste.

METHODS: This study is a single-center retrospective analysis of a dose-rounding protocol aimed at minimizing waste of outpatient infliximab infusions at UPMC St. Margaret Hospital (SMH) over a 4-month period. The study evaluated opportunities for dose-rounding prior to the planned implementation of a standardized dose-rounding protocol and then assessed post-implementation protocol compliance. Implementing the standardized protocol, pharmacists at SMH ensure proper weight- and indication-based dosing by rounding down within 10% of the calculated prescribed dose of infliximab. The primary endpoint is a cost comparison between infliximab dosing with and without use of a rounding protocol. The secondary safety outcome is use of rescue medications for infusion reactions.

RESULTS: Results are yet to be determined. Historical data from a 2-month sample has shown that approximately 25% of outpatient infusions of infliximab at UPMC St. Margaret are candidates for the dose-rounding protocol, resulting in cost savings of about \$5,200. Extrapolating this data over a year results in a potential projected reduction in drug acquisition of \$33,200.

CONCLUSIONS: Early results indicate substantial waste reduction. Regarding medication safety with the new dose-rounding protocol, conclusions are yet to be determined.



Lauren Della Grotta, PharmD

Lauren Della Grotta completed her PharmD at the University of Rhode Island. She is currently a PGY-1 pharmacy resident at UPMC St. Margaret and will stay on to complete her PGY-2 in Geriatrics. Her professional interests include geriatric wellness and chronic disease state management.

Mentor(s): Elizabeth Cassidy, PharmD, BCPS; Brianna Thompson, PharmD, BCPS, BCCCP

Descriptive Analysis of the Outpatient Medication Review Process as Patients Navigate Transitions of Care

Samantha DeMarco, PharmD, BCPS; Amy Grimes, PharmD, BCPS, BCGP; Elizabeth Mohan, MD; Cassandra Shatley, RN

BACKGROUND: Transitions of care is the process of a patient moving from one setting or level of care to another, such as from a hospital stay to discharge home. A recent report identified that up to 60% of all patient medication errors occurred during times of transition of care.¹ To help minimize medication errors and optimize medications, medication reconciliation (MR) is conducted as part of the transitional care management (TCM) process.² To meet quality metrics, MR must be completed within 30 days of a patient's transition from a hospital or skilled nursing facility to home.^{3,4} The purpose of this research is to describe the current practice of medication reviews, quantify the number of medication alterations made in the electronic health record (EHR), and characterize medications and disease states susceptible to alteration during transitions of care within two geriatric care centers with clinical pharmacists.

METHODS: This project was conducted at UPMC St. Margaret Geriatric Care Center (GCC), an academic care center in Pittsburgh, PA. The GCC is staffed by an interprofessional team comprised of nurses, pharmacists, geriatric fellows, and physicians who are involved with MR. The intervention of interest is the MR portion of the TCM encounter in which medication changes are identified in the EHR. A retrospective chart review will include patients of the GCC who were billed for a TCM visit encounter from Jan. 1, 2020 – Dec. 31, 2020. To be included individuals must be discharged from a hospital to home or a nursing facility to home. A descriptive analysis of the chart review will identify the current medication review practice within the GCC as well as the number and type of medication alterations made in the EHR.

RESULTS: Pharmacists completed 84% (N=119) of the total MRs. Of those completed by a PharmD, 55% included additional interventions like medication clarification with MD (42%) and coordination and scheduling (42%). A PharmD was present at 33% (N=47) of visits. The average time spent on chart review ranged from 0 to 75 minutes; 0-15 (N=22), 15-30 (N=56), 30-45 (N=17), 45-60 (N=1). Average time spent talking to the patient ranged from 0 to 45 minutes; 0-15 (N=86), 15-30 (N=29), 30-45 (N=1). The total number of medication alterations was 595. Discontinued medications accounted for 49% (N=289), new medication additions were 37% (N=220), and dose changes were 14% (N=86).

CONCLUSIONS: Clinical pharmacists complete the majority of MRs within our geriatric clinical practice and help to serve as liaisons for the coordination of care amongst providers and patients. Time spent on chart review and talking to the patient during the MR process helps to streamline medication issues, questions, and discrepancies prior to the TCM office visit. An average of 4 medication discrepancies on the EHR are identified per patient across the transition of care process. Cardiovascular medications, pain control, and bowel regimens are the most commonly altered medications as patients transition care.

Accepted for presentation at both the 2021 American Geriatrics Society Annual Conference and 2021 Society for Teachers in Family Medicine Annual Conference.



Samantha DeMarco, PharmD, BCPS

Dr. DeMarco is currently a PGY2 Geriatric Pharmacy Resident, Faculty Development Fellow, as well also serves as the Pharmacy Chief of Policy at UPMC St. Margaret. Dr. DeMarco received her Bachelor of Science from the University of Maryland, and her Doctor of Pharmacy from Virginia Commonwealth University. Upon completion of her PGY2, Dr. DeMarco has accepted a position at the University of Maryland St. Joseph's Medical Center and will serve as the hospitals Pain and Opioid Stewardship Clinical Pharmacy Specialist.

Mentor(s): Amy Grimes, PharmD, BCPS, BCGP

Use of dopamine versus epinephrine containing regimens in cardiogenic shock.

DiBridge JN, Rivosecchi RM, Slocum B

PURPOSE: Cardiogenic shock (CS) is a low cardiac output (CO) state attributed to heart failure, resulting in end-organ hypoperfusion and hypoxia. It is associated with up to a 50% mortality and management remains challenging despite recent therapeutic advances. The current guidelines on CS recommend intravenous inotropic agents and vasopressors; however, do not recommend one particular vasopressor agent or dosing strategy. The SOAP II trial found that, when compared with norepinephrine, dopamine was associated with more dysrhythmia. The SOAP II trial also included a subgroup analysis which showed in patients with CS, dopamine group had an increase in mortality. Norepinephrine is used as first line vasopressor for cardiogenic shock, although the preferred second line agent remains unclear. While epinephrine is known to increase lactate and other metabolic parameters, careful consideration of patient comorbidities may impact the decision to select one agent over another. This study aims to evaluate the safety and efficacy of dopamine compared to epinephrine containing regimens in patients with cardiogenic shock.

METHODS: This was retrospective single center review of adult patients with CS, identified by review of ICD9/10 codes requiring dopamine or epinephrine for at least 5 hours continuously from January 1, 2018 to June 30, 2020. Patients were excluded if they were younger than 18 years of age, had no hemodynamic evidence of CS after review of physician notes, had received a cardiectomy within 4 days, or were moribund. The primary endpoint was the rate of new onset dysrhythmias, defined as sinus tachycardia, atrial fibrillation or atrial flutter, premature ventricular contractions or premature atrial contractions, ventricular tachycardia, ventricular fibrillation, pulseless electrical activity, or asystole. Secondary endpoints were time to attainment of hemodynamic stability, rates of hyperlactatemia, rate of vasopressor failure, time to dysrhythmia, number of days without vasopressor support and rates of death in the ICU. Vasopressor failure was defined as discontinuation of vasopressor therapy due to ineffectiveness or adverse drug events, switch to or addition of an alternative vasopressor.

RESULTS: Research in progress with results pending.

CONCLUSIONS: The results of this study will add to the existing literature regarding rates of new onset dysrhythmias associated with vasopressor use in cardiogenic shock.



Julie DiBridge, PharmD, BCPS

Julie completed her undergraduate and pharmacy school training at the University of Pittsburgh and is currently a non-traditional Acute Care PGY-1 Pharmacy Resident at UPMC Presbyterian. She will stay on to complete her PGY-2 in Cardiology. Her areas of interests include advanced heart failure, mechanical circulatory support, critical care cardiology, and anticoagulation.

Mentor(s): Brittany Slocum, PharmD, BCCCP; Ryan Rivosecchi, PharmD, BCCCP

Retrospective Analysis of Prescribing Patterns for Restarting Anticoagulation after a Gastrointestinal Bleed

Faggioli A, Thompson B, D'Amico F

PURPOSE/BACKGROUND: Oral anticoagulation is used for the treatment of pulmonary embolism, deep vein thrombosis, and select patients with atrial fibrillation. Although anticoagulation is essential and lifesaving in these patient populations, major bleeding events can occur and anticoagulation medications are often held until the patient is stabilized. The American College of Cardiology guideline for the management of bleeding in patients on oral anticoagulation includes information to aid clinical decision making for the restarting of oral anticoagulation. Although this algorithm is helpful for clinicians, the ideal timing of the restarting of anticoagulation following a GI bleed is unknown. The risk of recurrent GI bleed after the resumption of therapy is about 10-18%, making the timing of therapy resumption critical. The purpose of this project is to describe current practices regarding the restarting of anticoagulation after a GI bleed at a community teaching hospital.

METHODS: This is a quality improvement project, approved by the Quality Improvement (QI) Review Committee, of patients on chronic anticoagulation who presented to a community teaching hospital with a GI bleed and had interruption in anticoagulation. Patients greater than 18 years were included in the QI project if they were admitted between July 2015-July 2020 with a GI bleed due to anticoagulation, characterized through ICD-9/ICD-10 code at time of admission, and were documented to be on direct oral anticoagulation or warfarin on admission. The primary outcome is to describe current practices, such as length of anticoagulation interruption, discontinuation of anticoagulation at discharge, and dose or drug change after a gastrointestinal bleed. The secondary outcomes are to identify patient factors that are associated with early (<30 days) versus late (≥30 days) restarting of oral anticoagulation, and number of patients with a recurrent GI bleed or cardiovascular event (PE/DVT/stroke) within 120 days.

RESULTS: This is a work in progress. Results are yet to be determined.

CONCLUSIONS: This is a work in progress. Conclusions are yet to be determined.



Alicia Faggioli, PharmD

Alicia is a PGY1 pharmacy resident at UPMC St. Margaret. She is was born and raised in El Salvador until moving to the United States in 2002. She received both her bachelor's degree in chemistry and her PharmD from the University of Tennessee. Her favorite activities outside of work include painting, trying out local coffee shops, and running. You can also catch her supporting the UT Volunteers on Saturday and Pittsburgh Steelers on Sunday! Upon completion of her PGY1, Alicia will continue her training in ambulatory care/family medicine at UPMC St. Margaret Lawrenceville Family Health Center.

Mentor(s): Brianna Thompson, PharmD, BCPS, BCCCP

The effect of a controlled substance policy on chronic opioid prescribing at an urban academic family health center

Gabriel CT, Ballard SL

PURPOSE: In 2017, UPMC Shadyside Family Health Center implemented a practice-level controlled substance policy (CSP) based on CDC guidelines. A 2018 analysis of CSP adherence guided several revisions on ordering, referrals, workflow, documentation, and monitoring. The project objective is to determine if revisions made to the CSP increase adherence to national best-practice guidance for chronic opioid therapy.

METHODS: 2020 CSP adherence was assessed for patients receiving chronic opioid therapy, defined as continuous opioids for 60+ days. Patients were identified by a new system report that included demographics, opioid prescription information, and discrete documentation fields. High-dose opioid therapy was defined as 50+ morphine milligram equivalents per day. Charts were reviewed for naloxone and workflow indicators. Data was analyzed using descriptive statistics, chi-square for between-group comparisons, and multiple regression for exploration of relationship.

RESULTS: Patients on chronic opioid therapy (n=73 vs. n=60), and total number of opioid prescriptions (n=1,051 vs. n=889) decreased from 2017 to 2020, respectively. In 2020, 7 fewer patients were prescribed high-dose opioids (n=27 vs. n=20) with a significant reduction in methadone prescribing (6% vs 2.8% of all prescriptions, p <0.05). Benzodiazepine co-prescribing (16.4% vs. 11.6%) decreased, and naloxone prescribing (20.5% vs. 25%) increased, but the difference was not statistically significant. Only 35% of high-dose opioid patients had naloxone prescriptions (n=7/20). Urine drug screen rates decreased (65.8% vs. 61%). There was a significant increase in completed controlled substance agreements (CSAs) (53.4% vs. 86%, p < 0.05) and prescriptions linked to an ICD-10 code (53.2% vs. 68.1%, p <0.05).

CONCLUSION: Adherence to the CSP continues to increase since implementation. High-dose prescribing, specifically of methadone, greatly decreased but naloxone remains underutilized. While some workflow items improved greatly (completion of signed CSAs), the COVID-19 pandemic affected others (in-office prescribing and urine drug screen completions). Data will inform revisions to the Family Health Center's CSP and system-wide data report.



Carly Gabriel, PharmD

Carly Gabriel, PharmD, completed her PGY1 Community-Based Residency with the University of Pittsburgh and Giant Eagle Pharmacy. She is the current PGY2 Ambulatory Care Family Medicine Track resident at UPMC Presbyterian-Shadyside. Upon completion of her residency, she will be the clinical pharmacist at the General Internal Medicine Clinic located in UPMC Montefiore.

Mentor(s): Stephanie Ballard, PharmD, BCPS

Evaluation of pharmacy waste at a free-standing children's hospital

Guggenberger JM, Shenk J, Goscicki B

PURPOSE: Pediatric hospital pharmacy practice is unique due to individualized dosing for each patient which requires additional steps in the preparation process. Pharmaceutical waste is created if transfers, dose adjustments, therapy changes, and/or discharges occur after the batch has been prepared and can have a negative impact on staff resources due to decreased productivity. All of the batches prepared at our institution cover a 24-hour time period. Other institutions have implemented more frequent and smaller batches which has led to a significant reduction in waste. The aims of this project were to identify the pharmacy practice of batching and cart exchanges at other pediatric institutions. Additionally, the project aimed to characterize the waste of products returned to our pharmacy by total cost, determine the reason for medications being returned, and to categorize medication order changes by time and patient care unit to design an alternate batch schedule to minimize waste.

METHODS: This evaluation received approval by the institution's quality improvement committee. All unused individualized oral liquid doses, IV syringes, and IV continuous preparations returned to the pharmacy from December 6th, 2020 to December 28th, 2020 were scanned and recorded using the pharmacy's proprietary medication delivery scanning system. Utilizing pharmacy purchasing data and the returned items, the approximate cost of the waste was generated. A second report was generated through the system's electronic health record and used to review new orders and discontinuations of all oral liquid doses and non-chemotherapeutic IV products. This data was used to design an improved pharmacy batch schedule. In addition to the data gathered at our institution, a survey was sent to the pharmacy manager email listserv through the Children's Hospital Association. The survey results were utilized to identify and compare the batch and cart exchange process at other pediatric institutions.

RESULTS: Four of the five institutions that responded to the survey had more than one batch for both their intravenous and enteral products. In the three-week study period, over \$54,000 of pharmaceutical waste was collected, which extrapolates to over \$941,000 in a year. The pediatric and cardiac intensive care units were the primary contributors to pharmaceutical waste. Medication ordering occurred primarily between 0600 to 1600 each day. Continuous infusions made up a disproportionate cost of waste relative to the number of items returned. There was a clear spike in discontinuations during the time when the batch typically gets prepared.

CONCLUSION: The current batch schedule at our institution generates a significant amount of pharmaceutical waste. The intensive care units are the largest contributors to pharmaceutical waste. To maximize our pharmacy resources, there is opportunity to retime the daily continuous infusion batch, transition to multiple cartfills each day, and create a more continuous workflow. These changes could lead to significant cost savings as well as increased pharmacy staff satisfaction.

Presented at the Pediatric Pharmacy Association Annual Virtual Meeting, April 2021



John Guggenberger, PharmD

John earned his PharmD from Creighton University's School of Pharmacy and Health Professions in Omaha, NE. He is the current PGY1 resident at UPMC Children's Hospital of Pittsburgh. Upon completion of his residency John will be a hospital pharmacist at Mayo Clinic in Rochester, MN.

Mentor(s): Jennifer Shenk, PharmD, BCPPS, Breana Goscicki, PharmD, BCPPS, Carlo Iasella, PharmD, MPH, BCPS

Implementation of a pharmacist-led PrEP consult service in an internal medicine clinic

Halza KG, Miller T, Hovis Z

PURPOSE: HIV has long been considered an epidemic in the United States. In 2018, 37,968 people in the United States were diagnosed with HIV, and 1.1 million people were at substantial risk for obtaining HIV. Antiretroviral pre-exposure prophylaxis (PrEP, Truvada® or Descovy®) taken once daily has been shown to reduce the risk of getting HIV from sex by about 99% and from injecting drugs by at least 74%. There is evidence that pharmacist-led PrEP services are feasible and can increase PrEP uptake, retention, and patient satisfaction. This quality improvement project evaluated the implementation of a pharmacist-led PrEP consult service in a primary care clinic.

METHODS: A pharmacist-led PrEP service was initiated at the UPMC General Internal Medicine Oakland clinic, a large hospital-based outpatient primary care clinic, in October 2020. Primary care physicians referred patients to the clinic pharmacist via an electronic consult for PrEP management. Pharmacists contacted patients via phone for education and assessment of appropriateness of therapy, ordered medication and lab monitoring, and completed documentation in the shared medical record. The pharmacist scheduled follow-up visits with the patient at 1 month for new starts, and every 3 months thereafter. The number of patients referred, newly started on PrEP, transferred for care, and who completed follow-up at three-month intervals were collected from 10/1/2020 to 5/7/2021.

PRELIMINARY RESULTS: As of the time of abstract submission in April 2021, 10 patients were referred to the pharmacy service for PrEP management. 3 of the 10 patients were newly started on PrEP, and 7 were transfers of care. Since initiation of the service, a detailed clinic workflow was established, education on PrEP and pharmacy services was provided to attending and resident physicians, a resource detailing appropriate ordering of lab work was created, informational flyers to inform patients about PrEP were displayed in the clinic, and smartphrases for documentation of visits and referrals were created and implemented.

PRELIMINARY CONCLUSIONS: We hope to evaluate the effects of the service, and of having a pharmacist providing care to decrease physician barriers to providing PrEP care to patients.



Katherine Halza, PharmD

Katherine is from Pittsburgh and received her PharmD at the University of Pittsburgh School of Pharmacy in 2019. She completed her PGY1 pharmacy residency at UPMC McKeesport and is now completing her PGY2 ambulatory care residency at UPMC Presbyterian Shadyside in the traditional track. Upon completion of PGY2, she hopes to practice as a clinical pharmacist in an outpatient clinic.

Mentor(s): Trisha Miller, PharmD, BCACP and Zach Hovis, PharmD, BCACP

The Appointment-Based Model at Klingensmith's Drug Stores: Developing an Implementation Blueprint

Herbert SMC, Heck L, Vogel A, Carroll J, Coley K, Maher R, Morales C, Hake K, McGivney M

PURPOSE: The objective of this project is to 1) determine the facilitators and barriers to adoption of the Appointment-based Model (ABM) at a small rural chain of independent pharmacies, and 2) develop tailored implementation strategies with the pharmacies to facilitate broad adoption. The ABM in community pharmacies has increased patient medication adherence and pharmacy efficiency. Implementation of the ABM in community pharmacies is encouraged by national pharmacy organizations. For example, the Flip the Pharmacy initiative, sponsored by the Community Pharmacy Foundation and led by CPESN USA, has made an extraordinary effort to promote the ABM over the past year. The evaluation of community pharmacy ABM implementation efforts is limited and implementation strategies that are most successful still need to be identified.

METHODS: This project is an exploratory, qualitative, mid-implementation study. Subjects include pharmacists, technicians, and fill clerks who participate in implementation and use of the ABM at a small rural chain of seven independent pharmacies. A 13-question semi-structured interview guide was developed using all five domains of the Consolidated Framework for Implementation Research (CFIR). The interviews were audio-recorded, de-identified, and transcribed verbatim. Rapid qualitative assessment methodology was utilized for transcript analysis. This process included sorting interview data into a templated summary table that was organized by CFIR constructs to help with categorization and interpretation of the data. The research team used consensus methods to determine the facilitators, barriers, and respective tailored implementation strategies to support adoption of the ABM at the pharmacies. The results from the analysis are being applied in partnership with the pharmacies. This project was approved by the University of Pittsburgh's Institutional Review Board.

RESULTS: A total of 31 interviews were completed with the pharmacy staff, including 10 pharmacists, 7 technicians, and 14 clerks who represent all seven pharmacy locations. The analysis led to the identification of several facilitators and barriers and appropriate implementation strategies for the pharmacies to consider. The research team provided three primary recommendations to pharmacy leadership: 1) identify aspects of the medication synchronization process and pharmacy staff roles that can be standardized across all pharmacy locations, 2) strengthen patient education to promote patient buy-in, and 3) institute hands-on training for all pharmacy staff.

CONCLUSIONS: Performing a mid-implementation evaluation can help reinvigorate implementation efforts for the ABM at the pharmacies. Development of the implementation blueprint with the pharmacy leadership began in September 2020 and execution of the tailored implementation approach is ongoing. This small rural chain of independent pharmacies can benefit from a tailored approach to implementation. Widespread adoption of the ABM is important to community pharmacy practice transformation. Others can learn both from the implementation strategies selected for use by these pharmacies and from the rapid, mid-implementation evaluation approach utilized by the research team.

Presented At: APhA2021 Virtual Annual Meeting and Exposition



Sophia Herbert, PharmD

Dr. Sophia Herbert is from Dayton, Ohio and received her PharmD from the University of Pittsburgh School of Pharmacy in 2019. She is completing a Community Pharmacy Practice Development Fellowship with the University of Pittsburgh School of Pharmacy Community Leadership and Innovation in Practice Center. Her professional interests include community pharmacy practice transformation, community-based research, and teaching. She will continue her fellowship program this year while expanding her involvement in teaching in the PharmD curriculum.

Mentor(s): Melissa McGivney, PharmD, FCCP, FAPhA; Kim Coley, PharmD, FCCP; Joni Carroll, PharmD, BCACP, CTTS

Assessment of Antibiotic Management for *Enterococcus* Positive Urine Cultures

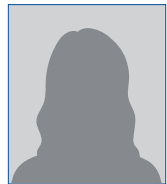
Holzworth A, Ours R, Welch J, Zdaniewski C, Lim R

PURPOSE: *Enterococcus* species are a gram-positive organism part of the normal gastrointestinal flora, specifically in the urinary tract. As a result, *Enterococcus* spp. often do not require antimicrobial treatment. If treatment is initiated, intrinsic resistance of *Enterococcus* spp. to certain agents, such as cephalosporins, must be taken into consideration. The primary goal of this study was to form a baseline assessment of the current pharmacologic management of *Enterococcus* positive urine cultures at UPMC Hamot and develop a foundation from which to recommend improvements in the current management, as well as identify potential cost-saving measures in regard to overall management and antimicrobial therapy.

METHODS: This study was a retrospective, qualitative analysis of patients with a urine culture result positive for *Enterococcus* spp. during an inpatient admission or emergency room visit over a four-month period. Data was collected from a review of the electronic health record to assess for the following: known antimicrobial drug allergies/reaction, length of hospitalization, Charlson comorbidity index score, documented symptoms pertaining to urinary tract infection if present, results of urinalysis, date urine culture collected, date urine culture resulted, reported sensitivity of *Enterococcus* spp. in culture, presence of catheter, duration of in-place catheter, initial antimicrobial agent ordered, date initial agent was ordered, physician and service that ordered initial agent, infectious disease consultation, and any change in antimicrobial therapy during admission or visit pertaining to the *Enterococcus* positive urine culture.

RESULTS: There were 75 patients included in the analysis. Only 17 patients (23%) had urinary symptoms documented. Of the *Enterococcus* isolates identified, 67 (89%) were *Enterococcus faecalis*. A total 30 patients (40%) received antimicrobial treatment. Of the patients treated, 16 (53.3%) were prescribed a cephalosporin. The initial agent was continued in 21 occurrences with an average of 6.5 days of therapy. The initial agent was discontinued in 5 occurrences after an average of 2.4 days or was switched to another agent in 4 occurrences. Cost saving results are pending.

CONCLUSIONS: The majority of patients that received an antimicrobial agent for an *Enterococcus* spp. positive urine culture received a cephalosporin. Education will be provided, primarily to hospitalist and emergency medicine services, on choosing targeted antimicrobial therapy for *Enterococcus*-positive urine cultures after appropriate determination that treatment is warranted.



Abriana Holzworth, PharmD

Abriana is from Cleveland, OH and received her PharmD at the University of Toledo College of Pharmacy and Pharmaceutical Sciences. After completing her PGY-1 residency UPMC Hamot in June, Abriana will be going on to complete a PGY-2 residency in Infectious Diseases at NYU Langone Hospital-Long Island.

Mentor(s): Rachael Ours, PharmD, BCIDP; Joseph Welch, PharmD; Christine Zdaniewski, PharmD, BCPS

Implementation of Health Risk Assessments into an appointment-based model workflow at an independent community pharmacy

Jackson EP, Pitzarella SR, McGrath SH, McGivney MS, Carroll JC, Coley KC

PURPOSE: This project was designed to pilot implementation of a Health Risk Assessment (HRA) questionnaire, typically provided by a Medicaid Managed Care Organization (MCO), at an independent community pharmacy. Patients have trusting relationships with their local pharmacist and are more likely to have discussions about the information that is asked in a HRA, leading to more open communication during completion of the HRA. Pharmacies with an appointment-based model perform outreach to patients monthly and are well-positioned to implement this questionnaire into their workflow rather seamlessly. Pharmacists can then relay this information to the MCO, which allows for identification of patients that are at a higher risk for health disparities. Conducting HRAs is beneficial to the pharmacy as it may lead to increased opportunities for revenue generated from vaccinations or smoking cessation therapies. Patients also benefit when pharmacists identify those in need of medication adherence packaging or medication synchronization.

METHODS: The HRA questionnaire was provided to the pharmacy by the MCO. Sixteen questions were identified as relevant to the pharmacy and had to be documented for the assessment to be considered complete by the MCO. Patients with the MCO that were previously enrolled in medication synchronization or adherence packaging were considered eligible for the service. These patients were scheduled for the assessments based on when their prescriptions were due to be filled. The 16 HRA questions were divided into two parts and administered and documented by trained pharmacy technicians or a pharmacist; follow-up with a pharmacist was completed as necessary. A handout with contact information for standardized MCO and community resources was given to patients with monthly prescriptions.

RESULTS: Forty-nine patients were identified as eligible for the screenings; thirty-nine questionnaires (79.6%) were completed. The median time for completion of both parts of the questionnaire was 19 minutes and 13 seconds, with a range of 11 - 59 minutes. Fifteen patients that used tobacco products were identified and seven were interested in follow-up for tobacco cessation services. Four of 8 patients with asthma accepted administration of an asthma control test. Influenza and pneumococcal vaccination opportunities were identified in over 60% and 40% of patients, respectively.

CONCLUSIONS: Pharmacists and trained technicians effectively implemented HRAs into the workflow of the pharmacy. Offering these screenings allowed for open conversations with patients about their health, their unmet needs, and risk factors regarding certain disease states. The pharmacy and the MCO mutually benefitted from these interventions, with the pharmacy strengthening relationships and earning revenue from a clinical service as the MCO increased their completion rate of HRAs and identified risk factors in their patients.



Erica Jackson, PharmD

Erica obtained her PharmD from Lake Erie College of Osteopathic Medicine School of Pharmacy in Erie, Pennsylvania. She is the Community-based Pharmacy Resident with the University of Pittsburgh and Asti's South Hills Pharmacy. After completion of her PGY-1, she plans to move to Syracuse, New York and work as a community pharmacist. She plans to be involved with the Community Pharmacy Enhanced Services Network (CPESN), helping community pharmacies shift to caring for patients over time and providing clinical services at their local pharmacy.

Mentor(s): Joni Carroll, PharmD, BCACP, CTTS and Kim Coley, PharmD, FCCP

Evaluation of the Timing of Antibiotic Administration in Relation to Obtaining Appropriate Cultures for Diabetic Foot Wounds at UPMC Hamot

Jorgensen RM, Korlinchak AN; Ours RL; Welch JT; Juhasz K; Rosielle LJ

PURPOSE: Untreated diabetic wounds often progress to deep seeded infections that require surgical intervention and/or extended durations of intravenous antibiotics.¹ In the management of diabetic foot infections, emphasis should be placed on obtaining appropriate cultures, and initiating proper empiric antibiotics to reduce unnecessary antibiotic exposure.² Despite guideline recommendations, which propose withholding antibiotic therapy in stable patients until appropriate cultures can be obtained, many patients are started on broad spectrum empiric antibiotics due to the poor appearance of the wound. Without confirmation from culture and sensitivities data it can be difficult to de-escalate antibiotics. The purpose of this study is to evaluate the current antimicrobial prescribing practices in regard to the appropriate timing of cultures in diabetic foot wounds at UPMC Hamot and the effects that it may have on culture results and subsequent antibiotic de-escalation.

METHODS: This is a retrospective observational study of adult patients who were admitted to UPMC Hamot and received antibiotics for a diabetic foot infection. A minimum of 100 patients will be included in this study and data will be collected through retrospective review of the electronic medical record. The primary outcome for this study is to identify how often antibiotics are withheld prior to obtaining appropriate cultures and how often the results are used to de-escalate antibiotics. Secondary outcomes include length of hospitalization, cost savings, rates of appropriate antibiotics given before culture, culture results, rates of antibiotic switch to culture directed therapy, rates of *Clostridioides difficile* and other known antibiotic related complications.

RESULTS: Preliminary results identified that 40/100 (40%) patients had antimicrobial therapy held before having sterile wound cultures obtained. Of the 60 patients who received antibiotics prior to obtaining cultures, 56% were considered stable based on pre-specified criteria. Average length of stay was 1.88 days shorter in patients who had antibiotics held compared to those who received antibiotics prior to obtaining cultures (7.725 vs 9.605). The most common organisms isolated were streptococcus species (36%), anaerobic species (26%), methicillin sensitive staphylococcus aureus (MSSA) (24%). Noteworthy, methicillin resistant staphylococcus aureus (MRSA) was present on 15% and pseudomonas species were present on 5% of cultures.

CONCLUSIONS: Final conclusions are still in progress.



Rachael Jorgensen, PharmD

Rachael is a PGY-1 pharmacy resident at UPMC Hamot in Erie, PA. She is originally from Auburn, New York and in 2020 she completed her PharmD at St. John Fisher College Wegmans School of Pharmacy in Rochester, New York. Upon completion of residency, Rachael hopes to continue working in a clinical setting. Her professional interests include emergency medicine, critical care and antimicrobial stewardship.

Mentor(s): Ariel N. Korlinchak, PharmD; Rachael L. Ours, PharmD, BCIDP; Joseph T. Welch, PharmD

Improving pediatric vaccine adherence at an urban community health center

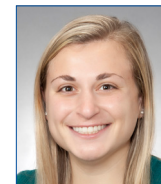
Karavolis ZA, Pater KS, Sugiura Y

PURPOSE: Childhood vaccination has shown to be one of the most effective public health approaches to prevent and control disease. The Advisory Committee on Immunization Practices suggests that most immunizations are to be administered during childhood, placing pediatric and family medicine practitioners in a powerful position to administer vaccines. UPMC Matilda Theiss Health Center is an urban community health center that provides family medicine services to patients of all ages, including underserved individuals. Providers at the health center have expressed concern with pediatric vaccination adherence, however, the exact vaccination rate had not been quantified. The aim of this project is to quantify vaccine adherence rates at the health center and implement a targeted pharmacist-driven program to increase overall vaccine adherence.

METHODS: This quality improvement project was initiated at UPMC Matilda Theiss Health Center on September 12, 2020 and is still ongoing. Phase I of the project consisted of a retrospective chart review accessed through the health system electronic medical record. Patients were identified by having been seen in clinic within the past year or had an upcoming appointment scheduled during the project period. All patients under the age of 18 were included in the chart review identifying administration dates for all vaccinations received except influenza vaccines. Each vaccine was color coded for analysis based on the Centers for Disease Control and Prevention's (CDC) Recommended Child and Adolescent Immunization Schedule for age 18 years or younger, 2021. Outreach was attempted to all patients with missing vaccines who were still in an eligible window to receive the vaccine. Outreach was made first by phone and subsequently by letter if contact was not made by phone.

RESULTS: A total of 227 patients were eligible for pediatric vaccines during the chart review time frame of September 12, 2020 and February 1, 2021. Out of all patients, 78 (34.36%) patients had completed a full pediatric vaccine series all of series and doses recommended by the CDC. No patients completed a full pediatric vaccine series completely on time. There were 71 patient (31.28%) that were missing one or more entire series of vaccines. Reasons stated for the missing dose include vaccine refusal by parent (74%), unable to come to clinic (18%), vaccine was unavailable at time it was due (5%), parent unaware of missing dose (3%).

CONCLUSIONS: Vaccine adherence at UPMC Matilda Theiss Health Center is lower than recommended by the Advisory Committee on Immunization Practices. Themes elicited from this project will guide the on-going framework of this quality improvement initiative for a pharmacist-driven vaccine program at the health center.



Zoe Karavolis, PharmD

Zoe is from Boston, Massachusetts and received her PharmD from Northeastern University in 2020. She is currently completing her PGY1 Pharmacy Residency at UPMC Presbyterian. Her professional interests include psychiatry, substance use disorders, and global health. After this year, she will complete her PGY2 in psychiatry at UPMC Western Psychiatric Hospital.

Mentor(s): Karen Steinmetz Pater, PharmD, CDCES, BCACP; Yui Sugiura, DO, MPH

Retrospective Review of the Impact of DOAC Utilization on Members of a Managed Care Organization

Karnick C, Modany A, McGraw M, Ludwig J, Hammonds T, Good C

PURPOSE: Since their approval, direct oral anticoagulants (DOACs) have become widely utilized for the prevention of stroke in patients with non-valvular atrial fibrillation (Afib) as well as for the treatment of venous thromboembolism (VTE). Prior to the advent of DOACs, warfarin was the standard of care for these indications. While clinically effective, warfarin has a narrow therapeutic index and requires frequent monitoring and dose adjustment to ensure patients remain appropriately anticoagulated. Conversely, DOACs do not require monitoring but are significantly more expensive. The primary objective of this study was to determine the all-cause medical and pharmacy costs as well as cost of anticoagulant associated adverse events of DOACs versus warfarin. The secondary objectives were to determine the bleeding and thrombotic event rates associated with DOACs versus warfarin and to assess medication adherence rates for DOACs versus warfarin.

METHODS: This analysis is an observational, propensity matched comparison study using five years of retrospective medical and pharmacy claims data for members enrolled at UPMC Health Plan. Members who were greater than 18 years of age who had at least one 30-day fill of warfarin or a DOAC filled on or within 30-days of a diagnosis for VTE or Afib were eligible for inclusion in the analysis. Matched pair comparisons between the warfarin and DOAC groups were examined to identify differences in the outcomes between the two groups. Non-parametric tests were deployed when analyzing data that was non-normally distributed. All cost data was assessed for outliers prior to statistical analysis and winsorization was used to account for extreme outliers. A confidence interval of 95% and a p-value of 0.05 was used.

RESULTS: Apixaban, rivaroxaban, and warfarin matched total costs of care per member per month were \$2082.80, \$1,815.36, and \$1,281.16 respectively. Apixaban use resulted in a significant increase in total cost of care (difference-in-difference (DID): -\$801.64, p=0.0178) and a significant reduction in VTE related costs (DID: \$177.09, p=0.0098) versus warfarin. Warfarin produced a significant reduction in all-cause pharmacy spend than either DOAC (Apixaban: DID -\$342.47, p<0.0001; Rivaroxaban: DID -\$386.42, p<0.001). Apixaban produced a significant reduction in other nonmajor bleeds (HR 1.526, p=0.0048) and both DOACs produced a significant reduction in PE (Apixaban: HR 1.941, p=0.0328; Rivaroxaban: HR 1.833, p=0.0489) versus warfarin.

CONCLUSIONS: DOACs were associated with higher costs in the outcomes of total cost of care, all-cause inpatient, and all cause-pharmacy compared to warfarin. However, they were also associated with lower VTE related costs compared to warfarin. Rivaroxaban resulted in the lowest all-cause outpatient and bleed related costs, but overall, results were similar between the three anticoagulants in these outcomes. Apixaban produced the most favorable bleed related outcomes. Rivaroxaban resulted in the highest incidence of major and nonmajor GI bleeds as well as the highest incidence of other major bleeds. Warfarin was associated with the highest incidence of DVT and PE.

Presented at 2021 AMCP Annual Meeting



Cameron Karnick, PharmD

Cameron received his PharmD degree for the University of Pittsburgh School of Pharmacy in 2020. He is currently the PGY-1 Managed Care Pharmacy Resident at UPMC Health Plan. His current professional interests include utilization and formulary management, clinical outreach programs, and specialty pharmacy management. Upon completion of his residency, he will pursue a clinical pharmacist role in a managed care organization.

Mentor(s): Ashley Modany, PharmD and Molly McGraw, PharmD, BCPS

Podcasts as a novel method to deliver education on stigma surrounding opioid use disorder

Kissell LM, Coley K, McGivney M, Ossman K, Amigh J, Ramanna C, Carroll JC

PURPOSE: The objective is to evaluate the effectiveness of a podcast series to educate student pharmacists on stigma surrounding opioid use disorder (OUD). Podcasts are becoming more popular as a form of entertainment and education. The format provides increased flexibility for participation (e.g., listening while driving or performing other activities), and does not require access to a computer. Podcasts are utilized by nurses and other health professionals as a form of continuing education but their use to deliver information to students in a professional program such as pharmacy is limited. Podcasts may provide a new, more convenient, and effective way to engage students in learning.

METHODS: Students in their second and third professional years from two schools of pharmacy listened to a podcast series incorporated into their PharmD didactic coursework. The series will be developed in cooperation with the Pharmacy Podcast Network. The podcast consisted of five 10-20 minute episodes. The series highlighted the following: (1) interviews with professionals who serve those affected by opioid use disorder; (2) types of stigma and how it affects health outcomes; and (3) the disease state processes involved in opioid use disorder, and (4) harm reduction strategies. Surveys were deployed before and after the students listened to the podcast. Questions aimed to assess changes in their perception of OUD and its associated stigma and consisted of free-response and Likert scale questions. Paired t-tests will be used to assess changes in survey responses from baseline. A content analysis will be performed on the open-ended survey responses. This project is funded by a grant from the Centers for Disease Control and Prevention.

RESULTS: Second and third-year student pharmacists from The University of Pittsburgh and Duquesne University Schools of Pharmacy were given the opportunity to listen to the podcast miniseries. A total of 232 pre-survey responses and 156 post-survey responses have been collected to date. Analysis on these survey results is currently ongoing.

CONCLUSIONS: Stigma associated with OUD leads to increased psychological distress and may result in fewer patients who seek treatment. Healthcare professionals, including future pharmacists, play an important role in limiting the amount of internalized stigma for those affected by OUD. Podcasts may be a novel way to teach student pharmacists about the importance of providing empathetic care to patients with stigmatized disease states. Podcasts also provide flexibility for remote learning which has become more prevalent during the COVID-19 pandemic. The preliminary results of this project provide evidence to support the use of podcasts as an effective method to provide stigma education.

Presented Online At: APhA Virtual Forum



Logan Kissell, PharmD, RPh

Dr. Logan Kissell is the current PGY1 Community-Based Resident with The University of Pittsburgh School of Pharmacy and Rite Aid Pharmacy. Logan is a graduate of Ohio Northern University's Raabe College of Pharmacy where he received his PharmD in May of 2020. Over the course of his community residency he has developed a passion for precepting and educating students. Following his residency he will be continuing with Rite Aid Pharmacy as a staff pharmacist at the residency site where he will continue to work with incoming residents and encourage their ongoing development in clinical services.

Mentor(s): Joni C. Carroll, PharmD, BCACP, CTTS; Kristine Ossman, PharmD

Assessment of Risk Factors for Hospital Readmission for Patients on Home Parenteral Nutrition (HPN)

Landsittel K, Bezjak J, Borneman T, Tokarski R, Szabo K, Ashner J, Ostrowski R

PURPOSE: The purpose of this pilot study is to examine the rate of hospital readmissions for high acuity patients discharged on HPN, and to then identify the risk factors associated with hospital readmission. The data points captured in this pilot study will guide the need for further research, and help in the examination of Chartwell processes that could benefit from additional improvement. By first identifying potential risk factors for readmission, this will allow for a better understanding of how to mitigate risk and therefore prevent controllable readmissions.

METHODS: This study is a single-center analysis comparing HPN patients who were readmitted to the hospital to those HPN patients who had no readmissions from July 2020 to present. A monthly census report of patients new to home infusion service was cross-referenced with a system-wide readmissions report. The inpatient medical chart is utilized to collect date and facility of readmission, as well as reason for readmission. Risk factors are assessed by using outpatient data. Patients are contacted by a pharmacist via telephone to complete an onboarding assessment, which inquires specific questions to assess risk factors for readmission. Readmissions are classified as related or unrelated to HPN. Readmissions related to HPN are further classified by cause: infectious, mechanical or metabolic. Statistical significance was calculated using Fisher's exact test through Stata statistical software, version 16.1. P-values < 0.05 were considered statistically significant.

RESULTS: Out of the total 40 included patients, 27 patients (67.5%) were readmitted to the hospital and 13 patients were not readmitted. The total amount of hospital readmissions among patients were 57. The maximum amount of readmissions per patient was 6 readmissions. 15 of the 27 readmitted patients (55.5%) were readmitted to the hospital within 30 days of their start of care date. 13 readmissions (22.8% of readmissions) were considered related to HPN therapy. Of the readmissions related to HPN therapy, 1 was considered metabolic, 6 were considered infectious and 6 were considered mechanical.

CONCLUSIONS: Potential risk factors for hospital readmission include age; drain, ostomy or fistula present; access type; number of lumens; number of children in the home; number of pets in the home; and involvement in care score. Limitations included the small sample size and the unequal amount of observation time among patients. Chartwell processes that warrant further examination include pre-discharge education, assessment of patient-specific factors, reinforcing use of the Chartwell HPN placement, and assessment of patient/caregiver understanding after the first HPN teach.

Presented at the 2020 ASHP Midyear and the 2021 NHIA Conference



Kimberly Landsittel, PharmD

Kimberly received her PharmD degree from the University of Pittsburgh School of Pharmacy in 2020. She is currently a PGY1 pharmacy resident at Chartwell. Her current professional interests include infectious disease and nutrition support. Upon completion of her residency, she will be working as a pharmacist at West Penn Hospital.

Mentor(s): Johanna Bezjak, PharmD, BCNSP; Tina Borneman, RPh, BCNSP; Rebecca Tokarski, PharmD, BCNSP; Kayla Szabo, PharmD, BCNSP; Jenifer Ashner, BSN, RN; Ranette Ostrowski, BSN, RN

Evaluation of the management of asymptomatic bacteriuria and pyuria in the emergency department at UPMC Hamot

Lobdell, RE. Ours, R. Welch, J. Korlinchak, A. Cammarata, C.

PURPOSE: Asymptomatic bacteriuria is defined as the presence of ≥ 1 species of bacteria growing in the urine at $\geq 10^5$ CFU/mL regardless of the presence of pyuria and without any signs or symptoms of a urinary tract infection. The Infectious Disease Society of America (IDSA) recommends that pregnant women, renal transplant patients <1-month status post-transplant, and patients undergoing invasive endourological procedures be treated with antibiotics regardless of the presence or absence of genitourinary symptoms. All other patient populations are not recommended to be treated with antibiotics.¹

METHODS: This study is an electronic medical record review of adult patients that were ordered a urinalysis that reflexed to culture in the Emergency Department at UPMC Hamot from March 2019- March 2020. A minimum of twelve patient each month were randomly chosen to be included in the analysis. Patients were excluded if they were ≤ 18 years of age, had another suspected source of infection, had high risk neutropenia (ANC <100cells/mm³, ≥ 7 days duration), pregnant, were undergoing an endourological procedure, had a ureteral stone, or were status post kidney transplant less than one month prior.

The primary outcome of this study is the number of patients with asymptomatic bacteriuria or pyuria that were managed appropriately according to the IDSA guidelines. Secondary outcomes include the number of patients that received appropriately targeted therapy, incidence of adverse effects from receiving inappropriate antibiotic therapy, and the cost of unnecessary antibiotic treatment.

RESULTS: The primary outcome of overall appropriate management of asymptomatic bacteriuria and pyuria was achieved in 111/144 (77%) of patients studied. A secondary outcome showed, 22/49 (45%) of patients received appropriate initial targeted therapy according to the IDSA guidelines. Documentation of adverse effects from inappropriate antimicrobial therapy was not noted in any of the patients treated (0/49 (0%)). The total cost of unnecessary antimicrobial treatment for this study was valued at \$742.14, averaging approximately \$22.49 per patient.

CONCLUSIONS: This study was important to determine the management of asymptomatic bacteriuria and pyuria in UPMC Hamot's emergency department. The majority of patients in this study were overall managed appropriately. Inappropriate treatment was often associated with patients one or more of the following; recent fall, altered mental status, and history of urinary tract infection. Inappropriate treatment leads not only to adverse effects but also unnecessary health care costs. These findings suggest there are opportunities for improvement include education on unnecessary treatment in patients systemically stable with altered mental status or falls.



Rachael Lobdell, PharmD

Rachael is from Warren, Pa., and earned her PharmD from West Virginia University. Her professional interests include emergency medicine, infectious diseases, and oncology. In her spare time, Rachael enjoys spending time with her family and friends, crafting, and spending time outdoors. Post PGY-1, Rachael hopes to obtain a pharmacist position in the hospital setting.

Mentor(s): Rachael Ours, PharmD, BCIDP, Joseph Welch, PharmD, Ariel Korlinchak, PharmD, Christopher Cammarata, DO.

Utilization of SGLT2 inhibitors in adults with heart failure with reduced ejection fraction

Manjerovic AM, Hall D, Coons JC, Mathier M

PURPOSE: Sodium-glucose cotransporter 2 (SGLT2) inhibitors are primarily utilized for the treatment of type 2 diabetes mellitus. Recently their benefits in patients with heart failure with reduced ejection fraction (HFrEF) have been established. SGLT2 inhibitors have demonstrated a 25-26% reduction in composite outcomes of cardiovascular death and heart failure (HF) hospitalization or exacerbation in large-scale clinical trials. Observed cardiovascular benefits extend to both patients with and without diabetes. The ADA Standards of Medical Care in Diabetes now recommends SGLT2 inhibitors as preferred therapy for patients with type 2 diabetes and HF following metformin initiation. The ACC/AHA/HFSA Guidelines for the Management of Heart Failure have not been updated to include a recommendation for SGLT2 inhibitor use in patients with HFrEF. The aim of this quality improvement project was to assess the usage of SGLT2 inhibitors in adults with HFrEF in an outpatient cardiology clinic.

METHODS: An electronic health record report identified patients on an outpatient cardiology clinic heart failure registry seen in the calendar year beginning October 2019. The report included patient identifiers, presence on the clinic diabetes registry, estimated glomerular filtrate rate (eGFR), left ventricular ejection fraction (LVEF), and prescription for a SGLT2 inhibitor.

Chart review was completed to collect further information: prescriptions for other guideline directed medical therapy, type of diabetes (type 1 or type 2), and any missing information from the report. Any patients that did not meet the LVEF criteria for HFrEF (< 40%) were excluded. Other exclusion criteria included a listed allergy to any SGLT2 inhibitor, diagnosis of type 1 diabetes, and an eGFR of < 30 ml/min/1.73 m². Data was reported using descriptive statistics. A chi-square analysis was used to determine whether diabetes diagnosis was associated with the prescribing of a SGLT2 inhibitor.

RESULTS: 2,366 patients were identified for having heart failure. 785 patients were identified as having heart failure with reduced ejection fraction (HFrEF). 83 patients met the exclusion criteria and were not included in the analysis. The overall SGLT2 inhibitor prescribing rate was 17.8% (N = 125/702), with 35.3% of patients having comorbid type 2 diabetes (N = 248). Only 11.9% of patients without diabetes were prescribed a SGLT2 inhibitor (N = 54/454), while under a third of eligible patients with HFrEF and type 2 diabetes received SGLT2 inhibitor therapy (28.6%, N = 71/248, p<0.0001).

CONCLUSIONS: The utilization of sodium-glucose cotransporter 2 (SGLT2) inhibitors in patients with heart failure with reduced ejection fraction (HFrEF) was limited in this assessment and probability of utilization was dependent on comorbid type 2 diabetes. While expected that SGLT2 inhibitors would be prescribed more in patients with type 2 diabetes, the results of this assessment highlight the need for increased consideration to the prescribing of these agents in patients with HFrEF regardless of a diagnosis of type 2 diabetes. This assessment provides an opportunity to develop pharmacist-directed interventions aimed at the implementation of SGLT2 inhibitors in this population.



Alison Manjerovic, PharmD

Alison is from Pittsburgh, PA and received her PharmD from the University of Pittsburgh in 2019. Last year, she completed a PGY-1 Ambulatory Care Focused Pharmacy Residency at Auburn University Clinical Health Services in Auburn, AL. This year, she is completing a PGY2 Ambulatory Care Pharmacy Residency at UPMC Presbyterian Shadyside (traditional track). Her professional interests include chronic disease state management and diabetes care.

Mentor(s): Deanne L. Hall, PharmD, CDE, BCACP

Evaluation of immunizations in allogeneic hematopoietic stem cell transplant patients

Mansour D, Miller T, Mascara G

PURPOSE: Hematopoietic stem cell transplantation (HSCT) involves the infusion of hematopoietic progenitor cells (HPCs) into patients with hematologic disorders in order to re-establish normal hematopoietic function and to take advantage of graft versus tumor immunity. Due to the loss of both cell mediated and humoral immunity following HSCT, several professional societies have published guidelines for administration of vaccines following HSCT. The primary objective of this study was to compare compliance to recommended vaccinations among allogeneic HSCT patients before and after the implementation of a standardized protocol for post-HSCT vaccinations at UPMC Hillman Cancer Center. The secondary objectives are to evaluate completion rates for individual vaccines before and after the protocol was implemented, reasons for vaccine noncompliance, and seroconversion following administration of hepatitis B vaccination among allogeneic HSCT patients.

METHODS: This was a UPMC IRB approved, retrospective cohort study of all patients who underwent HSCT at UPMC Shadyside between January 2016 and August 2019. Patients were excluded if they survived less than or equal to 6 months after transplant or if they were less than 18 years old. The primary outcome was complete vaccination rate before and after a standardized protocol was implemented on April 6, 2018. Complete vaccination was defined as administration of the following vaccines: pneumococcal conjugate (3 or 4); tetanus, diphtheria, acellular pertussis (3); meningococcal conjugate (1); inactivated polio recombinant (3); hepatitis B (2 or 3); inactivated influenza (1). Partial vaccination was defined as administration of at least two different vaccines recommended in the first series. Vaccination in process was defined as administration of at least two vaccines within the past four months. Baseline demographics were analyzed using descriptive statistics. Chi square was used to evaluate categorical variables.

RESULTS: Of the 158 allogeneic hematopoietic stem cell transplants performed during the specified period, 115 met inclusion criteria, including 64 prior to and 51 after implementation of the protocol. The complete vaccination rate prior to implementation was 15/64 (23%) compared to 13/51 (25%) after implementation of the vaccination protocol. ($\chi^2=0.0649$, p=0.799). The partial vaccination rate prior to implementation was 18/64 (28%) compared to 19/51 (37%) after implementation of the protocol ($\chi^2 = 1.0841$, p= 0.298). Of the partial completions in the HSCT group after the protocol was implemented, 5/19 (26%) were considered a completion in process.

CONCLUSIONS: The implementation of a standardized protocol for post-HSCT vaccinations did not significantly increase the compliance rate for guideline recommended vaccinations among allogeneic HSCT patients. However, there are several valid reasons for vaccine noncompliance, such as severe GVHD, disease relapse, infection, and death that need to be assessed prior to making recommendations for further interventions to improve adherence. Additionally, the data in the post-protocol group are immature and vaccinations in five patients are ongoing.



Diana Mansour, PharmD

Diana is from Greensburg, Pa., and earned her PharmD from the University of Pittsburgh School of Pharmacy. She is currently a PGY1 pharmacy resident at UPMC Mercy Hospital. She will be completing a PGY2 oncology pharmacy residency at UPMC Hillman Cancer Center next year. She enjoys hiking, cooking, and spending time with her husband.

Mentor(s): Taylor Miller, PharmD; Gerard Mascara, PharmD, BCOP

Comparison of the use of potassium binding agents for the treatment of acute hyperkalemia

McConnell M, Nickman S, Miller T

PURPOSE: In October 2019, sodium polystyrene sulfonate (Kayexalate®) was removed from formulary due to the risk of adverse effects including intestinal necrosis. Since these formulary changes, patiromer (Veltassa®) and sodium-zirconium cyclosilicate (Lokelma®) are the preferred formulary potassium binding agents as indicated for patients with hyperkalemia. Despite lack of FDA approval to treat acute hyperkalemia, these agents are often adjunctively utilized alongside multiple acute potassium lowering medications (insulin/dextrose, sodium bicarbonate, loop diuretics, albuterol). As a result, an evaluation was completed to assess the utilization and monitoring of potassium binding agents in patients experiencing acute hyperkalemia in the inpatient setting.

METHODS: Patients admitted to UPMC Mercy, UPMC Presbyterian and UPMC Shadyside who received sodium-zirconium cyclosilicate (SZC) or patiromer from July 1st, 2019 to June 30th, 2020 as well as patients who received sodium polystyrene sulfonate (SPS) from October 2018 to October 2019 were identified through charge codes. Patients within each medication cohort were randomly selected for chart review. Patients treated for acute hyperkalemia were eligible for review and stratified based on pre-treatment potassium level; patients were excluded if pre-treatment potassium level was 5-6 mMol/L, if the potassium binder was for chronic treatment of hyperkalemia, if the sample was hemolyzed, or if the patient was receiving hemodialysis. Additional data collected included: potassium levels pre-/post- medication administration, time of each potassium level, coadministration with other oral medications, and additional treatments for hyperkalemia. The data was evaluated with descriptive statistics.

RESULTS: A total of 422 patients were selected for evaluation. The cohort was then further narrowed to 72 patients treated for acute hyperkalemia with a pre-treatment potassium level of ≥ 6 mMol/L. Within this cohort, the net change in potassium level was -1.2, -0.71, and -0.68 mMol/L, and the average time between levels were 10.05, 7.7, and 9.0 hours for SZC, patiromer, and SPS, respectively. The use of at least one adjunctive acute hyperkalemia medication occurred in 88.2%, 68.8%, and 100% of patients administered SZC, patiromer, and SPS, respectively.

CONCLUSION: A larger decrease in potassium level was observed in patients with a pre-treatment potassium level of ≥ 6 mMol/L who were treated acutely with SZC. Additionally, there was inconsistent and variable monitoring of potassium levels. Considering SZC's more profound potassium lowering when compared to the other potassium binders, this agent should be considered for adjunct treatment of acute hyperkalemia in the inpatient setting through inclusion in the UPMC Hyperkalemia PowerPlan. Inclusion within the PowerPlan would also result in a more durable potassium lowering effect as well as consistent monitoring to ensure appropriate resolution of hyperkalemia.



Madison McConnell, PharmD

Madison is a PGY-1 pharmacy resident at UPMC Mercy. She is from Pittsburgh, PA and received her PharmD from the University of Pittsburgh School of Pharmacy in Pittsburgh, PA. Her professional interests include ambulatory care and academia. In her spare time, she enjoys baking, skiing, and hiking. Upon completion of her PGY-1, Madison will complete a PGY-2 in Ambulatory Care at UPMC Presbyterian-Shadyside in their Traditional Track.

Mentor(s): Sandra Nickman, PharmD and Taylor Miller, PharmD

Implementation of a Pharmacist-Led Pre-Exposure Prophylaxis Initiation Session for Patients at Risk of Acquiring HIV-1

McMahan ER, Pater KS, Sugiura Y

PURPOSE: In 2018, 31.5% of new HIV infections could be attributed to persons 25-34 years old. Recurrent sexually transmitted infections (STI), such as gonorrhea, chlamydia, or syphilis, can increase one's risk of acquiring HIV-1. In addition to safe sex practices, Pre-Exposure Prophylaxis (PrEP) is indicated in this patient population to decrease the risk of acquiring HIV-1. There are, however, many patient-specific and system-level barriers that can lead to underutilization of PrEP. Pharmacists are well-positioned to address potential barriers that could arise, such as patient education, medication cost, monitoring, and patient adherence. The purpose of this quality improvement project was to evaluate the impact of a guided counseling session with a clinical pharmacist regarding PrEP initiation among people with a history of recurrent STIs at a family health center. This project also aimed to improve awareness and education regarding PrEP and potential barriers that can arise when initiating a PrEP initiation session.

METHODS: All patients with a scheduled appointment were identified by a physician or pharmacist on the day of their appointment for any indication of recurrent STIs. Patients were included in the initiative if they had a past medical history of one or more STIs since January 2020. Baseline demographics, such as age, gender, race, HIV exposure, type of STI, and insurance status were collected on each patient enrolled in the service. Once identified, a physician would initiate the conversation regarding PrEP with the patient, then refer the patient to a clinical pharmacist for education and counseling. Pharmacists were required to follow-up with each enrolled patient via phone or in-person at 1-week, 1-month, and 3-months after beginning PrEP therapy. Any perceived patient- or system-level barriers were collected. All encounters were documented in the patient's electronic medical record.

RESULTS: Prior to initiating the PrEP protocol in August 2020, zero patients were taking PrEP. After initiation of our service, five patients were offered PrEP, and three patients were enrolled and followed by a clinical pharmacist at 1-week, 1-month, and 3 months. All three patients were adherent, and 66.7% (n=2) have met with a provider to obtain refills. A clinic workflow outline was essential for seamless patient enrollment and monitoring. Providers and pharmacists were informed of proper patient education and documentation for the service. Frequently encountered barriers included patient identification, clinical pharmacist availability, and patient follow-up (insurance issues, laboratory monitoring, refills).

CONCLUSION: After implementing the pharmacist-led PrEP initiation session, as well as physician and pharmacist education, the number of patients prescribed PrEP increased. Pharmacist-led PrEP counseling and follow-up sessions increased patient adherence. Many challenges arose when initiating a PrEP service, and due to the small sample size, data regarding patient- and system-level barriers is limited. Improvements will be made in our patient enrollment and patient follow-up process with the goal of increasing PrEP utilization in our patient population. Future efforts will focus on patient recruitment and engagement, as well as listing Matilda Theiss Health Center as an official PrEP Center.



Erin McMahan, PharmD

Erin is currently a PGY-1 Pharmacy Resident at UPMC Presbyterian. She is originally from Grant Park, Illinois, and she completed her Doctor of Pharmacy at Purdue University in West Lafayette, Indiana. Upon completion of her PGY-1 residency, she will begin a PGY-2 residency in Internal Medicine at West Virginia University. In addition to internal medicine, her interests include transitions of care, academia, and underserved care.

Mentor(s): Karen Pater, PharmD, CDCES, BCACP

Implementation of a Pharmacist-Driven Pediatric Transitions of Care Service at a Family Medicine Residency Practice

Mehta AP, Castelli G, D'Amico F, McGaffey A

PURPOSE: Primary care-based Transitions of Care (TOC) services from emergency department (ED) or inpatient stay to home within the pediatric population has not been adequately studied. Furthermore, the ED, rather than primary care, continues to be a consistently utilized source of care for pediatric patients, often despite severity or acuity of a primary medical complaint. This prospective cohort quality improvement study conducted at UPMC Bloomfield-Garfield Family Health Center (BG FHC) aims to improve the services provided for our high-risk pediatric patients who were discharged from hospital to home, in efforts to reduce unnecessary hospital healthcare reuse and increase outpatient follow-up.

METHODS: The intervention group included patients ≤ 18 years old with a primary care provider at BG FHC who were discharged from a hospital ED or medical unit between October 26, 2020 – March 26, 2021. An initial study created a control group of 40 patients ≤ 18 years old with a crude rate of 1.8 hospital visits per person between January 1, 2019 – July 1, 2020.

A pharmacist at BG FHC identified eligible patients daily and performed TOC call within 2 business days of patient discharge. The pharmacist discussed the patient's status, completed medication reconciliation, and scheduled a visit within 30-days for follow-up if deemed necessary. At least one additional intervention was made including 1) scheduling well child care (WCC) visits; 2) recommending overdue vaccinations; 3) providing caregiver education on red flag symptoms, our office triage and acute visit services; 4) discussing appropriate asthma management or antibiotic use

The primary outcome was 90-day hospital healthcare reuse, defined as ED utilization and all-cause readmissions

RESULTS: Preliminary results include 45 patients in the intervention group, majority female, on Medicaid, without a previous WCC visit in the past year, with an average 1.38 hospital visits in the past year. When comparing intervention to control group respectively, reductions were seen in 90-day healthcare reusage (25% vs. 37.5%), and improvements were seen in successful follow-up appointment within 30 days (58.1% vs. 47.5%) and up-to-date WCC visit (77.8% vs. 62.5%). Days until successful follow-up at BG FHC also improved (24 vs. 49 days). None of these results were statistically significant.

CONCLUSIONS: In this preliminary small sample study, pharmacist driven clinic-based transition of care services showed positive numerical differences for reduction in hospital healthcare reuse and increase in outpatient follow-up, although not statistically significant. Pharmacist-specific interventions like counseling on antibiotic dose and inhaler technique soon after discharge, along with discussing red-flag symptoms to triage non-urgent cases, may have improved outcomes. We will continue to evaluate this multidisciplinary service where a physician identifies high-risk pediatric patients discharged from the ED and a pharmacist reaches out to the patient for follow-up.



Amisha Mehta, PharmD, BCPS

Amisha is originally from New Jersey and completed her Doctor of Pharmacy degree from Ernest Mario School of Pharmacy, Rutgers University. She is a current PGY2 Family Medicine/ Ambulatory Care Pharmacy Resident and Faculty Development Fellow. Her professional interests include pharmacist advocacy, global health, and underserved community medicine. Outside of the clinic, you can find Amisha spending time outdoors hiking or biking, exploring the city, and trying new restaurants.

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

Effectiveness of adherence Targeted Medication Reviews on medication adherence

Frank Nenninger, Abraham Jose, Alexa Hospodar, Bethany Crofts, Maureen Klinefelter, Jennifer Heasley

BACKGROUND: The CVS Caremark Medication Therapy Management Program (CVSC MTM Program) provides comprehensive MTM services to eligible beneficiaries of Medicare Part D Plans and Medicare Advantage Plans. MTM services include Targeted Medication Reviews (TMRs) designed to encourage appropriate use of medications and to improve clinical outcomes for beneficiaries across multiple disease states. A TMR is an ongoing medication review performed by pharmacists that target a specific opportunity, such as adherence. Proportion of days covered (PDC) is a measure used by health plans, pharmacy benefit managers, and Centers for Medicaid and Medicare Services (CMS) to calculate patient adherence. The results of this study will be used to better understand the impact of adherence TMRs on proportion of days covered (PDC).

OBJECTIVE: To evaluate the effectiveness of adherence TMRs on medication adherence.

METHODS: This retrospective study will focus on measuring the impact of adherence TMRs on medication adherence for asthma, hypertension, hypercholesteremia, angina, chronic heart failure, depression, and diabetes medications. The primary outcome will be the percent of patients with a PDC above 80% for patients that had an adherence TMR completed versus patients targeted for an adherence TMR but did not have the TMR completed. PDC will be evaluated post-TMR targeting using prescription claims data and MTM system reports. Secondary outcomes will include the percent of patients with a PDC above 80% at 90 and 180 days post-TMR (completed versus not completed), average PDC before versus after an adherence TMR was completed, adherence TMR impact on PDC per disease state, and patient demographic factors (age, sex, and primary language) impact on adherence TMR effectiveness.

RESULTS: In progress

CONCLUSION: In progress



Frank Nenninger, PharmD, MBA

Frank received his PharmD and MBA from Washington State University and is completing a PGY1 Managed Care Residency at CVS Caremark. His professional interests include product development, digital healthcare, and pharmaceuticals. Upon completion of his residency, he will pursue a pharmacist role in a managed care organization.

Mentor(s): Abraham Jose, PharmD

Facilitating Access to Medication-Assisted Treatment for Patients with Opioid Use Disorder

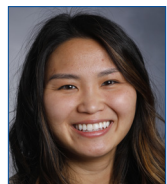
Nguyen TB Reid T Fabian TJ

PURPOSE: Medication-assisted treatment (MAT) is a holistic approach to treating substance use disorder by combining counseling, behavioral therapy, and the use of medications. Initiation and retention in MAT programs has been associated with decreased all-cause and overdose mortality. Benefits of MAT are well-established; however, barriers including access to maintenance treatment limit MAT initiation in hospitalized patients. A Medication Use Evaluation (MUE) evaluating current MAT prescribing practices for patients with opioid use disorders (OUD) admitted to an inpatient psychiatric hospital revealed low rates of inpatient MAT initiation and higher unplanned health care utilization in those patients not prescribed MAT at discharge. The purpose of this study is to evaluate the impact of pharmacist-led targeted MAT patient education and subsequent communication with the treatment team on MAT prescribing practices at an inpatient psychiatric hospital.

METHODS: A prospective, single-center pharmacist-led intervention was implemented on a dual-diagnosis floor of a psychiatric hospital from January 8th, 2021 to March 23rd, 2021. Patients who were at least 18 years old with a diagnosis of OUD on admission or at discharge were included. The intervention involved a pharmacist providing education to individual patients every Tuesday and Friday afternoon. Discussion with patients include previous medication trials, medication options, barriers to obtaining MAT, and initial interest in starting MAT. This information was communicated via email to the primary care team including attending psychiatrist, resident psychiatrist, and social worker. Outcomes measured include the number of patients with previous medication history trials, initial interest in starting MAT, and number of encounters prescribed MAT during admission and upon discharge. If patients were started on MAT, continuation from home or new start was determined by pharmacy fill history, documentation in electronic health record, or by patient report.

RESULTS: In this 10-week pilot, there were a total of 23 encounters (23 unique patients) that met criteria for inclusion. Out of 23 encounters, 19 (83%) were agreeable to education. Of these, 17 (89%) have had MAT trials in the past and 19 (100%) expressed interest in starting MAT while inpatient. MAT was prescribed inpatient during 15 (68%) encounters, of which 14 (93%) were discharged with a prescription for MAT. Three of the four patients who were interested but not started on MAT while inpatient was connected to outpatient programs for intake and initiation and one was attending inpatient rehabilitation.

CONCLUSIONS: These results highlight the effectiveness of pharmacist-led education as part of the interprofessional care team to increase access to MAT for patients with OUD during psychiatric hospitalization. Further research is needed to determine the most impactful use of pharmacist in the facilitation of MAT for patients with OUD.



Tuyen Nguyen, PharmD, MPH

Tuyen is from Worthington, MN and received her PharmD and MPH degrees from the University of Minnesota. She is currently a PGY1 Pharmacy Resident at UPMC Western Psychiatric Hospital. Upon completion of her PGY1 training, she will begin her PGY2 in psychiatry pharmacy at Scripps Mercy Hospital in San Diego, CA. Her professional interests include psychosis, mood disorders, transitions of care, and working with underserved populations. Outside of pharmacy, she enjoys traveling, reading, playing musical instruments, and being outdoors.

Mentor(s): Tanya Fabian, Pharm D, PhD, BCPP and Tiffany Reid, PharmD, TTS

Impact of Pharmacy Interventions on Aseptically Compounded Medication Reissues at UPMC Shadyside Pharmacy

Patel M, Shehab I, Stout Kostka S

PURPOSE: UPMC Shadyside's Pharmacy Department experiences an overabundance of reissued aseptically compounded medications. Unplanned reissues occur often and for a multitude of reasons. These reissues can disrupt workflow and, in some cases, may turn into an urgent situation if the original dose is not available for the nurse to administer to the patient. This puts an increased turn-around time burden on the pharmacy department, which increases cost, waste, and delays pharmacy operations as well as patient care. The primary objective was to evaluate the impact of pharmacy interventions on reducing medication dose requests for targeted aseptically compounded medications.

METHODS: This was a prospective study approved by UPMC's Quality Review Committee. The top 10 antimicrobial medications formulated as an aseptically compounded and parentally administered product were included. Excluded medications were titratable/on demand medications, PRN/as needed medications, premixed medications, NIOSH/USP 800 hazardous medications, and medications supplied as non-parental and/or non-aseptically compounded. Medication request reports were ran through the Discern Reporting Portal on Cerner. Reports were ran and analyzed for 2020 to establish reissuance baseline data. Descriptive statistics will be used to evaluate the following: highest reissued medication, potential cost for each reissue, highest month requested, and categories of hospital units issuing request. Pharmacy interventions will be implemented over a course of 3 weeks, in the form of weekly nursing reissuance awareness email reminders, handouts, and weekly in-service education. Post-intervention data will be collected from 4/19/21 to 5/9/21 and will be compared to 3 arbitrary pre-intervention weeks in December 2020 (12/1/20-12/21/20).

RESULTS: Data collection and analysis is ongoing, and results will not be available at the time of abstract submission.

CONCLUSION: The results of this study will identify the most reissued parenterally administered, aseptically compounded antimicrobial, which unit(s) send the most reissues, and most importantly, the impact of pharmacy interventions on reducing medication reissues.

Presented in poster format at the 78th Annual ASHP Midyear Clinical Meeting, Virtual platform, 2020.



Megha Patel, PharmD

Megha received her Doctor of Pharmacy from University of Pittsburgh School of Pharmacy in 2020. Megha is currently completing her PGY1 Pharmacy practice residency with UPMC Shadyside. Her career interests include cardiology, critical care, and internal medicine. Upon completion of the PGY1, Megha will pursue a career in direct patient care as a clinical pharmacist.

Mentor(s): Islam Shehab, PharmD, Shayna Stout Kostka, PharmD

Optimizing medication regimens during the transition of care out of an intensive care unit

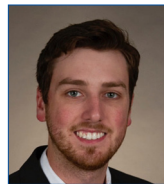
Patrick AR, Berletic JD, Miller TJ, Ganchuk S, Hansen M

PURPOSE: Many medications used in the intensive care unit (ICU) are not intended to be continued outside of the critical care environment, such as ventilator-associated pneumonia (VAP) prophylaxis, stress ulcer prophylaxis (SUP), and antipsychotics. When a patient is transferred out of the ICU to a lower level of care, these medications may not be discontinued and may be maintained on a patient's active medication list beyond when they are clinically indicated. Patients being transitioned to lower levels of care may also be able to take medications by mouth, creating an opportunity for intravenous medications to be converted to oral therapy. Additionally, antibiotic treatment durations may be finalized allowing for a stop date to be added to the order. The purpose of this study was to determine the impact a transitions of care pharmacist has on reducing the rate of inappropriately continued medication regimens, improving dosage form optimization, and increasing antimicrobial stewardship.

METHODS: Two pharmacist intervention groups were collected from weekday and weekend transfers. Patients discharged from intensive care units were assessed if they spent >24 hours in intensive care and were transferred to a lower level of inpatient care between 9/21/20 and 3/21/21. If applicable, pharmacists intervened on these patients to discontinue ICU prophylaxis/antipsychotics, change dosage forms, and enter antibiotic stop dates. Patients in the historic group were randomly selected from transfer reports between 9/21/19 and 3/21/20 and matched with intervention weekday patients by unit, gender, and age. Patients meeting criteria were assessed at the time of transition out of intensive care and identified opportunities for the aforementioned pharmacist interventions were tracked. The primary outcome of this study was rate of discontinuation of intensive care prophylaxis. Secondary outcomes were percent of transitioned patients needing dosage form optimization and percent of patients with antibiotic stop dates at the time of transition of care.

RESULTS: A total of 250 patients were assessed across the three groups. There was a 100% discontinuation rate for VAP prophylaxis, SUP, and antipsychotics in the pharmacist intervention groups. In the weekday and weekend groups, 6% and 10% of patients, respectively, had a medication that needed to be optimized post-transfer. At the time of transfer, 79.4% of patients in the weekday and 60% of patients in the weekend group on an antibiotic had a stop date ordered. The discontinuation rates in the historic group were 76.7% for VAP prophylaxis, 52.4% for SUP, and 83.3% for antipsychotics.

CONCLUSIONS: Focused pharmacist intervention during the transition out of intensive care increased ICU prophylaxis discontinuation rates to 100%. Dosage form optimization and antibiotic stop date entry were more frequently completed on weekdays than weekends. A transitions of care pharmacist may be able to increase focus on medication reconciliation at a transition of care and lead to higher rates of optimized medication regimens in patients stepping down from intensive care.



Adam Patrick, PharmD

Adam was born and raised in Pittsburgh, PA., and received his PharmD from the University of Pittsburgh School of Pharmacy. His professional interests include infectious diseases and critical care. Upon completion of his PGY-1 residency, Adam plans to pursue employment at a Pittsburgh-area hospital in a clinical role.

Mentor(s): Josef Berletic, PharmD, BCPS

Evaluating the Safety of Pharmacologic VTE Prophylaxis During Epidural-Facilitated Brachytherapy for Gynecologic Malignancy

Poblete S, Burke C, Knauss G

PURPOSE: The standard of care for women who have developed locally advanced gynecologic malignancies has progressed throughout the years. Brachytherapy via surgical implantation of a SYED Y applicator device allows for high dose radiation directly to the disease site and targets cancerous tissues sparing normal tissue that would generally be affected by external beam radiation. Epidural analgesia is often used in this patient population because of risk for pain, laceration, and delivery of radiation to the wrong site if the applicator were to dislodge. Due to high risk of VTE in these patients a one-time dose of prophylactic anticoagulation is administered. Given the scarcity of research and data with brachytherapy and anticoagulation we aim to determine whether VTE prophylaxis is safe in patients who undergo epidural-facilitated brachytherapy.

METHODS: This was a retrospective single center chart review of patients with gynecologic malignancies who received brachytherapy via surgical implantation of a SYED Y applicator device. Data was obtained from electronic records in Cerner and EPIC from January 2010 to October 2020. Patients were identified via the Department of Radiation Oncology at UPMC Magee-Womens Hospital and were included for analysis if greater than 18 years of age with a confirmed record of cervical, endometrial, or vaginal cancer diagnosis, who received brachytherapy via SYED device in conjunction with the use of an epidural. Patients were excluded if they were less than 18 years of age, did not complete a full regimen of brachytherapy, or did not receive an epidural. The primary endpoint was to assess whether a one-time dose of pharmacological VTE prophylaxis resulted in a spinal hematoma within our population.

RESULTS: Data collection and analysis are in progress.

CONCLUSIONS: The results of this study will add to current literature regarding the use of anticoagulation with epidurals and brachytherapy. The current practice of entering the anticoagulation in patients receiving epidural-facilitated brachytherapy at UPMC Magee-Womens Hospital is done via non-formulary entry, which poses an increased risk for error. We hope to implement the use of a set Powerplan for all patients receiving SYED therapy to allow for better quality and safety measures.



Samantha Poblete, PharmD

Samantha is from Buffalo, NY, where she received her PharmD from D'Youville College School of Pharmacy. She is currently a PGY-1 resident at UPMC Magee-Womens Hospital. Upon completion of her PGY-1 residency training, Samantha will continue training at Roswell Park Comprehensive Cancer Center as a PGY-2 pharmacy resident focusing in Oncology.

Mentor(s): Clayton Burke, PharmD; Ryan Rivosecchi, PharmD, BCCP; Leslie Gingo, PharmD; Sarah Taylor, MD; Sushil Beriwal, MD, MBA

UPMC Presbyterian Pharmacy Initiative to Reduce Duplicate Anticoagulation Administration

Madison Postlewaite, PharmD, MBA; Adrienne Szymkowiak, PharmD; Peg Verrico, BS Pharm, RPh

PURPOSE: Anticoagulants have been identified as a high-risk medication due to their potential to cause serious adverse drug events if not prescribed, transcribed, dispensed, administered, and monitored cautiously. The UPMC pharmacy department has used TheraDoc®, a rules-based electronic clinical surveillance system, to implement a pharmacy resident initiative on October 1st, 2019 to enable review of all duplicate anticoagulation alerts. The aim of this quality improvement project is to review the effectiveness of this initiative over the last year.

METHODS: Beginning October 1st, 2019 duplicate anticoagulation alerts generated by TheraDoc® were set up to fire to an email account for pharmacy residents to review daily, 7 days a week. At time of review, if duplicate anticoagulation is still active the resident reaches out to the patient's provider to attempt to get an inappropriate order discontinued. Interventions are documented on a shared tracking sheet and to RiskMaster if necessary.

RESULTS: A total of 349 significant alerts the year prior to initiation of this project including 269 anticoagulation drips and 80 subcutaneous anticoagulant orders reviewed. A total of 89 significant alerts were reviewed the year following initiation including 23 anticoagulation drips and 66 subcutaneous alerts. Average overlapping doses per alert was 1.15 and 0.58 for the year prior and after initiation. Average time from alert to order discontinuation was 31 hours and 4 minutes the year before project initiation and 7 hours and 53 minutes after project initiation. Average time from DOAC administration to anticoagulant discontinuation was 9 hours and 9 minutes the year before project initiation and 2 hours and 4 minutes the year after.

CONCLUSIONS: Duplicate anticoagulation was decreased significantly by daily resident review using TheraDoc® reporting. Average overlapping doses per alert were reduced by 50%. Average time to order discontinuation and time to anticoagulation infusion discontinuation was also reduced by over 75%.



Madison Postlewaite, PharmD, MBA

Madison received her PharmD and MBA at West Virginia University and is completing her second year of the PGY1/2 Health System Pharmacy. Her interests include pharmacy operations and automation. She hopes to secure a job that allows her to work cohesively with a team to provide progressive and personalized healthcare by providing informed and accessible leadership.

Mentor(s): Adrienne Szymkowiak, PharmD and Peg Verrico, BS Pharm, RPh

Cactus Sink Implementation for Secure Controlled Substance Wasting

Ray LB, Hylwa KT

PURPOSE: In August 2019, the Environmental Protection Agency updated regulations regarding hazardous controlled substance wasting which required a process change for our hospitals to meet this new requirement as well as comply with existing DEA regulations that require waste to be non-recoverable. Cactus Smart Sinks were installed near each AcuDose machine throughout both UPMC Presbyterian and Shadyside to improve efficiency by reducing the steps required to waste unused controlled substances and improve overall wasting practice compliance. The purpose of this quality improvement project is to determine nursing satisfaction and compliance with proper wasting prior to and after Cactus Sink implementation.

METHODS: Cactus Sinks were installed at both hospitals in September 2020. Nursing education was provided via email and multidisciplinary meetings. An anonymous survey was sent out to the nursing staff for feedback on this new process change in October 2020. Survey results were analyzed for nursing satisfaction, proper wasting compliance, and total steps required to properly waste controlled substances.

RESULTS: Preliminary results show an increase in nursing satisfaction by 20.2% Further results pending.

CONCLUSIONS: Pending



Lauren Ray, PharmD, MBA

Lauren received her Doctor of Pharmacy and Master of Business Administration degrees from West Virginia University. She is currently a PGY2 resident in the Health System Pharmacy Administration and Leadership (HSPAL) track at UPMC Presbyterian. Lauren is a candidate to remain at UPMC Presbyterian as a HSPAL fellow.

Mentor(s): Keith Hylwa, PharmD, MBA

Survey development to evaluate healthcare provider readiness for pharmacogenomic test results

Riden KA, Berenbrok LA, Coons JC, Empey PE

PURPOSE: Pharmacogenomics (PGx) is the study of the impact of genetic variation on drug response. Many institutions have implemented specialized PGx programs such as consult services or clinics to improve medication outcomes. Further, large-scale implementation such as the Pitt/UPMC PGx Center of Excellence and the All of Us research program plan to return PGx results to the electronic health record (EHR) and/or to participants. Our objective is to develop a survey to evaluate HCPs perceptions and attitudes towards using pharmacogenomic results already available in the EHR and to understand HCPs expectations and needs for clinical decision support.

METHODS: A literature review was conducted to capture previously published qualitative and quantitative work. Relevant studies were analyzed for their assessment domains, survey questions, and results. The Consolidated Framework for Implementation Research (CFIR) was utilized to construct the survey. CFIR domains and associated constructs were reviewed for study relevancy and selected for use. Development of survey questions was supported by the findings of the study analysis and questions were mapped to previously selected CFIR domains and constructs. The survey was piloted by the research team and members of the University of Pittsburgh PGx Center of Excellence.

RESULTS: CFIR domains selected for the survey included the "Characteristics of Individuals" and "Inner Setting". The "Characteristics of Individuals" domain will be used to evaluate the determinants of HCPs perceptions, attitudes, and expectations. The "Inner Setting" domain will be used to evaluate HCPs needs. The survey is approximately 30 questions long and expected to take participants less than 10 minutes to complete. Pharmacists, physicians, nurse practitioners, physician assistants, and nurses will be invited to participate.

CONCLUSIONS: Understanding HCPs self-efficacy, readiness, and needs involving the use of PGx test results in the EHR is needed for successful implementations beyond focused deployments. We intend to launch the survey to all HCPs at UPMC in 2021.



Katherine Riden, PharmD

Katie is from Florida, where she received her Bachelor of Science and Doctor of Pharmacy degrees from the University of Florida in 2015 and 2019, respectively. Following graduation, she worked as a community pharmacist for Walgreens in the Orlando, FL metro area. She started a two-year Clinical Pharmacogenomics fellowship at the University of Pittsburgh in 2020. She currently works on Pharmacogenomic research, implementation science, and provides clinical care for the Pharmacogenomics consult service at UPMC, PreCISE-Rx, and the UPMC Primary Care Precision Medicine clinic. She is excited for the second year of her fellowship and continuing research in pharmacogenomics.

Mentor(s): Philip Empey, PharmD, PhD; James Coons, PharmD, FCCP, BCCP; Lucas Berenbrok, PharmD, MS, BCACP

Rabbit anti-thymocyte globulin for treatment of corticosteroid refractory acute cellular rejection after lung transplantation.

Rudzik KN, Iasella CJ, Sacha LM, Rivosecchi RM, Morrell MM, McDyer JF, Moore CA

PURPOSE: Despite advances in immunosuppression and surgical techniques, overall survival following lung transplantation remains poor with 55% survival five years post-transplant. Chronic Lung Allograft Dysfunction (CLAD) is the primary cause for lung allograft failure and death after the first-year post-transplant. Acute Cellular Rejection (ACR) of grade A2 or higher is a major risk factor for the development of CLAD. First-line treatment for ACR after lung transplantation is high dose corticosteroids. When steroids fail to resolve or improve ACR episodes, rabbit anti-thymocyte globulin (rATG) is often used. However, data is lacking regarding the impact of rATG for steroid refractory ACR (rACR) after lung transplantation. The objective of this retrospective study was to evaluate the use of rATG for rACR in lung transplant recipients and define its success in improving or resolving ACR.

METHODS: Patients were included if they were 18 years of age or older, had received a single or double lung transplant as identified by ICD-CM 9 and 10 procedure codes between January 2010 and August 2019, and had received rATG after the date of initial transplantation through September 2019. rATG receipt was identified using medication charge data. Patients were included if rATG was given for acute cellular rejection as determined by chart review. The primary endpoint was the occurrence of ACR on follow-up transbronchial biopsy. Key secondary endpoints included freedom from ACR at one-year post-rATG administration, CLAD progression at one-year post-rATG administration, and all-cause mortality at one-year post-rATG administration.

RESULTS: Data analysis is ongoing.

CONCLUSIONS: Pending.



Katelyn Rudzik, PharmD

Katie was born and raised in Pittsburgh, PA and received her PharmD from the University of Pittsburgh School of Pharmacy. She is completing her PGY1 Pharmacy Residency at UPMC Presbyterian. Her professional interests include solid organ transplantation and infectious disease. Next year, Katie will stay on at UPMC Presbyterian to complete her PGY2 training in Solid Organ Transplant.

Mentor(s): Cody A. Moore, PharmD, MPH, BCPS; Carlo J. Iasella, PharmD, MPH, BCPS; Lauren M. Sacha, PharmD, BCPS; Ryan M. Rivosecchi, PharmD, BCCCP

Identifying physician barriers to the treatment of opioid use disorder in a community hospital

Sabella BA, Smith AF

PURPOSE: Opioid use disorder (OUD) affects over 10 million people in the United States. In 2018, nearly 65% of drug overdose deaths in Pennsylvania involved opioids. There are several medication-assisted treatment (MAT) options available to help manage and treat OUD as well as reduce the risk of experiencing an opioid use overdose. However, there are barriers to prescribing MAT for physicians to treat OUD effectively, including a common treatment buprenorphine, which requires prescribers to possess a DATA 2000 waiver. This quality improvement project identified physician barriers to treating OUD on medical floors in a community hospital as well as assess interest in an OUD consultation service. Based on the results of the survey, we will better understand what barriers are affecting physician comfort levels and a proposal for a new OUD consult service can be developed.

METHODS: Inclusion criteria included physicians working on medical floors at UPMC McKeesport, who were identified via a physician roster. Once identified, these physicians were emailed a survey through Qualtrics on January 1st, 2021. Results from the survey were received through January 31st, 2021 in real time and collected in an Excel data spreadsheet. Exclusion criteria included physicians in training such as residents and fellows, and physicians whose primary practice areas are the emergency department or addiction medicine unit of UPMC McKeesport. Survey entries that were not completed were not included in the results and analysis. Survey question categories included: Exclusion Criteria Rule Out, Demographics, OUD Comfort Level Assessment, DATA 2000 Waiver Assessment, OUD Barriers Assessment, and OUD Consult Service Agreeability.

RESULTS: The final analysis included 32 participants with a mean age of 50 years old (range 29-84 years) and mean years of practice of 21 years (range 1-58 years). Overall, physicians reported an average of 15 patients with OUD seen in the past year and a median OUD treatment comfort level of 2 on a scale of 1-5. Eight (25%) participants reported possession of a DATA 2000 Waiver, and 23 (95.8%) of those without a waiver reported they had no interest in receiving one. Of those with a DATA 2000 Waiver, the median comfort level reported was 3.5 on a scale of 1-5. Primary reported reasons for not wanting to obtain a DATA 2000 Waiver included not seeing enough patients with OUD and negative stigma of treating these patients. In total, 90.6% of participants reported that they would utilize an OUD consult service if it were available to them.

CONCLUSION: Based on survey results, most participating physicians at UPMC McKeesport feel uncomfortable treating OUD. The majority of participants do not have a DATA 2000 Waiver and are unable to prescribe OUD treatment such as buprenorphine. Participants who reported having a DATA 2000 Waiver had an overall higher comfort level for treating OUD. Barriers to treating OUD identified by physicians include lack of knowledge and communication among providers, negative stigma associated with OUD, and lack of resources available to successfully treat patients. If an OUD consult service were available for use in the inpatient setting, physicians would be agreeable to utilization of it based on this survey. Results also support education opportunities for UPMC McKeesport health professionals.



Brooke Sabella, PharmD

Brooke is from Pittsburgh and received her PharmD at Duquesne University School of Pharmacy with a concentration in Acute Care. She is currently completing her PGY1 pharmacy residency at UPMC McKeesport. Upon completion of her PGY1 residency, she will start her PGY2 pharmacy residency in Pain Management and Palliative Care at Summa Health in Akron, Ohio.

Mentor(s): Ashley Smith, PharmD

Quantifying the Value of Pharmacists Providing Direct Patient Care within Family Medicine Practices

Schmitz NR, Klatt P, Williams A

PURPOSE: Through collaborative relationships, pharmacists providing medication management services for chronic disease have been shown to improve outcomes such as reducing rates of emergency department visits and hospital admissions, increasing achievement of goal blood pressure, and lowering hemoglobin A1c and cholesterol. This equates to annual health care savings of \$918-\$3,556 per beneficiary. Incident-to billing allows practices to bill for evaluation and management (E/M) services provided by qualifying healthcare providers (which currently does not include pharmacists) under a physician NPI number. The purpose of this analysis was to quantify pharmacist financial value within Family Medicine practices.

METHODS: This 21-month prospective study analyzed documentation from pharmacist-led E/M encounters within family medicine practices using an extractable Epic SmartPhrase. Primary outcomes included actual levels of service billed and the determined level of incident-to service as supported by clinical documentation. Secondary outcomes included relative value units (RVUs) and characterization of pharmacist-led encounters. Outcomes were used to model sustainability as represented by encounters per day.

RESULTS: Phase 1 identified 1,032 patient encounters over a 12-month period. While all encounters were billed E/M level 1 per institutional protocol, over 99% met criteria for E/M level 3 or 4. This represents differences in reimbursement of up to \$83,761.13 and 2323.7 RVUs. If pharmacy services were billed as supported by documentation, a pharmacist's salary and benefits could be covered by conducting an average of 6.5-6.9 patient care encounters daily. When compared to exclusively billing at E/M level 1, an average of 14.7 patient care encounters would need to be conducted daily. Phase 2 (9 months additional data) results in progress.

CONCLUSIONS: When considering the complexity and duration of the patient care encounters, embedding pharmacy services in family medicine practices can be sustainable with accurate incident-to billing. However, sustainability is not achievable if pharmacy services are exclusively billed at an E/M level 1. Confirmatory results and conclusions of phase 2 pending.



Nolan Schmitz, PharmD, BCPS

Nolan Schmitz is a PGY-2 Ambulatory Care Pharmacy Resident with a Family Medicine focus at UPMC St. Margaret. He is originally from Omaha, Nebraska and earned his PharmD from the University of Kansas School of Pharmacy. He completed his PGY-1 Pharmacy Residency at UPMC St. Margaret. Nolan's professional interests include clinical service implementation, chronic disease state management, preventative medicine, and building financially sustainable practice models. Outside of pharmacy, he enjoys cheering on Nebraska Husker football, fitness, cooking, and reading.

Mentor(s): Patricia Klatt, PharmD, BCPS; Anne Williams, PharmD, BCPS

Evaluating Perceptions of The Role of the Pharmacist in Healthcare Non-governmental Organizations

Shagavah SM, Spielberger MG, Isaac J, Jonkman L, Connor S

PURPOSE: Within the global health world, non-governmental, non-profit organizations (NGOs) are essential in promoting and providing healthcare delivery, socio-economic support, and community empowerment for the populations they serve. Pharmacists' involvement in health-mission focused NGOs is rare and is less defined in this context. In this study, we aim to identify the perceptions of key NGO leaders regarding the role of pharmacists in achieving the mission of the NGO. We hope to describe the perceived value of a pharmacist at a health-related NGO from the perspective of the NGO director and the pharmacist themselves and identify factors that influence the decision to engage a pharmacist in health-related NGOs among NGOs that do or do not currently engage pharmacists.

METHODS: This qualitative research study used semi-structured interviews to illicit the perspectives of participants. Each interview, conducted remotely, was audio-recorded and transcribed verbatim. The research team then created a codebook from the data and each interview was independently coded by the primary investigator and a co-investigator. Coding discrepancies were discussed and clarified as a team. From the inductive analyses, common themes were elucidated and the most relevant identified, analyzed and integrated to provide a grounded theory fitting to the main objective of the study.

RESULTS: A total of 8 interviews have been conducted thus far representing pharmacists from 4 multinational NGOs. From the interviews, pharmacists have identified roles in administration, supply chain management and direct and indirect patient care. Specific skills and attributes that were deemed important included being adaptable and flexible, continuously learning and growing, networking within and outside of the organization, and taking responsibility for the outcomes of the NGO. Further interviews and thematic analysis are ongoing.

CONCLUSIONS: Pharmacists play a significant role in the function of health-related NGOs, particularly in the area of medicine use. This work can be further explored in order to expand the recognition of pharmacists in the area of global health.



Santon Shagavah, PharmD

Santon was born and raised in Kenya. He earned his PharmD from East Tennessee State University in 2019. He completed a PGY1 General Practice Pharmacy residency at Good Samaritan Regional Medical Center in Oregon. His areas of professional interest include providing patient care in low resource settings, global health, and chronic disease state management. Outside of pharmacy, Santon enjoys working out, watching soccer, outdoor adventures, traveling, reading autobiographies and spending time with family.

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

Evaluating the effects of a medication adherence packaging program on reducing hospitalizations and ED visits

Shope CJ, Bruno M, Aspinall M, Ruby-Scelsi CM, Naumovski J

PURPOSE: Suboptimal medication adherence, defined by Centers for Medicare and Medicaid Services as <85% of doses taken, is prevalent among older adults and can lead to serious health consequences and substantial financial burdens to the U.S. health care system. This includes increased ED visits, hospitalizations, and mortality rates. With such negative implications to patient outcomes, ways to improve medication adherence are highly pursued, such as medication synchronization and adherence packaging. Rx Partners, UPMC's long-term care pharmacy, has developed their AtHome program to focus on medication adherence packaging, synchronization, and optimization for patients who have been identified as nonadherent by the UPMC Health Plan. The purpose of this study is to show that RxPartners AtHome program improves patient outcomes through enhanced medication adherence and medication regimen optimization.

METHODS: For this retrospective cohort study, all community-residing geriatric patients (males and females of 65 years of age or greater) who were initially enrolled in Rx Partners' AtHome program between July – December 2019 were evaluated for inclusion in this study. Inclusion criteria consist of patients who had UPMC Health Plan insurance coverage during the designated period of interest and participated in the program for at least 12 months after enrollment. Retrospective chart review was conducted for all included patients for 12 months before and 12 months after their enrollment in the AtHome program, and information was collected on frequency and cause of hospitalizations/ED visits, adherence data, and pharmacist intervention frequency and nature. The primary objective was to compare hospitalization/ED visit rates before and after enrollment.

RESULTS: Final results and analyses are pending. Ninety-two patients were eligible for inclusion and followed for 12 months pre- and post-enrollment in the AtHome adherence program. Sixty patients were hospitalized in their pre-enrollment period for a total number of 146 hospitalizations. Fifty-four patients were hospitalized in their post-enrollment period, total number of hospitalizations was 126. There were 170 medication discrepancies identified and resolved for these 92 patients in the post-enrollment period through thorough medication reconciliations by Rx Partners' clinical pharmacists. Full analysis of hospitalization cause (medication-related vs. other) and adherence data is pending.

CONCLUSIONS: Results of this study will provide insight for both the AtHome pharmacists and the UPMC Health Plan regarding the potential benefit of this medication synchronization and adherence program.



Cori Shope, PharmD

Cori Shope is the PGY2 geriatric pharmacy resident at UPMC Presbyterian/Shadyside and Rx Partners LTC. She is from Sweetwater, TN and earned her PharmD at the University of Tennessee Health Science Center College of Pharmacy. Last year, she completed her PGY1 pharmacy practice residency at the University of Tennessee Medical Center in Knoxville, TN. Her professional interests include transitions of care, geriatrics, and adult primary care. Upon completion of residency, she is pursuing a career as an ambulatory care clinical specialist.

Mentor(s): Christine Ruby Scelsi, PharmD, BCPS, BCGP, FASCP; Monica Aspinall, PharmD, BCGP

Effect of Asymptomatic Bacteriuria Treatment on Post-Operative Wound Culture Sensitivities

Simpkins CA, Pickering A

PURPOSE: In surgical settings, perioperative antibiotics are routinely recommended to prevent skin flora from causing infection. However, it is not recommended to treat other potential sources of infection, like the urine. The Infectious Diseases Society of America (IDSA) specifically recommends against screening for asymptomatic bacteriuria (ABU) unless patients are pregnant or undergoing invasive urologic procedures because perioperative treatment of ABU has shown to have no effect on surgical site infection (SSI) rates. Despite evidence that treatment of ABU prior to surgery is ineffective and related to negative outcomes, patients continue to be screened and treated for ABU before non-urologic procedures. Treatment of ABU is correlated with increased rates of *Clostridium difficile* and risk of death. It is unknown how this treatment affects antibiotic susceptibility of subsequent infections. Thus, the aim of this study is to evaluate how the treatment of ABU affects the SSI antibiotic susceptibilities and long-term patient outcomes.

METHODS: A retrospective cohort study was performed that included all patients who underwent hip, knee, and spinal surgeries and subsequently developed a SSI at a community teaching hospital within the last 5 years. Patients were excluded if they experienced a symptomatic urinary tract infection (UTI) or received any antibiotic for an indication other than ABU one month prior to surgery. The primary outcomes are the susceptibility rates of bacteria in the SSI wound culture between patients who received perioperative antibiotics and those who did not. These primary outcomes were documented as the minimum inhibitory concentration (MIC) for each antibiotic on the susceptibility report in the electronic health record. The secondary outcomes include the length of stay, diagnosis of *Clostridium difficile* within 90 days of discharge, and diagnosis of UTI within one year and susceptibilities if available.

RESULTS: Complete results and analysis pending. A total of 68 patients were eligible for inclusion, and 88 unique pathogens were identified. Of the 60 gram positive pathogens, 8 were in patients who received treatment for ABU. Of the 28 gram negative pathogens, 6 were in patients who received treatment for ABU. Preliminary results show that among the pathogens that were present in both the treated and non-treated group, the MIC averages for each antibiotic did not consistently differ between the group who received perioperative antibiotics for ABU and those who did not.

CONCLUSIONS: We anticipate that there will be a trend of higher MIC averages in the patients with SSIs who were treated with perioperative antibiotics for ABU compared to those who were not treated. This would indicate a higher level of antibiotic resistance in patients who received perioperative antibiotics and add to the literature against testing and treating patients for ABU before non-urologic procedures. Avoiding testing and treatment for ABU will help prevent negative outcomes and could help decrease antibiotic resistance.



Courtney Simpkins, PharmD

Courtney Simpkins is originally from Louisville, Kentucky and completed her PharmD at the University of Kentucky. She is currently a PGY-1 pharmacy resident at UPMC St. Margaret and will stay on to complete her PGY-2 in Family Medicine/Ambulatory Care. Her professional areas of interest include global health, preventative medicine, and academia.

Mentor(s): Aaron Pickering, PharmD, BCPS

Budget Impact Analysis of a Multi-Modal Vancomycin Therapeutic Drug Monitoring Service

Simpson J, Rivosecchi R, Marini, R

PURPOSE: Vancomycin Therapeutic Drug Monitoring is a common institutional practice that aims to predict exposure within the body to adjust regimens. Literature has suggested that traditional trough-based dosing methods are in fact a poor predictor of therapeutic efficacy and therefore a shift to Area Under the Curve (AUC) dosing strategies is more appropriate. Another advantage of AUC based dosing involves a reduction in Acute Kidney Injury in patients due to more accurate prediction and tighter control of vancomycin levels. At UPMC Presbyterian, a large academic medical center, a multi-modal vancomycin therapeutic drug monitored service was implemented. This service initially began with pharmacokinetic consults with vancomycin managed pharmacists. The service expanded to include protocol ordering of MRSA Swabs and Genmark PCR's to assess if vancomycin therapy is appropriate. The purpose of this budget impact analysis is to assess the financial impact of a multi-modal, pharmacist driven, therapeutic drug monitoring service.

METHODS: The implementation of the vancomycin pharmacokinetic service was separated into a comparison of both pre- and post- service implementation. The post service implementation timeframe included the implementation of pharmacokinetic consults, MRSA Swabs ordered, and Genmark PCRs ordered. A time horizon of 6 months both pre- and post- was used to collect patient population. Cost Variables included cost of InsightRx Bayesian Software, vancomycin received per total course of therapy, pharmacist time spent on consults, nursing time for lab-draws, number of AUC or trough labs drawn, cost of MRSA Swabs ordered, and cost of Genmark PCRs ordered. Cost savings due to de-escalated or avoided vancomycin use based on the results of the MRSA Swabs or Genmark PCRs in the post implementation group. Acute Kidney Injury rates were quantified using KDIGO Criteria to account for AKI to account for any nephrotoxicity caused or avoided by implementation of the vancomycin therapeutic drug monitoring program.

RESULTS: Pending

CONCLUSIONS: Pending



Joe Simpson, PharmD

Joe is from Freehold, New Jersey and received his PharmD and MBA from Duquesne University in 2020. He is currently completing his PGY1 Pharmacy Residency at UPMC Presbyterian. His professional interests include clinical management, operations, medication safety. After this year, he will complete his PGY2 at UPMC Presbyterian as part of the Health System Pharmacy Administration and Leadership Residency Program.

Mentor(s): Rachel Marini, PharmD, BCIDP; Ryan Rivosecchi, PharmD, BCCCP

Treatment of Acute Bronchitis and Its Impact on Return Emergency Department Visits

Taylor AM, Zerfas I, Le C, Heath FR, D'Amico F, Baumgartner MA

PURPOSE: More than 47 million unnecessary antibiotics are prescribed each year. One opportunity to reduce antibiotic prescribing is treatment of acute bronchitis. Acute bronchitis primarily has a viral etiology and antibiotics are not recommended in healthy, uncomplicated adults. Despite this, studies have shown antibiotics are prescribed 60 to 70% of the time for acute bronchitis. In efforts to decrease inappropriate antibiotic use, there is a Healthcare Effectiveness Data and Information Set (HEDIS) measure which “assesses adults 18 to 64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription in which a higher rate is better”. This measure also provides high risk criteria that excludes patients from the measure. The purpose of this study was to compare hospital return rates between those who were prescribed an antibiotic versus those who were not prescribed an antibiotic for the treatment of acute bronchitis.

METHODS: A retrospective cohort study was completed evaluating patients 18 to 64 years old who presented to a community teaching hospital emergency department (ED) with acute bronchitis between January 2017 and December 2019. Patients were excluded if the ED visit resulted in an admission to the hospital. Patients who were prescribed an antibiotic for treatment of acute bronchitis were compared against patients who were not prescribed an antibiotic. The primary outcome was the rate of 30-day ED returns and hospital admissions from initial ED visit in both groups. A subgroup analysis of patients who met at least one of the HEDIS exclusion criteria was performed comparing the primary outcome of those who were and were not prescribed antibiotics. HEDIS exclusion criteria includes treatment for other bacterial infection, chronic lung disease, immunosuppression, recent antibiotic use, and prolonged duration of symptoms.

RESULTS: Of the 752 patients included, 311 (41%) were prescribed antibiotics. Baseline demographics were similar between both groups. At least one HEDIS exclusion criteria was present in 218 (70.1%) patients in antibiotic group compared to 278 (63%) patients in the no antibiotic group. Of those prescribed an antibiotic, 26 (8.4%) returned to the hospital within 30 days compared to 33 (7.5%) of patients who were not prescribed an antibiotic (odds ratio 1.13, 95% CI 0.66,1.92).

CONCLUSIONS: Prescribing antibiotics for the treatment of acute bronchitis did not provide a benefit in preventing patients returning to the hospital. Of note, over half of the patients who were not prescribed antibiotics would have qualified for treatment per the current high risk HEDIS exclusion criteria. Further evaluation is needed to determine the accuracy of the HEDIS exclusion criteria to appropriately identify high risk patients who may benefit from antibiotics for the treatment of acute bronchitis.

Presented at the Society of Teachers of Family Medicine Virtual Annual Spring Conference, May 2021.



Alexandria Taylor, PharmD

Alexandria Taylor is from Pittsburgh, Pennsylvania. She received her Doctor of Pharmacy degree from the University of Pittsburgh School of Pharmacy. Alexandria is a PGY-1 pharmacy resident and faculty development fellow at UPMC St. Margaret. After completing her PGY-1, she will continue at St. Margaret as a PGY-2 in Family Medicine. Her professional interests include chronic disease state management, population health, and addressing health disparities.

Mentor(s): Megan Baumgartner, PharmD, BCPS, F. Richard Heath, MD, Frank D'Amico, PhD

Deprescribing in Older Adults During Inpatient Psychiatric Hospitalization: Impact of Pharmacist Intervention and Interprofessional Collaboration

Temelie A, Joseph M, Gutowski M, Varon D, Sun C, Fabian TJ

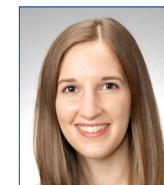
PURPOSE: Polypharmacy has been linked to several poor outcomes in geriatric patients, including increased skilled nursing facility placement, hospitalization, adverse drug events, morbidity, and mortality. While numerous studies have explored medication burden and deprescribing in older adults within the community settings, data in the inpatient psychiatric setting has been limited. This present study seeks to assess whether pharmacist intervention and interprofessional collaboration can reduce medication burden in patients 65 years or older admitted to an inpatient psychiatric hospital.

METHODS: A retrospective review was conducted to assess changes in medication burden in patients aged 65 and older who were discharged from an inpatient geriatric psychiatry unit between January 2019 and June 2019. Results of the retrospective phase (pre-intervention) were used to guide development of a pharmacist-led intervention which included provider education as well as implementation of a standardized process for pharmacist review of medication burden for geriatric psychiatry inpatients. Medication burden was assessed on admission, discharge and at weekly intervals. The post-intervention phase spanned from September 1, 2020 to March 31, 2021. Patients aged 65 years and older admitted and discharged from an inpatient geriatric psychiatry unit during the study period were included. Patients were excluded if they were emergently transferred to a medical hospital during the psychiatric hospitalization or if admission medication history was incomplete. Both phases of this study were approved by the UPMC QI Review Committee.

RESULTS: There were 134 patients included in the pre-intervention phase and 123 patients in the post-intervention phase. Standardized pharmacist review resulted in 97 unique pharmacist-initiated interventions. The majority of interventions (74%) involved non-CNS medications. Pharmacist identified interventions had high acceptance rates (86%) among prescribers. The direct intervention coupled with education provided to prescribers and members of the inpatient geriatric treatment team resulted in a statistically significant decrease in total number of medications, number of scheduled medications, number of doses per day, and number of medication administrations per day when compared to the pre-intervention cohort.

CONCLUSIONS: A pharmacist-initiated intervention resulted in a statistically significant reduction in medication burden at discharge. The most common classes of medications identified for deprescribing or optimization interventions included vitamins and atypical antipsychotics. This study highlights the impact of providing data-driven education to prescribers to target medication burden patterns identified at our institution. Additionally, implementation of a standardized pharmacist-led process to evaluate medication burden throughout the inpatient admission was an effective approach to identify opportunities for deprescribing and medication regimen optimization. Future directions include ensuring that reductions in medication burden are maintained during care transitions.

Presented At: CPNP Annual Meeting 2021



Andreea Temelie, PharmD

Andreea Temelie is currently a PGY2 Psychiatric Pharmacy Resident at UPMC Western Psychiatric Hospital. She completed her PGY1 pharmacy residency at UPMC Western Psychiatric Hospital after obtaining a bachelors in psychology from the University of Michigan and a PharmD with leadership emphasis and integrative interprofessional mental health focus from the University of Minnesota. Her professional interests include child/adolescent psychiatry, psychosis, mood disorders, underserved care, and transitions of care.

Mentor(s): Matthew Joseph, PharmD, BCPS; Marc Gutowski, PharmD; Daniel Varon, MD; Tanya J Fabian PharmD, PhD, BCPP

Comparison of bivalirudin versus unfractionated heparin in patients with cardiogenic shock requiring veno-arterial extracorporeal membrane oxygenation

Uricchio MN, Sappington P, Ramanan R, D'Aloiso B, Rivosecchi R

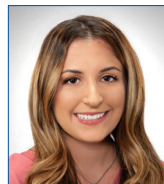
PURPOSE: The Extracorporeal Life Support Organization (ELSO) recommends the use of anticoagulation in extracorporeal membrane oxygenation (ECMO) but does not indicate a preferred agent. This study aimed to evaluate differences in bleeding and thrombotic outcomes with bivalirudin in comparison to unfractionated heparin (UFH) in patients with refractory cardiogenic shock requiring veno-arterial (VA) ECMO.

METHODS: We performed a retrospective observational study at a tertiary academic medical center. We included patients greater than 18 years of age supported with VA ECMO due to cardiogenic shock from January 2009 to February 2021. Those requiring veno-venous ECMO, VA ECMO for alternative indications, managed without anticoagulation, or transitioned between anticoagulants were excluded. Patients were separated into two groups based on anticoagulant received. A thrombotic event was defined as any thrombosis (deep vein thrombosis, pulmonary embolism, stroke, or in-circuit thrombosis) occurring during ECMO cannulation. We evaluated both major bleeding (per ELSO criteria) and blood product administration during ECMO cannulation. Time to development of thrombotic event was evaluated by performing a multivariable Cox regression. Bleeding comparisons between the groups were completed using Fisher's Exact or Mann-Whitney U, as appropriate.

RESULTS: Overall, 142 patients were included in our analysis with 53 having received bivalirudin and 89 having received UFH. Median age was 53 [IQR 40-61] years and median duration of ECMO was 92 [IQR 56-172] hours. While controlling for history of diabetes and blood product administration, bivalirudin use was independently associated with reduction in risk of thrombosis when compared to UFH (Exp(B) = 2.48, P=0.02). Patients who received bivalirudin experienced less major bleeding events (29% vs. 49%, P=0.02) with less total red blood cell and fresh frozen plasma administration (P=0.004 and P=0.045, respectively).

CONCLUSION: Bivalirudin was associated with a reduction in thrombotic and major bleeding events when compared to UFH in patients requiring VA ECMO for cardiogenic shock.

Presented at the American College of Cardiology and World Congress of Cardiology Virtual Annual Conference in the Pharmacist Poster Session, May 2020.



Marissa Uricchio, PharmD

Marissa is the current PGY2 Cardiology Pharmacy Resident at UPMC Presbyterian Hospital. She received her Doctor of Pharmacy degree from Massachusetts College of Pharmacy in Boston, Massachusetts and completed her PGY1 training at UPMC Presbyterian Hospital as well. Her professional areas of interest include advanced heart failure, mechanical circulatory support, and academia

Mentor(s): Ryan Rivosecchi, PharmD, BCCP

Evaluation of Caregivers' Perception of Pediatric Vaccinations Being Administered at a Supermarket Chain Community Pharmacy

Wasylyson E, Carroll J, Richardson R, McGivney M, Coley K

PURPOSE: Prior to the COVID-19 pandemic, community pharmacists in Pennsylvania could only vaccinate children aged 9 and older with the annual influenza vaccine under prescription or protocol. Other immunizations could only be administered to patients 18 years or older. In August of 2020, the US Department of Health and Human Services issued an amendment to their Public Readiness and Emergency Preparedness Act which allows licensed pharmacists and pharmacy interns to administer immunizations to children ages 3 through 18. This amendment allows for the administration of any childhood vaccine beyond the influenza vaccine. Since parents and guardians were previously unable to widely vaccinate their children in community pharmacies, there is a need for expanded research on this topic.

METHODS: Parents or guardians of pediatric patients, ages of 3-17, will be enrolled from three supermarket pharmacy locations in Western Pennsylvania. Locations were selected to provide a wider composition of subject demographics. Subjects will be identified for inclusion when they present to the pharmacy with a new prescription for their child who is under the age of 18. Subjects will be asked to complete a survey at prescription pick-up. Survey questions were included to gather perceptions of (1) past experience with adult vaccinations by community pharmacists, (2) attitudes toward childhood vaccinations in general, (3) perceived barriers to getting their child vaccinated, and (4) perceived facilitators to utilizing their community pharmacy for childhood vaccinations. Additionally, a question was included to survey whether parents or guardians felt that the COVID-19 Pandemic influenced their decision to have their child vaccinated in a community pharmacy. Lastly, demographic data was also collected. Descriptive statistics will be utilized to analyze the results.

PRELIMINARY RESULTS: To date, a total of 36 surveys have been completed. Almost half of the respondents state they are willing or very willing to have their child vaccinated at a pharmacy while 30% state they are unsure. Participants are more likely to bring their child for a flu vaccine as opposed to other childhood immunizations. The top 3 factors that would increase likelihood are (1) the pharmacy could give a shot during evening and weekend hours; (2) the child could get a shot in 20 minutes or less; and (3) the pharmacist knows/asks about the child's medical history. Data collection is ongoing.

IMPLICATIONS/CONCLUSIONS: The current health crisis surrounding the COVID-19 pandemic has highlighted the need for caregivers to have additional access to immunizations for their children. Locations where pediatric patients are typically vaccinated, such as doctors' offices, have limitations on the amount of people admitted into these spaces due to the pandemic. There are new opportunities for community pharmacists to provide immunizations to children ages 3-9, which expands access and may help improve pediatric vaccination rates. The implications of these findings will investigate parent/guardian comfort and willingness to utilize pharmacies as access points for immunizations while investigating factors that may increase rates.

PPA Virtual Mid-Year Conference, February 2021 and APhA Virtual Poster Hall Gallery, March 2021



Erin Wasylyson, PharmD

Erin is from Mars, PA and earned her PharmD from the University of Pittsburgh in 2020. She is the current PGY1 Community-Based Resident with the University of Pittsburgh & Giant Eagle Pharmacy. During her residency, she is working towards further developing her clinical skills as a community pharmacist while having an expanded impact on patients through a variety of outpatient services. Following residency, Erin has accepted a pharmacist position with Giant Eagle Pharmacy where she will continue to provide care to patients in the community.

Mentor(s): Joni Carroll, PharmD, BCACP, CTTS; Renee Richardson, PharmD; Melissa McGivney, PharmD, FCCP, FAPhA; Kim Coley, PharmD, FCCP

Assessing Factors for Patients' No-Show Rates in an Outpatient Family Medicine Health Center

Williams CB, Koenig M, D'Amico F, Frazier W

PURPOSE: UPMC St. Margaret New Kensington Family Health Center (NK FHC) provides primary care that includes behavioral health, medication assisted treatment for substance use disorders, social work case management, counseling, and medication management services to a primarily underserved population. Despite this, the patients' no-show rates continue to exceed 20%. The UPMC Enterprises created a tool that utilizes natural language processing and unstructured data to create a report that describes the NK FHC patient population. The current literature on no-show rates and predictor models lacks the use of social determinants, demographics, chronic diseases states, and unstructured data from electronic health records (EHR). It is also difficult to utilize the predictor models on a numerical scale. The specific aims are to: identify the patient population with high no-show rates and assess how demographics, chronic conditions and social determinants correlate with the number of ED visits, hospitalizations, and readmissions.

METHODS: Study design: point prevalence retrospective chart review utilizing UPMC Enterprises' report. Setting: UPMC St. Margaret NK FHC. Academic FHC with 13 family medicine physician residents, 4 social workers, 2 pharmacists, and 3 attending physicians. Participants: ≥18 years old, NK FHC PCP, and attended ≥1 appointment(s) between 10/1/2017 to 9/29/2020. Main Outcomes: Patients' no-show rates (%), dates of first and last visits, demographics, social determinants (lives alone, food insecurity, substance abuse, and unemployment), comorbidities, ED visits, and hospitalizations will be collected. Various descriptive statistics will be calculated from an excel sheet of data analyzed using the JMP V. 9.0 software.

RESULTS: A total of 209 patients were included. There was a higher percentage of black patients in the high no-show rate group (28%) as opposed to the low no-show rate group (10%). More patients with depression were present in the higher no-show rate group (40%) compared to the low no-show rate group (21%). A larger percentage of unemployed patients were present in the higher no-show rate group (14%) versus the low no-show rate group (9%).

CONCLUSIONS (ANTICIPATED): The preliminary results suggest that certain chronic disease states and social determinants may have a correlation with patients' no-show rates. The results could lead to the creation of a EHR tool to create a predictor score for no-shows and a multi-disciplinary program that targets patients with specific predictor scores. The program could include targeted community outreach to gain the community's trust, creation of support groups, and resource allocation.



Cassidy Williams, PharmD, BCPS

Cassidy B. Williams is from Hammond, Louisiana. She received her Doctor of Pharmacy degree from Xavier University of Louisiana College of Pharmacy. Currently, she is a UPMC St. Margaret PGY2 Ambulatory Care Family Medicine Focus Pharmacy Resident and Faculty Development Fellow. Cassidy is interested in academia, internal medicine, chronic disease state management, and psychiatry. In her free time, she enjoys spending time with family and friends, traveling, trying new activities, and sightseeing around the city.

Mentor(s): Marianne Koenig, PharmD, BCPS

Evaluation of a Phased-Approach to Early Recovery After Cardiac Surgery Protocol Implementation

Williams VL, Rivosecchi R, La Colla L, Coyan G, Subramaniam K

PURPOSE: Opioid use for the control of post-operative pain following cardiac surgery is standard practice, but contributes to increased time on mechanical ventilation, longer ICU and hospital lengths of stay, and additional financial burden. Complications and side effects of opioid analgesia (alterations in bowel function, altered mental status, respiratory depression, and significant nausea) along with potential development of dependence and/or abuse following hospital discharge is of increasing concern. To minimize the use of opioid analgesia in the post-operative period while continuing to provide adequate pain control for our patients, an Early Recovery After Cardiac Surgery (ERACS) protocol was developed by the Divisions of Cardiac Surgery and Anesthesia. This quality improvement project aims to evaluate the phased implementation of ERACS protocols and the impact of these protocols on post-operative pain control practices.

METHODS: In this retrospective review of a phased-approach to ERACS protocol implementation, pre-operative, peri-operative, and post-operative data related to medical and surgical interventions was collected from the ERACS dashboard, Society of Thoracic Surgery (STS) database, and electronic health records. The first phase of the ERACS protocol to be implemented included the addition of select pre-operative medications (gabapentin, perphenazine, and aprepitant) and intra-operative medications (ketamine, dexmedetomidine, and intravenous acetaminophen). The second phase included all interventions from phase one, with the addition of three possible analgesic pathways for intra-operative pain control: intrathecal morphine, intravenous methadone, or a spinal block with lidocaine or bupivacaine. Phase three was similar to phase two, except for the analgesic pathways which did not include the nerve block option. Outcomes related to pain scores, oral morphine equivalents (OMEs), opioid-related complications, time on mechanical ventilation, ICU and hospital lengths of stay, and cost were evaluated across phases.

RESULTS: TBD

CONCLUSIONS: TBD



Victoria Williams, PharmD

Victoria received her Doctor of Pharmacy degree from The Ohio State University in Columbus, OH. She completed her PGY1 Pharmacy Practice residency at the University of Tennessee Medical Center in Knoxville, TN. Currently, Victoria is the PGY2 Critical Care Resident at UPMC Presbyterian. Her interests within critical care include pain control, sedation practices, and management of ICU delirium.

Mentor(s): Ryan Rivosecchi, PharmD, BCCCP

Evaluation of an extended-infusion dosing strategy for cefepime in febrile neutropenia

Woodworth KG, Brenner TL, Oleksiuk LM, Trisler M, Mascara GP

PURPOSE: Patients with hematologic malignancies receiving chemotherapy are at risk of infectious complications due to prolonged neutropenia, and up to 80% develop a fever while neutropenic. At UPMC Shadyside, the preferred agent for treatment of febrile neutropenia is cefepime. The pharmacokinetic/pharmacodynamic parameter best correlated with efficacy for beta-lactams like cefepime is time above minimum inhibitory concentration, which can be optimized by increasing the intravenous infusion time. Extended infusion of beta-lactams for treatment of sepsis has been associated with reduced mortality in a meta-analysis of randomized control trials. Studies in oncology patients have shown similar time to defervescence, but higher rates of clinical treatment success for patients receiving extended infusions. Based off these data, UPMC Presbyterian-Shadyside changed from an intermittent infusion (30 minutes) to an extended infusion (3 hours) for select beta-lactams in June 2019. We evaluated the impact of extended infusion cefepime on the rate of treatment success for febrile neutropenia.

METHODS: The primary outcome of this quality improvement initiative was a composite endpoint of treatment success, which was defined as defervescence within 48 hours, resolution of signs and symptoms of infection, microbiologic cure, and absence of therapy escalation. A retrospective evaluation of patients who received cefepime for the treatment of neutropenic fever during an admission for acute leukemia induction chemotherapy or stem cell transplant conditioning chemotherapy between July 2018 and June 2020 was performed using electronic review of health records. Data included demographics, clinical and microbiological details of treatment course, and other antimicrobials received by patients while on cefepime or immediately afterward. Descriptive statistics and between-group comparisons are reported.

RESULTS: In total, 111 patients met eligibility criteria out of 389 patients with a hematologic malignancy who received cefepime during the study period. Patients were most commonly excluded because they did not receive intensive chemotherapy (n=87) or received cefepime for less than 48 hours (n=85). Baseline characteristics were similar between groups. There was no difference in treatment success [84% for 30-minute infusion (n=49) vs. 79% for 3-hour infusion (n=42), p=0.47]. Time to defervescence was also similar (median 13 hours vs. 16 hours, p=0.53). No differences were identified when patients were stratified by initial maximum temperature.

CONCLUSIONS: Extending the cefepime infusion time from 30 minutes to 3 hours did not improve rates of treatment success or decrease time to defervescence in patients with febrile neutropenia. Reasons for the lack of difference could include the small sample size and low rates of documented infections in this population.

Presented at the Hematology/Oncology Pharmacy Association Annual Conference 2021, Online + On Point, April 13-17, 2021



Katharine Woodworth, PharmD

Katie is the current PGY2 Oncology Pharmacy Resident at UPMC Shadyside Hospital. She received her Doctor of Pharmacy degree from the University of North Carolina Eshelman School of Pharmacy in 2019 and completed her PGY1 training at UPMC Presbyterian Hospital. Her clinical interests include hematologic malignancies, stem cell transplant and cellular therapies, and opportunistic infections. Upon completion of residency training, Katie will work as a Cancer Care Pharmacist at The University of Kansas Health System.

Mentor(s): Timothy L. Brenner, PharmD, BCOP; Louise-Marie Oleksiuk, PharmD, BCPS; Michael Trisler, PharmD, MPH, BCIDP; Gerard P. Mascara, PharmD, BCOP

Comparing Triptan Utilization for Acute Migraine Treatment in Members Using Prophylactic Therapies in a Commercial Population

Zegarac R, Jose A, Hospodar A, Klinefelter M, Heasley J

PURPOSE: Migraine is a common and disabling neurologic condition with significant financial and societal burdens, where annual total costs approach \$27 billion in the United States. The pain and symptoms associated with a migraine can be addressed with acute treatments, prophylactic treatments, or both. Overutilization of 5HT-1 agonists (i.e., triptans) and other acute migraine treatments can lead to rebound headaches, which makes prophylactic treatment crucial for those experiencing frequent headaches. Injectable calcitonin gene-related peptide (CGRP) receptor antagonists are a novel class of monoclonal antibodies approved for the prevention of migraine headaches. While these agents offer a unique mechanism, they are more costly than existing prophylactic therapies. There is limited data regarding the impact of prophylactic therapies on triptan use, as well as utilization and cost of migraine products, following approval of injectable CGRP receptor antagonists.

METHODS: A retrospective observational analysis was completed on prescription claims data from a cohort of a commercial population. Claims data was analyzed for a one-year study duration with a 6-month lookback period to ensure members were existing utilizers of a prophylactic therapy. Acute migraine treatment with an oral triptan was compared in three study arms: members using an oral prophylaxis agent, members using an injectable CGRP receptor antagonist, and members receiving any combination of the two. The targeted oral prophylaxis agents included divalproex sodium, topiramate, valproate sodium, propranolol, timolol, metoprolol, atenolol, nadolol, amitriptyline, or venlafaxine. The primary endpoint of the study was overall oral triptan utilization between the three groups, measured by the average number of units of oral triptans dispensed. The secondary endpoints analyzed the overall cost of migraine medications and the mean number of oral prophylaxis agents tried before starting injectable CGRP receptor antagonist monotherapy.

RESULTS: The oral prophylaxis monotherapy group had the lowest average triptan utilization of 5.14 units per utilizing member per month (PUPM). The injectable CGRP receptor antagonist monotherapy group and the combination therapy group had an average triptan utilization of 6.80 units and 6.99 PUPM, respectively (p=0.06). Average gross cost of triptans and prophylactic therapies was \$69.33 PUPM for the oral prophylaxis group, \$460.84 PUPM for the injectable CGRP receptor antagonist monotherapy group, and \$563.18 PUPM for the combination therapy group (p<0.05). The mean number of oral prophylaxis agents tried before injectable CGRP receptor antagonist monotherapy was 1.14.

CONCLUSIONS: Members receiving monotherapy with an oral prophylaxis agent had on average less triptan utilization and a lower total gross cost when compared with members receiving either monotherapy or combination therapy with an injectable CGRP receptor antagonist. Members that have progressed to injectable CGRP receptor antagonist therapy may have worse migraine burden and therefore may utilize acute treatments more frequently. Members on injectable CGRP receptor antagonist combination therapy had similar triptan utilization but an increased PUPM cost when compared with members on monotherapy. Given this data, oral prophylaxis agents remain a cost-effective and clinically appropriate option for managing chronic migraines.

Presented virtually at AMCP Annual Meeting 2021



Rachel Zegarac, PharmD

Rachel was born and raised in Cleveland, Ohio and earned her PharmD from Lake Erie College of Osteopathic Medicine School of Pharmacy in 2020. Rachel is a PGY-1 managed care pharmacy resident at CVS Health. Upon completion of her managed care residency program, she will continue at CVS Health as a clinical pharmacist in utilization management development.

Mentor(s): Abraham Jose, PharmD; Alexa Hospodar, PharmD

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Pharmacy Residency Program

Post Graduate Year 1 (PGY1)

Community Pharmacy: Rite Aid Pharmacy, Giant Eagle Pharmacy, Asti's Pharmacy
Director: Melissa Somma McGivney, PharmD, FCCP, FAPhA

Managed Care at CVS Caremark
Director: Maureen Castner, PharmD, RPh, BCGP

Managed Care at UPMC Health Plan
Director: Molly McGraw, PharmD, BCPS

Pharmacy at UPMC Chartwell Pennsylvania, LP
Director: Johanna Beznak, PharmD, BCNSP

Pharmacy at UPMC Children's Hospital of Pittsburgh
Director: Jennifer Shenk, PharmD, BCPPS

Pharmacy at UPMC Hamot
Director: Brad E. Cooper, PharmD, MBA, DPLA, FCCM

Pharmacy at UPMC Magee-Womens Hospital
Director: Julie Nowak, RPh, BCGP, FASCP

Pharmacy at UPMC McKeesport
Director: Nicole Likar, PharmD, BCPS

Pharmacy at UPMC Mercy
Director: Robert Simonelli, PharmD

Pharmacy at UPMC Presbyterian Shadyside
Director: Heather Johnson, PharmD, BCPS

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Director: Matthew Joseph, PharmD, BCPS

Pharmacy Residency Program

PGY1/PGY2 Health-System Pharmacy Administration and Leadership

UPMC Presbyterian Shadyside
Director: Alfred A. L'Altrelli, PharmD

Post Graduate Year 2 (PGY2)

Ambulatory Care at UPMC Presbyterian Shadyside
Director: Deanne Hall, PharmD, CDE, BCACP
Global Health Track Coordinators: Sharon Connor, PharmD; Lauren Jonkman, PharmD, MPH
Traditional Track Coordinator: Trisha Miller, PharmD, BCACP
Family Medicine Track Coordinator:
Stephanie Ballard, PharmD, BCPS

Ambulatory Care at UPMC St. Margaret
Director: Roberta M. Farrah PharmD, BCPS, BCACP

Cardiology at UPMC Presbyterian Shadyside
Director: James C. Coons, PharmD, FCCP, BCCP

Critical Care at UPMC Presbyterian Shadyside
Director: Pamela L. Smithburger, PharmD, MS, BCPS, BCCCP, FCCP, FCCM

Geriatrics at UPMC Rx Partners
Director: Christine Ruby-Scelsi PharmD, BCPS, FASCP

Geriatrics at UPMC St. Margaret
Director: Heather Sakely, PharmD, BCPS, BCGP

Oncology at UPMC Cancer Centers
Director: James Natale, PharmD, BCOP

Psychiatric Pharmacy at UPMC Western Psychiatric Hospital
Director: Tanya J. Fabian, PharmD, PhD, BCPP

Solid Organ Transplantation at UPMC Presbyterian Shadyside
Director: Kristine Schonder, PharmD



