RESIDENT & FELLOW RESEARCH

2025–2026

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Health Sciences
School of Pharmacy

Our Mission

The School of Pharmacy develops pharmacists and pharmaceutical scientists as innovators and leaders to improve the health and well-being of the world around us.

Through inclusive excellence, innovation, and leadership, we achieve pioneering and exemplary:

- Pharmacy and pharmaceutical sciences education,
- Research and scholarship, and
- Patient care and service.

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MESSAGE FROM THE DEAN

Dear Members of the Resident and Fellowship Class of 2026,

Thank you for your dedication and hard work this year! On behalf of the University of Pittsburgh School of Pharmacy, congratulations! You are completing a residency or fellowship program at one of the country's finest and largest programs. What an intensive year you have had—gaining practice expertise and mastering elements of teaching and research.

We are proud of your achievements. The environment created through our program provides the best that the academic and practice worlds have to offer. This excellence can only be achieved with strong collaborations between the School of Pharmacy and each of its partners. This includes the UPMC hospitals: Children's Hospital of Pittsburgh, Magee-Womens Hospital, McKeesport, Mercy, Presbyterian, Shadyside, St. Margaret, Hamot, Harrisburg, and Western Psychiatric Hospital. Additional partners include UPMC Health Plan, UPMC CarepathRx, RxPartners, Allegheny County Health Department, Pennsylvania Pharmacists Care Network, Pitt Vaccination & Health Connection Hub, CVS Caremark, Comprehensive Medication Management employee benefit program, Novartis, Indivior, and the Grace Lamsam Pharmacy Program for the Underserved.

Your commitment to learning and demonstrating clinical research and scholarship skills will serve you well during your career as you solve clinically important questions. These skills create a foundation to become tomorrow's leaders and innovators. Additionally, as alumni of our Pitt Pharmacy Residency and Fellowship Program, you will forever be a part of our collaborative alumni network. It is my sincere hope that you carry with you the rich experiences of the past year and a network of colleagues and friends as you launch the next phase of your career.

We are so proud of you! Congratulations, good luck, and keep in touch!

Amy L. Seybert, PharmD, FASHP, FCCP, CHSE
Dean and Dr. Gordon J. Vanscoy Endowed Professor of Pharmacy
University of Pittsburgh School of Pharmacy

VALUING OUR PARTNERS

The University of Pittsburgh School of Pharmacy values our partnerships. UPMC Presbyterian, UPMC Shadyside, UPMC Magee-Womens Hospital, UPMC Harrisburg, UPMC Hamot, UPMC McKeesport, UPMC Mercy, UPMC St. Margaret, UPMC Children's Hospital of Pittsburgh, and UPMC Western Psychiatric Hospital participate in our residency programs. 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 the U.S. Other valued partners include UPMC Health Plan, UPMC CarepathRx, RxPartners, and CVS Caremark. It is through these partnerships that the Residency Program has grown in national reputation.

Our pharmacy fellowship partners have also grown and include UPMC Presbyterian with our Clinical Pharmacogenomics, Infectious Diseases, Health-System Pharmacy Administration and Leadership programs. Additionally, we partner with Novartis and Indivior on Health Economics & Outcomes Research fellowships. Finally, we partner with the Pitt Vaccination & Health Connection Hub and the Pennsylvania Pharmacists Care Network for our Community Pharmacy Leadership & Research fellowship, and with the Allegheny County Health Department for our Public Health Pharmacy fellowship. Our Pitt Pharmacy fellowships include Antiretroviral Clinical Pharmacology, and Medication Safety & Pharmacovigilance.

PHARMACY RESIDENCY & FELLOWSHIP RESEARCH PROGRAM

Kim C. Coley, PharmD, FCCP
Coordinator, Pharmacy Residency and Fellowship Research Program

The Pharmacy Residency and Fellowship Research Program at the University of Pittsburgh School of Pharmacy incorporates a structured research educational series with longitudinal research support touchpoints with research experts. This approach provides a foundation for performing research and gives additional opportunities for mentorship and feedback. Within the framework of the program, residents and fellows are responsible for the completion of all aspects of their project, from conceptualization to final manuscript preparation.

The program guides resident and fellow learnings in research fundamentals including developing research ideas, human subjects research requirements, quality improvement, study design, and data management. Participants also learn to effectively communicate their project results in both verbal and written formats. Overall, the Pharmacy Residency and Fellowship Research Program contributes to the diversity of residency and fellowship training and produces well-rounded candidates eligible for a wide range of career opportunities.

I would like to thank those who have helped make this program a success through contributions to the Research Discussion Series including Ryan Rivosecchi, Joni Carroll, and Melanie Weltman. I'd also like to thank those who helped with the planning and implementation of Research Day: Pamela McCormick, Ryan Rivosecchi, Alexandria Taylor, Tiarra Gordon, Cheryl Sorensen, Chloe Spencer, Matt Mraz, Mike Grisetti, and Rhea Bowman. I would also like to thank those who volunteered to serve as session moderators and evaluators. Finally, Amy Seybert, Dean of the School of Pharmacy and Douglas Slain, Chair of the Department of Pharmacy and Therapeutics, must also be recognized for their dedication to the program.

Most importantly, this program is successful because of the diligence and commitment of our research mentors and outstanding residents and fellows!

Pharmacy technician resilience and well-being across a hospital system

Achyutuni KG, Cullen M, Temelie A, Fabian TJ

BACKGROUND: Pharmacy technicians are essential to pharmacy operations and increasingly assume expanded responsibilities. However, stress from workload, staffing shortages, limited recognition, and constrained advancement opportunities may negatively impact well-being, resilience (ability to bounce back after adverse events), patient safety, and workforce retention. This study evaluated well-being, resilience, and workplace factors influencing job satisfaction among pharmacy technicians.

METHODS: A cross-sectional survey was conducted among pharmacy technicians across three hospitals over a 10-day period. A REDCap-based survey was distributed via supervisor-shared email links. Well-being and resilience were assessed using the Mayo Clinic Well-Being Index and the Brief Resilience Scale. Additional items evaluated factors contributing to job satisfaction, dissatisfaction, and coping strategies. Data were analyzed using descriptive statistics.

RESULTS: Twenty-nine pharmacy technicians participated (mean age 33 years), with 48% having 0–3 years in their current role. Job satisfaction varied: 10.3% reported being very satisfied and 10.3% very dissatisfied, while 24.1% were satisfied, 20.6% dissatisfied, and 34.4% neutral. Low resilience was identified in 45% of respondents, while 55% demonstrated normal resilience. The most frequently reported contributors to job satisfaction were comprehensive benefits, supportive supervisors, job security, manageable workload, and flexible scheduling. Key sources of job dissatisfaction included insufficient recognition, lack of teamwork, inadequate staffing, unclear leadership direction, and monotonous tasks. Common coping mechanisms included caffeine consumption, counseling services, and supervisor support.

CONCLUSIONS: Pharmacy technicians in this hospital system demonstrated low to normal resilience and a moderate risk of impaired well-being. Job satisfaction was driven by benefits, supervisor support, job stability, workload balance, and schedule flexibility, while dissatisfaction stemmed largely from recognition, staffing, teamwork, and leadership challenges. Coping strategies centered on caffeine use and seeking professional or supervisory support. These findings will inform initiatives such as team-building efforts and expanded support resources for pharmacy technicians at UPMC.

Presented at the American Association of Psychiatric Pharmacists (AAPP) Annual Conference 2026, Seattle, WA, on April 21, 2026.

Kavya Achyutuni, PharmD

Kavya obtained her PharmD from the University of California San Francisco (UCSF) School of Pharmacy in 2024, completed her PGY1 pharmacy residency at UPMC Western Psychiatric Hospital, and is currently completing her PGY2 psychiatric pharmacy residency there. Her interests include severe mental illness, geriatric psychiatry, and substance use disorders. She enjoys coffee shops, dramas, and long walks, and plans to pursue inpatient or outpatient psychiatric practice.

Mentors: Marissa Cullen, PharmD, BCPP; Andreea Temelie, PharmD, BCPP; Tanya J. Fabian, PharmD, BCPP, PhD

Dalbavancin outcomes after inpatient treatment (DO IT): Comparing patients who use or do not use drugs

Ahrens D, Trisler MJ, Marini RV, Silveira FP, Oleksiuk LM

BACKGROUND: Dalbavancin's pharmacologic properties and growing evidence supporting its off-label use for complicated gram-positive infections make it a useful option for transitioning hospitalized patients to outpatient care. Dalbavancin may further support treatment completion in people who use drugs (PWUDs) facing barriers with prolonged intravenous or oral antibiotic therapy. This study evaluated real world use of dalbavancin to facilitate hospital discharge and compared adherence to multidose regimens and 90-day clinical outcomes between PWUD and non-PWUD.

METHODS: This was a two-site retrospective cohort study of adult patients discharged from the hospital to complete one or more outpatient doses of dalbavancin for gram-positive infections between January 2023 and December 2025. Characteristics of PWUD and non-PWUD, infection type, hospital stay and treatment, adherence and outcomes were compared using chi-square or Fisher's exact test for categorical variables, and t-test or Mann-Whitney U test for continuous variables, where applicable.

RESULTS: Among the 246 patients included in the study, 111 were PWUD and 135 were non-PWUD. Compared with non-PWUD, individuals who used drugs were more frequently treated for deep-seated infections (86/111 [77%] vs 60/135 [44%], $p < 0.001$). PWUD were also more often discharged on multidose dalbavancin regimens (84/111 [76%] vs 70/135 [52%], $p < 0.001$) but were less likely to complete these regimens (53/84 [63%] vs 61/70 [87%], $p < 0.001$). Clinical cure at 90 days was observed in 97/111 (87%) of PWUD and 107/135 (79%) of non-PWUD ($p = 0.09$). Completion of multidose regimens was strongly associated with clinical success, with lower cure rates among patients who did not complete therapy compared with those who did (28/40 [70%] vs 101/114 [89%], $p = 0.006$). This pattern held true for both PWUD (24/31 [77%] vs 50/53 [94%], $p = 0.034$) and non-PWUD (4/9 [44%] vs 51/61 [84%], $p = 0.018$). Among patients who failed to complete the multidose dalbavancin regimen for gram-positive infection (n = 38), 90-day clinical cure occurred in 9/12 (79%) of those discharged with concurrent antibiotic therapy versus 17/26 (65%) of those discharged without it ($p = 0.714$).

CONCLUSIONS: Dalbavancin was an effective agent for the treatment of gram-positive infections in our patient population. Both PWUD and non-PWUD achieved similar clinical cure rates, which were comparable to cure rates in other trials. The lower cure rates in patients who failed to complete intended multidose regimens highlight the critical importance of regimen completion and underscore the need for interventions to support adherence, particularly among PWUD.

D Ahrens, PharmD

D graduated from University of Pittsburgh with their Doctor of Pharmacy in 2025 and Bachelor of Anthropology in 2018. They also hold Associate of Art and Science degrees from Portland Community College. Currently, they attend a PGY1 acute care residency at UPMC Shadyside Hospital with plans to pursue a PGY2 in solid organ transplant. Their professional interests lie in thoracic pathologies, leukemias, and infectious diseases in immunosuppressed populations.

Mentors: Louise-Marie Oleksiuk, PharmD, BCPS; Michael Trisler, PharmD, BCIDP

Comparative effectiveness and safety of proton pump inhibitors versus histamine-2 receptor antagonists for stress ulcer prophylaxis in mechanically ventilated patients

Al-Dafaai T, Lipski M, Jones B, Racedo C

BACKGROUND: Stress ulcer prophylaxis (SUP) is commonly used in critically ill patients requiring mechanical ventilation due to increased risk of stress-related mucosal bleeding. Current Society of Critical Care Medicine guidelines recommend either proton pump inhibitors (PPIs) or histamine-2 receptor antagonists (H2RAs), though the optimal agent remains unclear. PPIs may reduce gastrointestinal bleeding risk but have been associated with increased infectious complications such as hospital-acquired pneumonia (HAP) and Clostridioides difficile infection. Institutional protocols at UPMC Hamot were updated in 2025 to favor PPIs for SUP. The objective of this study is to evaluate the comparative effectiveness and safety of PPIs versus H2RAs in mechanically ventilated intensive care unit patients.

METHODS: This retrospective cohort study included adult patients (≥18 years) admitted to the intensive care unit at UPMC Hamot between September 1, 2024, and September 1, 2025. Eligible patients required mechanical ventilation for at least 48 hours and receipt of either a PPI or H2RA for SUP. Patients were excluded if they had an upper gastrointestinal bleed on admission, received both agents during the same admission, or were not mechanically ventilated. Data collected included demographics, comorbidities, Acute Physiology and Chronic Health Evaluation II (APACHE II) scores, SUP regimen details, and concomitant medications. The primary outcome was clinically significant upper gastrointestinal bleeding (UGIB). Secondary outcomes included HAP/ventilator-associated pneumonia (VAP), 90-day mortality, and hospital and intensive care unit length of stay.

RESULTS: A total of 91 patients were included (PPI n=46; H2RA n=45). Baseline characteristics were similar between groups, including age (64±16 vs 64±15 years) and APACHE II score (27±7 vs 27±7). Clinically significant UGIB occurred in 35% of the PPI group and 20% of the H2RA group (p=0.114). HAP/VAP was significantly higher in the PPI group (76% vs 51%, p=0.013). No significant difference was observed in 90-day mortality (22% vs 29%, p=0.433). Median hospital length of stay was longer in the PPI group (19 vs 15 days, p=0.015), while ICU length of stay was similar (12 vs 9 days, p=0.091).

CONCLUSIONS: In mechanically ventilated ICU patients, PPIs were not associated with a statistically significant reduction in gastrointestinal bleeding compared to H2RAs but were associated with increased rates of pneumonia and longer hospital length of stay. These findings suggest that H2RAs may represent a safer alternative in select patients. Further prospective studies are needed to confirm these findings and guide optimal SUP selection.

Tabark Al-Dafaai, PharmD, MMS

Tabark Al-Dafaai earned her Doctor of Pharmacy degree from Lake Erie College of Osteopathic Medicine (LECOM) in Florida. She is currently completing a PGY1 Pharmacy Residency at UPMC Hamot in Erie, Pennsylvania. Her current interests are acute care and internal medicine. Following residency, she plans to pursue a clinical pharmacist position and continue involvement in research and education.

Mentors: Michelle Lipski, PharmD, BCCCP; Brooke Jones, PharmD; Carlos Racedo, MD

From static signal to longitudinal narrative: a retrospective case study of ketamine-induced cystitis using quarterly disproportionality analysis

Anderson MK, Karimzadeh I, Boyce RD, Kane-Gill SL

BACKGROUND: Ketamine is a dissociative anesthetic and non-opioid analgesic with substantial recreational misuse potential. Lower urinary tract injury, most notably ketamine-induced cystitis, is among its most clinically significant complications. However, a limitation to current publications surrounding this adverse event and others is the reliance on conventional pharmacovigilance (PV) tools, including the FDA Adverse Event Monitoring System (AEMS) Public Dashboard and openFDA for surveillance since they only provide aggregate case counts without temporal disproportionality statistics, rendering a signal's developmental history invisible to standard analysis. The objective was to conduct a temporal disproportionality analysis for ketamine-induced cystitis.

METHODS: A systematic literature review identified 82 published case reports and case series from 14 countries involving more than 2,800 patients. For the PV case study, AEMS reports (Q1 2004–Q2 2025) were analyzed using the PV Copilot, a novel tool developed at the University of Pittsburgh School of Pharmacy that generates quarterly temporal disproportionality profiles across automatically deduplicated reports. The reporting odds ratio (ROR) identified preliminary signals, subsequently refined using observed-to-expected (OE) ratio in the final analytic quarter.

RESULTS: After normalizing 131 ways that ketamine was mentioned in AEMS data to a single ingredient code, cumulative deduplicated AEMS case counts present in PV Copilot across the full analysis period were 258 ("cystitis"), 29 ("cystitis interstitial"), and 34 ("cystitis ulcerative"), with Q2 2025 RORs of 6.50 (ROR05 5.75), 15.15 (ROR05 10.52), and 1,270.15 (ROR05 857.97), respectively. Quarterly analysis revealed that the first AEMS case report predated the landmark Shahani et al. clinical case series by three years (Q2 2004 vs Q3 2007). Signal thresholds were crossed at staggered time points: Q4 2008 for "cystitis ulcerative," Q3 2009 for "cystitis," and Q4 2010 for "cystitis interstitial," spanning an 8-quarter window invisible to aggregate analysis. All three signals have been continuously significant for 59–67 consecutive quarters and remain in orders of magnitude above the detection threshold as of Q2 2025. Notably, reports of "cystitis" continue to climb, a trajectory not observed for "cystitis ulcerative" or "cystitis interstitial."

CONCLUSIONS: Quarterly temporal disproportionality analysis surfaces signal developmental arcs, differential event trajectories, and inflection point that static methods obscure. The ketamine–cystitis case demonstrates that a signal's existence and its trajectory are distinct pieces of safety information, and that current public surveillance tools capture only the former. Prospective deployment of this capability represents a concrete step toward more dynamic, contextually informed post-market drug safety surveillance.

McKenna Anderson, PharmD, MS, BS

McKenna graduated from Concordia University Wisconsin School of Pharmacy with a PharmD and MS in Natural Products Science. She is currently completing her postdoctoral fellowship at the University of Pittsburgh. She is passionate about natural products and translating research into real-world tools that ultimately improve patient outcomes. Current research explores how artificial intelligence can improve medication safety. Future research hopes to also include cannabis and other natural products.

Mentors: Sandra L. Kane-Gill, PharmD, MS, FCCM, FCCP and Richard D. Boyce, PhD

Evaluation of phosphate replacement practices during continuous veno-venous hemodialysis in ICU patients before and after protocolized phosphate replacement implementation

Bandehyazdani Z, PharmD, Dittmer A, PharmD, BCCCP, DeSilva R, MD

BACKGROUND: Hypophosphatemia is a frequent complication in critically ill patients receiving continuous veno venous hemodialysis (CVVHD), primarily due to enhanced phosphate clearance during therapy. Severe hypophosphatemia may result in clinically significant consequences, including respiratory muscle weakness and prolonged mechanical ventilation. Given these risks, timely recognition and replacement of phosphate are essential components of supportive care for patients undergoing continuous renal replacement therapy. Despite routine laboratory monitoring, phosphate replacement practices during CVVHD remain highly variable, leading to inconsistent dosing and missed opportunities for early intervention. To promote earlier and more consistent phosphate repletion, a standardized phosphate replacement PowerPlan was implemented across adult intensive care units at UPMC in Oct. 2023. The objective of this study is to evaluate phosphate replacement practices and phosphate related outcomes before and after implementation of the PowerPlan in critically ill adults receiving CVVHD.

METHODS: This retrospective quality improvement study compared adult ICU patients receiving CVVHD for at least 72 hours during a 3-month pre implementation and a 3 month post implementation of phosphate replacement PowerPlan. Data were obtained through chart review and included patient demographics, illness severity (SOFA score), baseline kidney function, CVVHD characteristics, phosphate values, and phosphate replacement practices. Primary outcomes included time from CVVHD initiation to first phosphate administration, incidence of severe hypophosphatemia (< 1.0 mg/dL), dosing frequency, route of phosphate replacement, and use of the PowerPlan versus ad hoc supplementation. Exploratory outcome included prolonged mechanical ventilation (>7 days). Pre and post implementation cohorts will be compared using descriptive and comparative statistical analyses as appropriate.

RESULTS: Data collection is complete and results are pending completion of statistical analysis.

CONCLUSIONS: Results and final conclusions are pending completion of statistical analysis. This study is expected to inform whether standardized PowerPlan-based phosphate replacement improves process consistency and safety during CVVHD in critically ill patients.

Zahra Bandehyazdani, PharmD

Zahra earned her bachelor's degree from UCLA and her PharmD from Midwestern University. She is currently completing her PGY1 year of a combined PGY1/PGY2 Health-System Pharmacy Administration and Leadership residency at UPMC. Her first year focused on acute care and next year her goal is to develop skills in streamlining pharmacy operations. After residency, Zahra aims to advance innovative therapeutics, bridge leadership gaps, and drive system-level improvements that optimize workflows, enhance interdisciplinary collaboration, and improve patient-centered care delivery.

Mentor: Alison Dittmer PharmD, BCCCP

Ironing out the details: A comparative look at intravenous iron dosing strategies

Birmingham EK, Ikoma MM, Kemling SN, Bensur JM, Koenig ME

BACKGROUND: Intravenous (IV) iron is indicated for patients with severe iron-deficiency anemia or who cannot tolerate oral iron. There are no consensus-based guidelines for dosing recommendations, prompting health systems to employ various methods. The objective of this project was to evaluate treatment success of IV iron (defined by ferritin >50 ng/mL on follow up labs) based on the dosing strategy used. The three dosing strategies evaluated were: 1. Using the Ganzoni equation 2. Using the Schrier equation and 3. Administering a standard dose of 1000mg.

METHODS: This was a quality improvement project conducted at three residency-based Family Health Centers. Patients with IV iron orders placed from July 20, 2022, to July 31, 2025, with final infusion completed by September 10, 2025, were included. Data collection was performed via retrospective chart review. Patients were excluded if they were less than 18 years old or had a diagnosis of end-stage renal disease or chronic kidney disease stage 3-4. Data collected included total dose of IV iron ordered and administered, dosing strategy used, date of birth, sex, baseline hemoglobin and ferritin, target hemoglobin used in dosing equations, indication for IV iron, date IV iron was ordered, whether a follow-up iron panel was ordered and collected, time from last infusion to follow-up labs, and ferritin upon follow-up. Analysis consisted of descriptive statistics.

RESULTS: We identified 140 patients for review. Out of 58 patients with follow up labs, 55.6% achieved ferritin >50 ng/mL in the Ganzoni equation group, 12.5% in the Schrier equation group, and 50% in the standard 1000mg group. Of the patients who received IV iron, 58/110 (52.7%) had follow up labs collected within 6 months of their final iron infusion. For average change in ferritin, patients in the Ganzoni equation group had an increase of 60.9 ng/mL, patients in the Schrier equation group had an increase of 24.9 ng/mL, and patients in the standard 1000mg group had an increase of 73.3 ng/mL.

CONCLUSIONS: These findings support the Ganzoni equation as a preferable method for dosing IV iron. This highlights the importance of individualized care, as many patients do not require maximum dosing at 1000mg and may have greater improvement in iron deficiency anemia with the use of this equation. Based on the results of this quality improvement project, current institutional IV iron dosing and monitoring protocols will be updated, and additional education for medical and pharmacy residents regarding appropriate treatment and monitoring will be provided.

Presented at UPMC Family Medicine Scholarship Day in Altoona, PA on May 15, 2026.

Emily Birmingham, PharmD

Emily received her PharmD from the University of South Carolina in Columbia, SC. She is a PGY1 resident and Faculty Development Fellow at UPMC St. Margaret. After completion of PGY1, she will complete a PGY2 in Ambulatory Care at UPMC St. Margaret. Her professional interests include academia, chronic disease management, and family medicine. Following residency, she hopes to pursue a faculty appointment or position in inpatient or outpatient family medicine.

Mentors: Marianne Koenig, PharmD, BCPS; Justine Bensur, DO

Clinical and economic outcomes of long-acting injectable versus oral pre-exposure prophylaxis among health plan members

Bodnar NA, Marr D, Modany A, Huang Y, Peasah S, Good CB

BACKGROUND: Real-world adherence to daily oral pre-exposure prophylaxis (PrEP) has been shown to be suboptimal, despite high efficacy in preventing human immunodeficiency virus (HIV) infection in controlled clinical trials. Long-acting injectable cabotegravir has demonstrated improved adherence and reduced HIV incidence; however, research evaluating its use in real-world settings remains limited. Data comparing healthcare utilization and cost outcomes between these therapies is also limited. Thus, the primary objective of this study was to compare clinical and economic outcomes between injectable and daily oral PrEP.

METHODS: This retrospective claims analysis included members aged ≥ 12 years who initiated PrEP between July 2021 and June 2024. Members from all lines of business with continuous enrollment were included, and pregnant members were excluded. Members were also excluded if they had evidence of HIV infection prior to the study period date, active hepatitis B or C infection at treatment initiation, or switched treatment groups during the study period. Two cohorts were evaluated: injectable cabotegravir (Apretude®) and daily oral PrEP (Truvada®, Descovy®, emtricitabine/tenofovir). The primary outcome was new onset HIV diagnosis, defined by new HIV diagnosis code, plus either a detectable HIV RNA viral load, or new start antiretroviral therapy post-index date. Secondary outcomes included adherence, healthcare utilization, and cost. Adherence was defined as a proportion of days covered ≥ 80% and was assessed at 3, 6, 9, and 12 months. Healthcare utilization and total cost of care were analyzed in a pre/post analysis.

RESULTS: A total of 266 members were included after matching, with 133 in each cohort. New HIV diagnoses were low and similar between groups. Adherence declined over 12 months in both cohorts but remained consistently higher among cabotegravir users. Adherence differences were significant at all time points. Healthcare utilization increased, with the injectable group experiencing a greater rise overall. Total cost of care increased in both groups, with a slightly greater increase observed in the injectable cohort after removing high-cost outliers.

CONCLUSIONS: This study demonstrated effectiveness and adherence rates consistent with previously published PrEP literature. Adherence results suggested a potential advantage of sustained medication use in the injectable group. The increase in healthcare utilization and total cost of care following initiation in both groups was driven primarily by outpatient visits and pharmacy costs, respectively.

Presented at the Academy of Managed Care Pharmacy Annual Clinical Meeting in Nashville, TN on April 15, 2025.

Nicole Bodnar, PharmD

Nicole is the current PGY1 Managed Care Pharmacy resident at UPMC Health Plan. She earned her PharmD degree from Duquesne University. Her professional interests include care management and specialty medications. Upon completion of her residency, she will pursue a clinical pharmacist role at a managed care organization.

Mentors: Ashley Modany, PharmD; David Marr, PharmD

Comparison of two transdermal buprenorphine strengths for micro-induction in patients with opioid use disorder

Breier CG, Gray VC, Bornstein AM, McCormick PJ

BACKGROUND: Micro-induction with buprenorphine, a partial mu-agonist, allows for the gradual displacement of full-agonist opioids from the mu-opioid receptor to avoid precipitated withdrawal. Transdermal (TD) buprenorphine is utilized for micro-induction due to the extended time to reach steady state and the low dose of buprenorphine when compared with typical dosing for treatment of opioid use disorder. At UPMC Mercy, there are varying dosing strategies for micro-induction with TD buprenorphine utilized; 20 mcg/hour (one patch) or 40 mcg/hour (two 20 mcg/hour patches). This study aims to evaluate the treatment of withdrawal symptoms in patients with opioid use disorder on TD buprenorphine 20 mcg/hour versus 40 mcg/hour for micro-induction, using the number of as needed clonidine doses administered within 48 hours of patch placement.

METHODS: This was a single-site, retrospective cohort study of adult patients admitted to UPMC Mercy from January 1, 2021, to July 31, 2024, who received TD buprenorphine for the purpose of buprenorphine micro-induction. Patients were excluded if they were < 18 years of age, incarcerated, admitted to the intensive care unit (ICU) for withdrawal, concomitantly treated for alcohol withdrawal, treated with TD buprenorphine for < 24 hours, administered anesthesia within 24 hours prior to or after patch placement, or if they had a documented allergy to buprenorphine. The primary outcome was the number of clonidine doses administered as needed for withdrawal symptoms as measured by the Clinical Opiate Withdrawal Scale (COWS) within 48 hours of patch placement. Secondary outcomes included cumulative as needed clonidine and buprenorphine doses, lowest and highest COWS scores documented, milligram morphine equivalents (MME) prior to and during patch placement, duration of patch placement, successful induction of buprenorphine maintenance therapy, and reasons for early termination of TD buprenorphine patch.

RESULTS: A total of 99 patients met the inclusion criteria, with 22 patients in the 20 mcg/hour group and 77 patients in the 40 mcg/hour group. The median number of as needed clonidine doses within 48 hours of patch placement was 0.5 in the 20 mcg/hour group and 0 in the 40 mcg/hour group (p=0.009).

CONCLUSIONS: Patients on 40 mcg/hour TD buprenorphine for micro-induction required fewer administrations of as needed clonidine doses for withdrawal symptoms when compared to those on 20 mcg/hour TD buprenorphine. Although this difference was statistically significant, it is not expected to correlate with a significant clinical difference, given the low rate of clonidine administrations in both groups.

Carlee Breier, PharmD

Carlee is from McMurray, Pennsylvania and received her PharmD from Duquesne University. She is currently a PGY1 acute care pharmacy resident at UPMC Mercy in Pittsburgh, PA. Following her PGY1, Carlee will be staying at UPMC Mercy to complete a PGY2 in emergency medicine. Upon completion of her PGY2, she plans to pursue a career as a clinical pharmacist in the emergency department.

Mentors: Victoria Gray, PharmD, BCPS; Abigail Bornstein, PharmD, BCPS; Pamela McCormick, PharmD, BCPS, BCEMP

Evaluation of subcutaneous octreotide on pancreatic leaks post-pancreaticoduodenectomy

Callahan FK, McGinnis CB, Gunn SR, McTee R

BACKGROUND: A Whipple procedure, or pancreaticoduodenectomy, is an operation most commonly performed for patients with malignant tumors on the pancreatic head. A complication of this surgery is the formation of a pancreatic fistula or pancreatic leakage, characterized by increased drain output containing amylase levels greater than three times the upper limit of normal at the pancreatojejunostomy site. A proposed treatment for this pancreatic leakage is administration of subcutaneous octreotide, a somatostatin analogue. The objectives of this study were to determine the efficacy and safety of subcutaneous octreotide for pancreatic leaks post-pancreaticoduodenectomy.

METHODS: This retrospective study included patients admitted to the gastrointestinal surgery service of UPMC Presbyterian who underwent pancreaticoduodenectomy between January 2015 and December 2025 and subsequently developed pancreatic leaks or fistulae that were treated with subcutaneous octreotide. Patients were excluded if they were <18 years old, received octreotide for reasons other than pancreatic leak or fistula, received doses of octreotide other than 100 mcg three times daily, received less than 6 doses of octreotide, or inability to obtain drain output. The primary outcome of this study was the change in drain output (mL) pre- and post-octreotide initiation. Secondary outcomes were drain amylase levels pre- and post-octreotide initiation and incidence of bradycardia, defined as heart rate <60. A Wilcoxon Signed-Rank test was used for the primary outcome with a p-value of 0.05 being considered statistically significant.

RESULTS: There were 690 patients identified who had received octreotide with 39 patients meeting final inclusion criteria. The most common reasons for exclusion were incorrect dose of octreotide and not having undergone a pancreaticoduodenectomy or not developing pancreatic leak or fistula. Of the 39 patients included in analysis, 56% were female and 97% were white. The median age and length of stay was 65 years (IQR: 54-75) and 11 days (IQR: 8-10), respectively. There was a nonsignificant decrease in the cumulative drain output before (132 mL, IQR: 0-220) and after (30 mL, IQR: 0-195) the initiation of octreotide, p=0.06.

CONCLUSIONS: Final conclusions are pending.

Frances (Frankie) Callahan, PharmD

Frankie received her PharmD in 2025 from the University of Pittsburgh School of Pharmacy. She is currently a PGY1 Acute Care Resident at UPMC Presbyterian. Her professional interests include critical care and emergency medicine.

Mentors: Renee McTee, PharmD, BCCCP; Cory McGinnis, PharmD, BCCCP

Evaluation of outcomes and platelet reactivity testing in patients prescribed clopidogrel following PCI with DES

Castellucci NF, Wageh J, Andrick LM, Knepper SL

BACKGROUND: Antiplatelet therapy is standard of care following percutaneous coronary intervention (PCI) with drug-eluting stents (DES), with clopidogrel being a P2Y12 inhibitor used in this setting. Platelet inhibition with clopidogrel is variable, with up to 30% of patients having a reduced response to clopidogrel therapy. Platelet reactivity unit (PRU) testing assessing response to P2Y12 inhibitors is available, though guidelines do not comment on the utilization of PRU testing. The utility of PRU test results as predictors for adverse outcomes yields mixed results in current studies. The objective of this study is to compare outcomes between patients who received and did not receive PRU testing when clopidogrel was selected for maintenance therapy post-PCI.

METHODS: This is a retrospective analysis of adult patients who underwent non-elective PCI and received clopidogrel as initial P2Y12 therapy at UPMC Harrisburg or UPMC West Shore from October 1, 2025, to December 31, 2025. Patients were identified with the SlicerDicer tool within the Epic™ software. Patients were excluded if they received elective PCI, initial P2Y12 inhibitor therapy with ticagrelor or prasugrel, pregnant patients, and incarcerated patients. Demographics, PRU test results, outcomes, and relevant past medical history were collected. The primary endpoints were all-cause mortality and a major adverse cardiovascular event (MACE) composite at 30 and 90 days post-PCI. The MACE composite consisted of nonfatal myocardial infarction (MI), nonfatal stroke, cardiovascular death due to MI, stroke, cardiac arrest, or stent thrombosis. Fisher's Exact test was used to analyze outcomes.

RESULTS: Of 155 patients identified, 27 met inclusion criteria, with 8 (29.6%) patients receiving PRU testing. The majority of exclusions were for clopidogrel indication other than PCI. Of those who received PRU testing, 2 (25%) tested as clopidogrel non-responders, which resulted in one patient being switched to an alternative P2Y12 inhibitor. All-cause mortality at 30 days occurred in 1 patient (5.3%) in the no-PRU test group and 1 patient (12.5%) in the PRU test group ($p = 0.51$). At 90 days, all-cause mortality occurred in 2 patients (10.5%) in the no-PRU test group and 2 patients (25%) of the PRU test group ($p = 0.56$). The MACE composite outcome occurred in 1 patient (5.3%) in the no-PRU test group, with no occurrences in the PRU test group ($p = 1.0$).

CONCLUSIONS: No significant difference was observed in all-cause mortality or MACE outcomes at 30 or 90 days between patients who received PRU testing and those that did not.

Nicholas Castellucci, PharmD

Nicholas Castellucci is a PGY1 pharmacy resident at UPMC Harrisburg. He received his Doctor of Pharmacy from Wingate University School of Pharmacy in Wingate, North Carolina. His clinical interests include infectious disease and cardiology. Upon residency completion, he plans to work as a clinical pharmacist at UPMC Altoona.

Mentors: Savannah Knepper, PharmD, BCPS, BCCP; John Wageh, PharmD, BCCCP; Laura Andrick, PharmD, BCCCP, FCCM

Infection-related outcomes of dalbavancin for prosthetic joint and spinal hardware infections

Courtnage KC, McCreary E, Jacobs M, Sheridan K, Greenfield AC

BACKGROUND: Prosthetic joint infections (PJIs) necessitate long-term use of intravenous antibiotics. Long-acting antibiotics, such as dalbavancin, provide a unique two-dose regimen spaced one week apart, providing an alternative to standard care outpatient parenteral antimicrobial therapy. Dalbavancin is currently only approved by the Food and Drug Administration for skin and soft tissue infections. However, dalbavancin is used off label for a variety of indications, including PJIs. At a local 250-bed community teaching hospital, patients diagnosed with PJI and spinal hardware infections often receive dalbavancin after discharge at an outpatient infectious disease clinic as continuation of care. Existing studies are limited by small sample size and low numbers of PJI and spinal hardware infection cases. The purpose of this study was to demonstrate the incidence of infection recurrence with dalbavancin for PJI and spinal hardware infection.

METHODS: This observational, multicenter retrospective cohort study included patients ≥18 years old diagnosed with a PJI or spinal hardware infection associated with identification of a gram-positive bacteria and received at least one dose of dalbavancin. Patients who received dalbavancin from January 1, 2021-December 31, 2024, were identified through a query of the outpatient infectious disease clinical infusion database. Data was collected via chart review of the electronic medical record. The primary outcome was 90-day infection incidence, defined as the need for additional antibiotics for worsening infection or the need for repeated infection-related surgical intervention after completion of the last dose of dalbavancin. Secondary outcomes included 180-day and 365-day infection incidence and 90-day inpatient re-admission.

RESULTS: During the study period, there were 79 patients included who were treated for a PJI or spinal hardware infection in the outpatient infectious disease clinic and received dalbavancin. The most common site of infection was total knee arthroplasty (27%). 60% of the population retained their hardware. The incidence of infection at 90 days was 8 patients (10%). 3 patients (4%) had infection recurrence with the same organism at 90 days. 2 patients (3%) had 180-day infection recurrence, 1 patient (1%) had 365-day infection recurrence, and 6 patients (8%) had an inpatient readmission within 90 days.

CONCLUSIONS: In the study population, dalbavancin was associated with a low incidence of infection recurrence. This study supports the use of dalbavancin for PJIs and spinal hardware infections, particularly with removal of prosthetic hardware. Future research can focus on comparing infection recurrence with standard care antibiotics.

Presented at Society of Teachers of Family Medicine in New Orleans, LA on May 4, 2026.

Keri Courtnage, PharmD

Keri received her PharmD from the University of Pittsburgh School of Pharmacy. She is a PGY1 Pharmacy Resident and a Faculty Development Fellow at UPMC St. Margaret. After completion of PGY1, she will complete a PGY2 in Ambulatory Care at UPMC St. Margaret. Her clinical interests include ambulatory care, diabetes management, and transitions of care. Following residency, she hopes to pursue a position in inpatient or outpatient family medicine.

Mentors: Adam Greenfield, PharmD, BCIDP; Erin McCreary, PharmD, BCPS, BCIDP; Micah Jacobs, MD; Kathleen Sheridan, DO

Post-graduate year 1 pharmacy residency program directors' perceptions of time-off policies: A national survey

Cox RC, Grimes AE, Taylor AM

BACKGROUND: Current ASHP pharmacy residency program standards limit pharmacy residents' time away from their program to 37 days per 52-week period, though there is little additional guidance on how programs should structure time away. Additionally, limited published data describe typical time-off policies or average amounts of leave offered to pharmacy residents. The purpose of this study is to evaluate residency program directors' (RPDs') perceptions of their time-away policies and compare these perceptions with averages reported in the survey.

METHODS: Eligible RPDs of accredited PGY1 pharmacy practice programs in the United States were identified through the ASHP residency directory and email contacts collected from program websites. A 15-question survey (covering time-off policies, perceptions, and demographics) was piloted, revised, and distributed electronically via Qualtrics®. Managed care, community-based, ambulatory care programs, and programs in U.S. territories or minor islands were excluded. Identified RPDs were contacted 3 separate times over the course of 6 weeks with an invitation to complete the survey. Responses with 0% survey completion along with responses flagged as duplicates were removed from analysis. Responses are being analyzed using descriptive statistics to calculate averages and compare perceptions.

RESULTS: In the fall of 2025, 337 of 1085 RPDs completed the survey. Residents are allotted an average of 21.74 days of paid time off (PTO). For RPDs who chose "below average" as their perception, 100% (n=5) were correct. Among RPDs who chose "above average," 51.3% (n=115) were correct. However, among RPDs who chose "average" as their perception, 61.2% (n=201) were incorrect, with their programs offering less than 21 days of PTO.

CONCLUSIONS: This study establishes baseline data on current practices and perspectives that may inform programs about variability in pharmacy resident paid time off, supporting future discussions on resident wellness, workforce sustainability, and the alignment of pharmacy training with residency standards.

Rebekah Cox, PharmD

Rebekah is a PGY1 pharmacy resident and first-year Faculty Development Fellow at UPMC St. Margaret. She received both her Bachelor of Science degree and her Doctor of Pharmacy degree from Ohio Northern University, Raabe College of Pharmacy, in Ada, Ohio. Her professional interests include geriatrics, transitions of care, and chronic disease state management. This upcoming year, Rebekah plans to continue her training as a PGY2 Geriatrics Pharmacy Resident at UPMC St. Margaret.

Mentors: Alexandria Taylor, PharmD, BCPS; Amy Grimes, PharmD, BCGP

Comparison of contrast reaction incidence based on compliance with a 4-hour pretreatment regimen

Cynkar AC, Ankney EJ, Snyder BR, McCormick PJ

BACKGROUND: Adverse reactions to iodinated contrast media are a clinically significant concern, particularly in patients with prior documented allergic reactions. Premedication with corticosteroids and antihistamines are routinely recommended to reduce the risk of allergic reactions. In emergent scenarios, accelerated premedication protocols are used to avoid delays in critical imaging. Prior studies demonstrated that premedication does not eliminate breakthrough reactions but appears to mitigate risk without delaying critical imaging. This study aims to compare contrast reaction incidence between standard 4-hour and expedited (<4-hour) premedication strategies in patients with documented contrast allergies.

METHODS: This single-center, IRB-approved retrospective cohort study included adults with documented contrast allergies who received urgent premedication and intravenous iodinated contrast from January 1, 2020, to August 31, 2025. Patients were excluded if they were incarcerated, treated with corticosteroids for other indications, prescribed but not given corticosteroids, or if they did not undergo contrasted CT imaging. The primary outcome was the incidence of allergic reactions. Secondary outcomes included reaction type, treatment, timing, diphenhydramine and corticosteroid administration, additional steroids after contrast administration, and hyperglycemia.

RESULTS: A total of 220 patients were included, with 183 in the expedited group and 37 in the standard 4-hour group. There was no significant difference in incidence of allergic reactions between the groups, and the overall incidence was low (2.2% vs 2.7%, p=1.000). Most reactions were mild, occurring in 1.6% of patients in the expedited group and 2.7% in the standard group. One moderate reaction occurred in the expedited group, with none in the standard group (p=1.000). All patients who experienced reactions received treatment with diphenhydramine (1.6% vs 2.7%, p=1.000). Additional steroid doses after contrast administration were uncommon and did not differ significantly between groups (15.8% vs 3.8%, p=0.645), with the number of extra doses ranging from 1 to 18 doses. Hyperglycemia following steroid administration occurred in 11.5% of patients in the expedited group and 5.4% in the standard group (p=0.538), with no statistically significant difference observed.

CONCLUSIONS: Expedited premedication was associated with similarly low rates of allergic reactions compared to the standard 4-hour protocol, with no significant differences in reaction severity. These findings suggest that shorter premedication regimens may be a safe option in emergent settings when delays in imaging may delay a critical diagnosis. Adoption of expedited protocols could help optimize workflow without compromising patient safety.

Ashley Cynkar, PharmD

Ashley is from Pittsburgh, Pennsylvania and received her PharmD from the Duquesne University School of Pharmacy in 2025. She is currently a PGY1 pharmacy resident at UPMC Mercy. Ashley's professional interests include solid organ transplant and academia. Upon completion of her PGY1 residency, she will pursue a PGY2 in Solid Organ Transplant at UC Health-University of Cincinnati Medical Center.

Mentors: Emily Ankney, PharmD, BCCCP, BCEMP; Brett Snyder, PharmD, BCEMP; Pamela McCormick, PharmD, BCPS, BCEMP

A retrospective analysis of patient characteristics prolonging the interaction between DOACs and heparin anti-Xa assays

Davis BR, Dittmer A, Sullinger D

BACKGROUND: Direct-acting Oral Anticoagulants (DOACs) interact with unfractionated heparin anti-Xa lab assays, which can lead to falsely elevated anti-Xa levels. These levels are unable to be utilized to quantify heparin for therapeutic drug monitoring. UPMC has implemented DOAC interference order sets for heparin drips intending to avoid misinterpretation of anti-Xa results for patients that have been on a DOAC within the previous 72 hours. Heparin in these order sets is not titrated during the first 72 hours post order set initiation, as this reflects the predicted time of interference with the anti-Xa assay based on DOAC excretion time. Common patient-specific characteristics that can prolong time to excretion of DOACs include renal impairment, hepatic impairment, low BMI, and drug-drug interactions. The aim of this study is to assess the correlation between these characteristics and an anti-Xa level >1.1, the maximum threshold of the assay, at 72 hours. A secondary aim is to explore how anti-Xa levels >1.1 at 72 hours are being addressed at UPMC Presbyterian Hospital.

METHODS: This retrospective review was a single-site cohort study. All patients with a DOAC interference heparin drip order set initiated between October 31st, 2024, and October 31st, 2025, were considered for inclusion. Patients were excluded if they received heparin for less than 72 hours or had no record of potential DOAC administration within 72 hours of order set initiation. The primary endpoints included association of anti-Xa level at 72 hours with DOAC drug interactions, BMI, AKI stage, CKD classification, and presence of liver impairment. The secondary endpoint was the adjustment in the heparin plan for patients with anti-Xa >1.1 at 72 hours as determined by chart review.

RESULTS: Data analysis is currently pending review.

CONCLUSION: Final conclusions pending data analysis review.

Brittany Davis, PharmD

Brittany is a PGY1 Health-System Pharmacy Administration and Leadership (HSPAL) resident at UPMC Presbyterian. She received her PharmD from the West Virginia University School of Pharmacy. Her current professional interests include pharmacy operations, informatics, and medication safety. Following completion of her first residency year, Brittany will remain at UPMC Presbyterian for the PGY2 HSPAL residency year.

Mentors: Alison Dittmer, PharmD, BCCCP; Danine Sullinger, PharmD, BCCP

Cost-effectiveness of calcitonin gene-related peptide monoclonal antibodies for chronic migraine prevention in U.S. adults

Do S, Chan C, Erb S, Suh K

BACKGROUND: Migraine is a chronic, disabling neurological condition affecting an estimated 15.9% of U.S. adults and is the second leading cause of disability worldwide. A 2024 American Headache Society position statement includes calcitonin gene-related peptide (CGRP)-targeting therapies as first-line for migraine prevention. The goal of this study was to evaluate the cost-effectiveness of CGRP monoclonal antibodies (eptinezumab, erenumab, fremanezumab, and galcanezumab) for migraine prevention in patients with chronic migraine from a U.S. payer perspective.

METHODS: A Markov model with monthly cycles and a 10-year time horizon was designed to compare CGRP monoclonal antibodies against best supportive care. The model included on- and off-treatment health states, each having a distribution of migraine-free, mild, moderate, and severe days, plus death. A published network meta-analysis of randomized controlled trials was used to derive transition probabilities and monthly migraine days for each health state. Monthly migraine days were used to estimate quality-adjusted life years (QALY), and adverse events were applied as disutility values. Drug acquisition and health state costs were estimated in 2025 U.S. dollars. Both costs and utilities were discounted at 3% annually. Incremental cost-effectiveness ratios (ICERs) were calculated, and changes in migraine-free days were assessed. Probabilistic and one-way sensitivity analyses assessed the robustness of results. Scenario analyses accounting for a societal perspective and the clinical effect of CGRP mAbs on migraine severity distribution were conducted.

RESULTS: Compared with best supportive care, none of the CGRP monoclonal antibodies were cost-effective at a willingness-to-pay threshold of $100,000 per QALY gained. Eptinezumab, erenumab, fremanezumab, and galcanezumab resulted in ICERs of $239,120, $260,398, $118,808, and $332,244 per QALY gained, respectively. Fremanezumab resulted in the lowest total cost ($52,519) and lowest QALY (6.44) while galcanezumab had the highest total costs ($74,525) and highest QALY (6.47). Migraine-free days gained versus best supportive care were 81.2, 84.5, 68.9, and 98.8 for eptinezumab, erenumab, fremanezumab, and galcanezumab, respectively.

CONCLUSIONS: At current prices, CGRP monoclonal antibodies were not cost-effective compared with best supportive care from a U.S. payer perspective. These findings may inform payer decision-making regarding coverage and reimbursement for chronic migraine prevention.

Presented at the ISPOR 2026 Annual Meeting in Philadelphia, PA on May 19, 2026.

Steven Do, PharmD

Steven received his bachelor's degree and Doctor of Pharmacy from University of Wisconsin — Madison. He is a Health Economics and Outcomes Research (HEOR) Fellow at the University of Pittsburgh and UPMC Health Plan. His professional interests include real-world evidence generation, economic modeling, and value-based contracting in respiratory, oncology, and cardiometabolic disorders. After completing this fellowship, he hopes to lead HEOR teams in the pharmaceutical industry.

Mentor: Kangho Suh, PharmD, PhD, MS

Patient-directed education with pharmacist outreach to promote proton pump inhibitor deprescribing in older adults

Fasth LM, Yuan DT, Grimes AE, Sakely HA

BACKGROUND: Proton Pump Inhibitors (PPIs) are commonly prescribed medications for upper gastrointestinal disorders, yet 70% of patients taking a PPI lack a clear indication for use. Effective strategies to increase deprescribing include patient-directed education and pharmacist-led interventions including direct patient outreach. However, the combined intervention of patient-directed education and pharmacist outreach for PPI deprescribing has been understudied. This project aimed to quantify PPI deprescribing rates after a patient-directed education and pharmacist outreach intervention in older adults.

METHODS: This quality improvement project was conducted at two outpatient geriatric primary care clinics. Patients included in the study were community-dwelling patients ≥ 65 years of age seen at one of the clinics within the last year for primary care and taking a prescribed PPI. Patients with an indication for continued PPI therapy were excluded. Patients in the intervention group received a patient-directed educational brochure on PPI deprescribing and a phone call from a pharmacist ahead of their PCP appointment. Patients in the control group received the current standard of care. The primary outcome was PPI deprescribing measured at the end of an 8-week period. Secondary outcomes included utilization of histamine-2 receptor antagonists and incidence of gastrointestinal bleeding. Study data was analyzed using basic statistical measures.

RESULTS: A total of 86 patients across both clinics took a prescribed PPI. Of this population, 43 patients did not have a compelling indication for PPI continuation. Baseline characteristics were similar between the intervention (n=18, mean age 79, 83% female) and control (n=25, mean age 81, 84% female) groups, with most patients taking ≥ 5 medications at baseline. The mean duration of PPI use in both groups was 8 years, with ≤ 25% of patients with a prior deprescribing attempt. At 8 weeks, zero (0%) patients in the control group achieved PPI deprescribing compared to 10 (67%) of patients in the intervention group. No incidence of gastrointestinal bleeding was seen among patients in either group. Of the patients who deprescribed their PPI, 7 (70%) started a histamine-2 receptor antagonist or antacid.

CONCLUSIONS: Pharmacists promote deprescribing PPIs in primary care through patient eligibility screenings, patient education, and direct outreach. In addition, this study examines the efficacy of patient-directed educational brochures as a teaching tool in an older adult population. Future research should assess the efficacy of this combined intervention with high-risk medication classes, including benzodiazepines and sedative-hypnotics.

Presented at the American Geriatrics Society 2026 Virtual Annual Meeting on April 30, 2026.

Lauren Fasth, PharmD

Lauren is a PGY2 Geriatrics Pharmacy Resident and second-year Faculty Development Fellow at UPMC St. Margaret. She previously completed her PGY1 Pharmacy Residency at UPMC St. Margaret. She is from Charlotte, NC and earned her PharmD from the University of North Carolina at Chapel Hill. Her clinical interests include deprescribing and osteoporosis. After completion of her PGY2 program, she will work in consulting pharmacy specializing in deprescribing and falls prevention.

Mentors: Heather Sakely, PharmD, BCPS, BCGP, AGSF; Amy Grimes, PharmD, BCPS, BCGP; David Yuan, MD

Evaluation of bleeding outcomes in patients receiving concurrent apixaban and triazole antifungal therapy

Foulkrod NK, Moore CA, Iasella CJ, Ezigbo UG, Groetzinger LM

BACKGROUND: Apixaban is a CYP3A4 substrate that has reduced drug metabolism when taken with CYP3A4 and P-glycoprotein (P-gp) inhibitors, increasing apixaban concentration. Manufacturer dosing recommendations for apixaban include dose reductions when taken concurrently with posaconazole, a strong CYP3A4 and P-gp inhibitor, to mitigate bleeding risk. However, defined dose reductions do not exist for concurrent administration with voriconazole, a strong CYP3A4 inhibitor without P-gp activity, or isavuconazonium, a moderate CYP3A4 and P-gp inhibitor, leading to variation in dosing strategies. The objective of this study was to evaluate the occurrence of bleeding and thrombotic outcomes in patients taking apixaban with either voriconazole, posaconazole, or isavuconazonium after the initiation of concurrent therapy.

METHODS: This was an IRB-approved, retrospective study to evaluate patients on a triazole antifungal and apixaban between January 2018 and October 2025 at UPMC Presbyterian Hospital. Patients were included if they received at least 24 hours of concurrent apixaban and either voriconazole, posaconazole, or isavuconazonium. The primary endpoint was the occurrence of any bleeding event as defined by the International Society of Thrombosis and Hemostasis (ISTH), which includes fatal bleeding, symptomatic bleeding in a critical area or organ, bleeding that causes a fall in hemoglobin level of 2 g/dL or more, or leading to transfusion of two or more units of blood. Patients were evaluated for up to 90 days after the initiation of concurrent therapy or until one medication was discontinued. Chart review utilized both inpatient and outpatient records for the duration of therapy or inclusion. Secondary endpoints included the occurrence of thrombotic outcomes (venous thromboembolism or stroke), receipt of reversal agents, and time to bleed event.

RESULTS: Data analysis is currently ongoing. On preliminary analysis, 170 patients were included with n=103 receiving voriconazole, n=44 receiving isavuconazonium, and n=23 receiving posaconazole. In total, there were 23 (13.5%) total bleeding events. Of which, 8 (4.7%) patients met the criteria for a major bleed and 15 (8.8%) were minor bleeds.

CONCLUSIONS: Final conclusions are pending. Results of this study will provide insight into the rates of bleeding and thrombotic outcomes in patients taking apixaban with three different triazole antifungals, with the goal of developing a better understanding of the impact of CYP and P-gp enzyme inhibition on clinical outcomes with apixaban therapy.

Nicole Foulkrod, PharmD, MSBE

Nicole received her Doctor of Pharmacy and Master of Science in Biomedical Ethics from Lake Erie College of Osteopathic Medicine School of Pharmacy in Erie, PA. She is a current PGY1 Acute Care Resident at UPMC Presbyterian. Her clinical interests include cardiology and transitions of care.

Mentors: Lara Groetzinger, PharmD, BCCCP; Cody Moore, PharmD, MPH, BCTXP, BCPS; Carlo Iasella, PharmD, MPH, BCTXP, BCPS

Decreasing polypharmacy in patients with trauma and behavioral disorders

Freisen J, Clark C, Temelie A, Fabian TJ, Bender D

BACKGROUND: Pediatric patients with trauma and behavioral disorders are a vulnerable patient population at risk for polypharmacy. A medication use evaluation (MUE) was done at a psychiatric hospital to describe prescribing trends of medications used in pediatric patients and to evaluate alignment with available evidence for use. The most common diagnosis associated with the use of treatments with limited evidence was PTSD, and the most common medications used with limited evidence were antipsychotics and mood stabilizers. On admission, 26.3% (n=107) of patients were prescribed medications that did not align with available evidence for treatment, and 88% (n=94) of those patients had potential deprescribing opportunities identified. The results were discussed with unit attending physicians at the time of project completion. This project aims to implement a pharmacist-led intervention process to deprescribe medications with limited evidence for use in pediatric patients with trauma or behavioral disturbances.

METHODS: This is a prospective quality improvement study of pediatric patients admitted to an inpatient psychiatric hospital between 2/1/2026 and 4/30/2026. Patients were eligible for inclusion in the study if they were under 18 years old, admitted to prespecified pediatric inpatient units, and prescribed an antipsychotic or mood stabilizer on admission as continuation of their home medication regimen. Patients were excluded if the only antipsychotic prescribed was an as needed medication for agitation. Patients were identified by pharmacist review on designated units and chart review was performed to determine indications for prescribed antipsychotics and mood stabilizers. If these medications were determined to not have an FDA approved indication or literature evidence for use, the inpatient physicians were notified of a potential deprescribing opportunity via email. Baseline demographic information and inpatient encounter information were collected. The primary outcome is the rate of medication discontinuation in patients who were identified as deprescribing candidates. Secondary outcomes include descriptive statistics for antipsychotic and mood stabilizer agents and associated indications for all patients screened.

RESULTS: Full results, including demographic information, deprescribing rates, and descriptions of antipsychotic and mood stabilizer use in all patients screened, to follow.

CONCLUSIONS: Full conclusions to follow. Results from this quality improvement project will show the outcomes of a pharmacist initiated deprescribing process in pediatric patients who are prescribing antipsychotics and mood stabilizers with limited evidence for use. The results will also provide insight into the usage of antipsychotics and mood stabilizers and their associated indications in pediatric patients admitted to an acute psychiatric hospital.

Juliana Freisen, PharmD

Juliana obtained her PharmD from the University of Southern California School of Pharmacy in 2025. She is the PGY1 pharmacy resident at UPMC Western Psychiatric Hospital and plans to pursue her PGY2 training in psychiatric pharmacy at UPMC Western Psychiatric Hospital. Her professional interests include pediatric psychiatry, severe mental illness, and substance use disorders. Outside of work, Juliana enjoys taking her pet dog on hikes, going to yoga classes, and exploring Pittsburgh.

Mentors: Christine Clark, PharmD, BCPP; Andreea Temelie, PharmD, BCPP; Tanya Fabian, PharmD, PhD, BCPP; Daniel Bender, DO

Antithymocyte globulin dose capping due to body weight and risk of rejection after kidney transplant

Georgiades L, Tevar A, Shimko K

BACKGROUND: UPMC Presbyterian Hospital protocol for administration of antithymocyte globulin (ATG) induction immunosuppression following kidney transplantation is a cumulative dose between 5-6mg/kg based on actual body weight, not exceeding 600mg. This study sought to evaluate if patients who receive a cumulative ATG dose <5 mg/kg due to body weight–based dose capping have an increased risk of rejection or other adverse events.

METHODS: Patients weighing >120 kg who received a kidney transplant between 2022–2025 were screened for inclusion. Patients were excluded from the primary outcome analysis if they did not have a biopsy within the study period. Patients were stratified based on the number of ATG doses received: 4 doses (<5 mg/kg) due to weight-based capping versus 5 doses (≥5 mg/kg). The primary outcome was biopsy-proven acute rejection (BPAR) within 6 months after transplant. Secondary outcomes included delayed graft function, median white blood cell (WBC) and platelet count between 3-6 months after transplant, and BK, CMV, or EBV viremia within the study period.

RESULTS: 22 patients were included, 8 of which received 5 ATG doses. Patients in the 5-dose group had significantly higher body weight (134 kg vs 122 kg, p=0.005) and received a significantly higher median cumulative ATG dose (5.5 mg/kg vs 4.9 mg/kg, p=0.002). 17 patients had a biopsy within 6 months after transplant, 4 of which received 5 ATG doses. There was no difference in BPAR between the 4- and 5-dose groups (17.6% vs 5.9%, p=1). WBC and platelet counts were similar in the 4 and 5-dose groups between 3-6 months post-transplant (4.85 109/L vs. 4.83 109/L, p=0.86 and 218 109/L vs. 237 109/L, p=0.66). No difference was found in delayed graft function (4-dose: 21% vs. 5-dose: 25%, p=1). Additionally, between the 4 and 5- dose groups, there was no difference in the incidence of CMV (0% vs 13%, p=0.36), EBV (7% vs. 0%, p=1), or BK (43% vs. 13%, p=0.2) viremia.

CONCLUSIONS: In this small cohort of kidney transplant recipients weighing >120 kg, a cumulative ATG dose <5 mg/kg was not associated with higher rates of rejection or adverse outcomes. These findings support that supplemental ATG dosing can be guided by patient-specific risk factors in this population.

To be presented at American Transplant Congress in Boston, MA on June 20, 2026.

Leah Georgiades, PharmD

Leah is a graduate of The Ohio State University College of Pharmacy in Columbus, OH. She completed a PGY1 acute care residency at UPMC Presbyterian, where she is currently a PGY2 solid organ transplant resident. An additional area of clinical interest includes infectious diseases. She is looking forward to starting a role specializing in lung transplant at Cleveland Clinic after residency.

Mentor: Kristen Shinko, PharmD, BCTXP

Intravenous fluid shortage impact on post-operative acute kidney injury

Gonsalves MS, McCormick PJ, Pursglove ML

BACKGROUND: Perioperative intravenous (IV) fluids are used to maintain hemodynamic stability and renal perfusion; however, both restrictive and liberal fluid strategies may contribute to adverse outcomes. Acute kidney injury (AKI) is a common perioperative complication associated with increased morbidity, mortality, length of stay, and healthcare costs. In September 2024, a nationwide IV fluid shortage prompted restrictive use of perioperative IV fluids and emphasized oral hydration strategies. Prior studies evaluating IV fluid restriction and AKI have shown conflicting results and are largely limited to procedure-specific populations. The objective of this study was to assess the impact of a perioperative IV fluid–sparing strategy on postoperative AKI incidence in a heterogeneous surgical population.

METHODS: This was a retrospective chart review of adult patients admitted to UPMC Mercy one day prior to a non-emergent surgical procedure. Patients given pre-operative IV fluids during the pre-shortage period (April 24, 2024–September 24, 2024) were compared with those that did not receive pre-operative IV fluids during the IV fluid shortage period (October 24, 2024–April 24, 2025). Patients were excluded if they were incarcerated, undergoing urgent or time-critical surgery, treated for septic shock or burns, had a urologic procedure, had preoperative AKI or dialysis dependence, or lacked serum creatinine values. The primary outcome was postoperative AKI (serum creatinine increase ≥0.3 mg/dL or ≥50%) within 48 hours. Secondary outcomes included AKI resolution (return of serum creatinine to admission baseline prior to discharge), perioperative fluid and blood product volume, intra-operative and postoperative hypotension and pressor requirements, post-operative diuretic use, length of stay, and in-hospital mortality.

RESULTS: A total of 734 patients were reviewed, and 216 met the inclusion criteria. AKI occurred in 5 of 105 patients in the pre-shortage group and in 6 of 111 patients in the shortage group (4.8% vs. 5.4%; p=0.830). There was no significant difference in resolution of AKI (p=1.000), incidence of intra-operative (p=0.243) and post-operative hypotension (p=0.438), number of push dose pressors (p=0.276), post-operative diuretic use (p=0.486), length of stay (p=0.610), or in-hospital mortality (p=1.000). Patients in the pre-shortage group had significantly larger quantities of perioperative IV fluids and blood products administered (p<0.001) and higher intra-operative pressor infusions requirements (p=0.004).

CONCLUSIONS: A perioperative IV fluid–sparing strategy was not associated with differences in postoperative AKI or secondary clinical outcomes in this heterogeneous surgical cohort. These findings suggest that restrictive perioperative fluid management does not increase AKI risk and may be safely implemented in perioperative care.

Michelle Gonsalves, PharmD

Michelle is from Muscat, Oman and graduated from the University of Pittsburgh School of Pharmacy in Pittsburgh, Pennsylvania. She is currently a PGY1 pharmacy resident at UPMC Mercy Hospital. Her professional interests include ambulatory care and chronic disease management, and she will continue her training with the PGY2 Ambulatory Care Residency at UPMC Shadyside Family Health Center. She plans to practice as an ambulatory care clinical pharmacist following residency training.

Mentors: Marci Pursglove, PharmD; Pamela McCormick, PharmD, BCPS, BCEMP

Impact of obesity on adenosine efficacy for supraventricular tachycardia in the emergency department

Hair M, McCormick P, Schotting P, Jansen K

BACKGROUND: Adenosine is recommended as the first-line pharmacologic agent in the management of supraventricular tachycardia (SVT). The 2025 ACLS Guidelines recommend an initial adenosine dose of 6 mg via rapid IV push, followed by 12 mg if another dose is needed. Several studies have shown that 6 mg doses may potentially be less effective in patients with a higher body weight and body mass index (BMI). These studies, however, included limited patients with obesity (defined as a BMI ≥30). The primary objective of this study was to compare the rate of adenosine efficacy in terminating SVT between patients with a BMI <30 and a BMI ≥30. The secondary objective was to compare characteristics between patients who successfully converted to a sinus rhythm and those who did not convert following adenosine administration.

METHODS: This single center, IRB approved, retrospective study included adult patients who received adenosine at UPMC Mercy over a five-year period from August 1, 2020, to July 31, 2025. Patients were excluded if the dose was not administered in the emergency department, if the rhythm was determined to not be SVT, if no recent height or weight were documented, if an adenosine dose other than 6 mg or 12 mg was administered, and if adenosine was administered through a central line or a line site that was not documented. SVT was considered to be terminated if the patient converted to a sinus rhythm and sustained this rhythm for at least one hour following the adenosine dose.

RESULTS: A total of 77 adenosine doses were included in the BMI <30 group and 64 doses were included in the BMI ≥30 group. SVT was terminated following 41 doses in the BMI <30 group and 28 doses in the BMI ≥30 group (53.2 % vs 43.8%, p=0.621). When reviewing all adenosine doses regardless of BMI, 69 doses resulted in successful SVT termination while 72 doses failed to terminate the SVT. When compared to the success group, the failure group had a higher median weight (74.0 kg vs 91.2 kg, p=0.019) and a higher mean BMI (27.3 vs 30.4, p=0.040).

CONCLUSIONS: Patients with a BMI ≥30 had a lower rate of SVT termination following adenosine compared to those with a BMI <30, though this result was not statistically significant. Patient weight and BMI may impact the efficacy of adenosine, but a larger study population is recommended to confirm these findings.

Michael Hair, PharmD

Michael received his PharmD from the Duquesne University School of Pharmacy in Pittsburgh, PA. He completed his PGY1 pharmacy residency at UPMC Shadyside and is currently a PGY2 emergency medicine pharmacy resident at UPMC Mercy. Michael's interests include advanced cardiac life support, infectious diseases, and toxicology. After residency, he will be working as an emergency medicine pharmacist at AHN Allegheny General Hospital.

Mentors: Pamela McCormick, PharmD, BCPS, BCEMP; Paul Schotting, PharmD, BCEMP; Kyle Jansen, PharmD

Antibiotic durations at discharge: Assessing total durations of therapy for common infections at hospital discharge

Hawk NC, Welch JT, Jorgensen RM, Lewis GJ

BACKGROUND: Historically, antibiotic durations for common infections have been influenced by prescribing habits and local practice norms rather than evidence-based guidelines and literature. According to the U.S. Centers for Disease Control and Prevention, antimicrobial stewardship focuses on improving antibiotic use, optimizing patient safety, and decreasing antimicrobial resistance. Hospital discharge is a critical point where antibiotic overuse occurs, with patients often receiving longer-than-necessary therapy. This project aims to identify total antibiotic therapy durations for community-acquired pneumonia (CAP), hospital-acquired pneumonia (HAP), uncomplicated cystitis, pyelonephritis, and gram-negative bacteremia due to Enterobacterales (GNB-E) and assess whether they are appropriate at hospital discharge according to current literature and guidelines.

METHODS: This retrospective chart review was conducted at a 445-bed tertiary care hospital. Reports of all inpatients diagnosed with CAP, HAP, uncomplicated cystitis, pyelonephritis, or GNB-E between January and December 2024 were identified to assess total antibiotic duration. The primary outcome was discharge with an antibiotic prescription completing an appropriate total duration, defined as five days for CAP, three to five days for uncomplicated cystitis, and seven days for HAP, pyelonephritis, and GNB-E. Secondary outcomes included diagnosis of Clostridioides difficile infection (CDI) within 30 days of treatment, 30-day all-cause hospital re-admission, 30-day re-admission due to acute kidney injury (AKI), 30-day all-cause mortality, and inpatient infectious disease consultation. Chi-square testing assessed associations between infection type and duration appropriateness, as well as duration appropriateness and each of the secondary outcomes.

RESULTS: A total of 170 antibiotic courses were evaluated across the five infectious indications. Of these, 61 courses (35.9%) had appropriate treatment duration, while 109 courses (64.1%) were classified as inappropriate. There was a statistically significant association between infection type and antibiotic duration appropriateness ($\chi^2 = 15.89$, $p = 0.0032$). Inappropriate durations were most frequently observed in CAP and uncomplicated cystitis, accounting for 46 of 58 courses (79.3%) and 30 of 45 courses (66.7%), respectively. No significant associations were identified between duration appropriateness and any secondary outcomes.

CONCLUSIONS: These findings suggest certain infectious diagnoses may be more prone to inappropriate antibiotic courses. Habitual prescribing practices, concerns regarding relapse, limited reassessment at transitions of care, and comfort with extended antibiotic use may contribute to the high rate of inappropriate durations observed in both CAP and uncomplicated cystitis. Targeted antimicrobial stewardship interventions, such as the implementation of guideline-based order sets, automatic stop dates, and provider education, may reduce unnecessary antibiotic exposure and improve adherence to evidence-based treatment durations.

Presented at the American Society of Health-System Pharmacists 2025 Midyear Clinical Meeting in Las Vegas, NV on December 10, 2025.

Nicole Hawk, PharmD, MMS

Nicole is from Pittsburgh, PA and received her M.S. in Medical Science and PharmD from Lake Erie College of Osteopathic Medicine in Erie, PA. She is a current PGY1 acute care resident pharmacist at UPMC Hamot in Erie, PA. Her professional interests include ambulatory care, infectious disease, internal medicine, and pediatrics. Upon residency completion, she will be a pharmacist within the Meadville Medical Center independent health system in Meadville, PA.

Mentors: Joseph Welch, PharmD, BCIDP; Rachel Jorgensen, PharmD; G. J. Lewis, D.O.

Evaluation of pharmacist-led tobacco use disorder program in a family medicine residency clinic

Hess D, Hamilton A, De Jesus S, Drew G, Mercuri J, Bensur J, Proddutur S, Koenig M

BACKGROUND: Tobacco use claims the lives of over seven million people annually. Smoking use is a preventable, modifiable risk factor, and smoking cessation reduces the risk of mortality and comorbidities leading to improved patient health outcomes. The options for tobacco use disorder (TUD) are based on behavioral counseling, nicotine replacement therapy (NRT), and oral medications. Insurance coverage and cost of therapies create barriers for patients in achieving cessation. Patients have difficulty taking the first step to connect with state-funded free NRT programs. This project aimed to assess the impact of a pharmacist-led smoking cessation program embedded in a family medicine residency clinic. Grant funding was secured to offer NRT free of charge to the patients served by the clinic to remove access barriers. The project objectives were number of patients referred, number of patients who reached abstinence at 12 weeks, and reduction of cigarette use.

METHODS: This single center, retrospective cohort project evaluated a pharmacist-led TUD program. Participants were identified by the physicians and referred to the pharmacist for enrollment into the 12-week program. The intervention included a combination of grant funded NRT pharmacotherapy and motivational interviewing performed by a pharmacist. The program included free NRT provided at the clinic and at least three follow-up visits within twelve weeks, either in-person or telemedicine. The primary outcomes assessed a pharmacist-led program for the treatment of TUD defined by tracking the number of patients enrolled in the TUD program, patients that reach cessation at 12 weeks, and the change in number of cigarettes used daily at 12 weeks. The secondary outcomes were to quantify the patients' perspective on their importance and confidence in smoking cessation, and Fagerstrom Nicotine dependence score.

RESULTS: Sixty-two patients were referred to the pharmacist-led program. Out of those patients referred, only 21 patients completed the program. 38% (8/21 patients) were able to reach cessation. The other 62% (13/21 patients) were able to reduce their daily cigarette usage. Six patients were excluded, and 33 patients never attended their first session with a pharmacist.

CONCLUSIONS: Patients who completed the pharmacist-led program decreased cigarette usage or reached cessation at 12 weeks. Implications of combined free NRT and pharmacist follow up visits will help to create further workflows and support for patients with TUD.

Presented at Pennsylvania Academy of Family Physicians Conference in Bethlehem, PA on April 4, 2026.

Devon Hess, PharmD, MBA

Devon is a PGY2 Ambulatory Care Pharmacy Resident and Faculty Development Fellow at UPMC St. Margaret. She also completed her PGY1 pharmacy residency at UPMC St. Margaret. Devon received her BA in mathematics, MBA in Healthcare Management, and PharmD degrees from High Point University in North Carolina. Devon has accepted a position with Inova Health as a Senior Clinical Pharmacist in Comprehensive Medication Management in Fairfax, Virginia.

Mentor: Marianne Koenig, PharmD, BCPS

Evaluation of fixed-dose phenobarbital taper between weight classes in the management of alcohol withdrawal

Huffman ED, Gray VC, Yu B, McCormick PJ

BACKGROUND: Phenobarbital is an established treatment for alcohol withdrawal syndrome (AWS); however, dosing strategies vary widely, particularly outside of critical care settings. At UPMC Mercy, a standardized four-day fixed dose phenobarbital taper (total cumulative dose 648 mg) is routinely used for patients admitted to the inpatient withdrawal management unit. This study evaluated the safety and efficacy of this standardized taper by comparing outcomes across patients with differing ideal body weights.

METHODS: This single center, retrospective cohort study included adult patients admitted to UPMC Mercy who received the standard phenobarbital taper for acute AWS between August 1, 2020, and July 31, 2025. Patients were identified through use of the "Phenobarbital for Prevention of Alcohol Withdrawal PowerPlan." Exclusion criteria included age <18 years, incarceration, receipt of phenobarbital prior to taper initiation, or suspected concurrent benzodiazepine or opioid withdrawal. Patients were stratified by total phenobarbital dose per kilogram of ideal body weight (IBW): ≤10 mg/kg and >10 mg/kg. The primary outcome was total benzodiazepine exposure within 96 hours of phenobarbital initiation, reported as cumulative lorazepam equivalents. Secondary outcomes included benzodiazepine doses administered for Withdrawal Assessment Scale (WAS) scores ≥20 and 10–19, hospital length of stay, and taper completion. The safety outcome was escalation of care, defined as transfer to a critical care unit.

RESULTS: Of 527 patient charts reviewed, 118 met inclusion criteria, with 87 (73.7%) in the ≤10 mg/kg group and 31 (26.3%) in the >10 mg/kg group. Exclusions were primarily due to suspected concomitant opioid withdrawal. Baseline characteristics were comparable between groups with respect to age, race/ethnicity, and initial blood alcohol concentration. Median benzodiazepine exposure within 96 hours was similar between groups (9.0 vs 10.0 mg lorazepam equivalents; p=0.600), as were benzodiazepine doses administered for WAS scores ≥20 (0 vs 0) and 10–19 (8 vs 6; p=0.471). Median hospital length of stay was longer in the >10 mg/kg group (5.0 vs 4.6 days; p=0.014). Completion of the full phenobarbital taper did not differ between groups (48.4% vs 37.9%; p=0.309). Escalation of care occurred in two patients (6.45%) receiving >10 mg/kg and none receiving ≤10 mg/kg (p=0.067, Fisher's exact).

CONCLUSIONS: Fixed dose phenobarbital tapering resulted in similar benzodiazepine utilization across weight based dosing groups, with similarly low rates of care escalation. Higher relative dosing conferred no additional benefit and was associated with increased length of stay. Prospective studies are needed to further define optimal phenobarbital dosing strategies for inpatient alcohol withdrawal management.

Emily Huffman, PharmD

Emily is a PGY1 Acute Care Pharmacy Resident at UPMC Mercy. She received her PharmD from the University of Pittsburgh School of Pharmacy in 2025. Her professional interests include medication safety, hematology and oncology, and improving care for underserved populations.

Mentors: Victoria Gray, PharmD, BCPS; Brittany Yu, PharmD; Pamela J. McCormick, PharmD, BCPS, BCEMP

Increasing screening and treatment of depression in a multicultural, urban free clinic

Hutar M, Ndungu M, Ploski J, Connor S

BACKGROUND: In 2023, the estimated prevalence of depression in the U.S. was 13.1% and overall population treatment rate was 38%. Depression is undertreated, especially in underserved populations, and pharmacists can play a role in optimizing treatment. Validated rating scales such as the Patient Health Questionnaire-9 item (PHQ-9) and 2-item (PHQ-2) are used to track symptom severity and response in depression. These instruments are recommended to be administered at baseline and at regular intervals. This quality improvement (QI) project aimed to implement a protocol for consistent PHQ-9 documentation, compare pre-post rates of mental health diagnoses and active treatment, and identify patient interest in talk-therapy, pharmacotherapy, or other mental health resources.

METHODS: This QI project began with a baseline chart review that evaluated documentation of scores from 1/1-12/30/25. The new protocol, developed by a pharmacy resident, was implemented between 1/1-4/30/26 at a free clinic in Pittsburgh, Pennsylvania. Each patient was screened using the standard PHQ-9 in their preferred language during their visit. Reports were generated monthly by investigators and charts were reviewed to collect post-implementation data including questionnaire scores, psychotropic pharmacotherapy use, interest in counseling, relevant demographic data: age, gender identity, spoken language, active medication list, and mental health diagnoses. Scores were also used in real time during primary care and medication therapy management encounters to discuss, initiate, or adjust treatment for depression. This QI was approved by the UPMC Quality Review Committee.

RESULTS: Prior to implementing the protocol, of the 310 patients seen for primary care in 2025, only 15.5% had a documented PHQ-9 score, 41.9% had a PHQ-2, and 58.1% had no documented screenings. 9% were actively receiving psychotropic pharmacotherapy. Since protocol implementation, 94.9% of patients seen by primary care physicians [n=258] have documented PHQ-9 scores. The prospective patient population was 52.7% female, 47.3% male, 50.4% Spanish-speaking, 39.1% English-speaking, and 10.5% spoke Portuguese, Arabic, Turkish, Indonesian, or Haitian. Of those screened [n=245], 11.4% reported scores >/=10. 5.3% endorsed self-harm ideation. 14.7% of patients documented interest in talk therapy services. 23.2% were actively receiving pharmacotherapy for depression, anxiety, or mood disorders collaboratively managed by primary care and pharmacy.

CONCLUSIONS: Standardized depression screening improved detection and treatment. Pharmacists enhanced care through pharmacotherapy management and monitoring. Patient engagement supports expanding pharmacist-led, culturally responsive mental health services in underserved and diverse populations. Future clinic funding could be designated for bilingual therapy services and medications for mental health.

Presented at the 2026 American College of Clinical Pharmacy Virtual Poster Symposium.

Megan Hutar, PharmD

Megan is a PGY2 Global Health Pharmacy Resident with UPMC Presbyterian. She graduated from the University of Pittsburgh School of Pharmacy in 2024 and completed a PGY1 Pharmacy Residency at the CMJC Veterans Affairs Medical Center in Philadelphia, PA. Her clinical interests include diabetes, heart failure, women's health, and mental health. Upon completion of residency, she will serve as a Primary Care Clinical Pharmacist Clinician with University of Vermont Health.

Mentor: Martha Ndung'u PharmD, BCACP

Comprehensive evaluation of risk factors associated with ifosfamide-induced encephalopathy: A real-world retrospective review

Jamison HR, Bastacky ML, Brenner TL, Gogniat MA, Dewhurst HE, Al-Dhumeen FS, Rosario AV, Sergi RA, Nacev BA, Burgess MA

BACKGROUND: Ifosfamide is an alkylating agent used to treat multiple malignancies, including sarcomas, lymphomas, and germ cell tumors. One of its metabolites, chloroacetaldehyde, crosses the blood–brain barrier and contributes to ifosfamide-induced encephalopathy (IIE). IIE occurs in 5–30% of patients and ranges from mild confusion to coma. Previously reported risk factors included hypoalbuminemia, renal dysfunction, performance status, prior cisplatin exposure, disease in the pelvis, ifosfamide formulation and dosing, infusion duration, obesity, interacting medications, cancer type, and age. The primary objective of this study was to evaluate patient- and disease-specific risk factors for IIE. Secondary objectives included assessing the association of fosaprepitant or aprepitant with IIE and comparing IIE incidence between ifosfamide formulations.

METHODS: This retrospective cohort study included adults who received at least one dose of an ifosfamide-containing regimen at UPMC Shadyside Hospital between October 2013 and October 2024. Data collected included demographics, cancer type and stage, prior cisplatin exposure, ifosfamide dose, infusion duration, ifosfamide formulation, laboratory values, concomitant CYP3A4/CYP2B6 interacting medications, and IIE incidence. IIE was graded using CTCAE v5.0. Categorical and continuous variables were analyzed using Chi-square or Fisher's exact tests and the Mann–Whitney U test, respectively. Multivariable logistic regression identified independent predictors of IIE.

RESULTS: Forty-four of 250 (18%) patients developed IIE. Most had sarcoma (54%) and advanced disease (61%). Patients with IIE were more often female (61%), had lower baseline weight (median 79 vs. 87 kg), lower body surface area (BSA) (median 1.9 vs. 2 m2), and pelvic disease (39% vs. 22%). Acute kidney injury (AKI), lower nadir serum albumin (median 2.9 vs. 3.2 g/dL), and lower baseline hemoglobin (median 9.9 vs. 12.1 g/dL) were also associated with IIE. The use of the ifosfamide solution formulation was more common in the IIE group (20% vs. 5%). Concomitant fosaprepitant or aprepitant use was not associated with increased risk. In a multivariable analysis adjusted for sex and AKI, pelvic disease (aOR 2.4, 95% CI 1.11–5.38) and the ifosfamide solution formulation (aOR 5.1, 95% CI 1.71–15.26) remained independently associated with IIE, while higher baseline hemoglobin was protective (aOR 0.7, 95% CI 0.54–0.81).

CONCLUSIONS: Female gender, lower body weight and BSA, pelvic disease, ifosfamide solution formulation, AKI, lower albumin, and lower baseline hemoglobin were associated with increased risk of IIE on univariable analyses. Pelvic disease, lower baseline hemoglobin, and ifosfamide solution formulation emerged as independent risk factors.

Presented at HOPA Annual Conference 2026 in New Orleans, LA on March 27, 2026.

Hanna Jamison, PharmD

Hanna is currently a PGY2 oncology pharmacy resident at UPMC Shadyside Hospital. She earned her Doctor of Pharmacy degree from Duquesne University in Pittsburgh, PA, and completed her PGY1 pharmacy residency at UPMC Presbyterian Hospital. Her professional interests include gastrointestinal malignancies and malignant hematology. Upon completion of her PGY2 residency, Hanna will pursue a career as an Ambulatory Oncology Pharmacy Specialist at the WVU Hospitals Cancer Center in Morgantown, WV.

Mentors: Melissa Bastacky, PharmD, BCOP; Timothy L. Brenner, PharmD, BCOP

Impact of a pharmacy managed dosing service on calcineurin inhibitor optimization after transplant

Kue SP, Iasella CJ, Sacha LM, Rivosecchi RM, Moore CA

BACKGROUND: Calcineurin inhibitors (CNIs), tacrolimus and cyclosporine, are the backbone of most immunosuppression regimens after solid organ transplantation. However, maintaining therapeutic drug concentrations can be difficult due to narrow therapeutic indices, drug-drug interactions, and interpatient variability. Subtherapeutic or supratherapeutic drug levels can increase the risk of graft rejection or lead to adverse effects such as renal dysfunction or neurotoxicity. Pharmacy-managed dosing services have been proposed to improve CNI optimization and ensure patient safety and effectiveness. The purpose of this study was to evaluate time-in-therapeutic range (TTR) of a pharmacy-to-dose CNI service.

METHODS: This was a retrospective chart review of adult solid organ transplant recipients managed under the CNI pharmacy dosing service at UPMC Presbyterian Hospital between June 14, 2023, and December 12, 2025. The study included adults 18 years or older who received a solid organ transplant and were treated with either tacrolimus or cyclosporine with at least two days of consult, available laboratory and dosing records sufficient to calculate TTR. Patients were excluded if the patient underwent multiorgan transplantation, re-transplantation, or no known baseline serum creatinine.

The primary outcome was the time in therapeutic range, calculated using the Rosendaal's linear interpolation method. Secondary outcomes include incidence of acute kidney injury (AKI) assessed using the Kidney Disease Improving Global Outcomes (KDIGO) criteria, the proportion of patients therapeutic at discharge, and to characterize the frequency of extreme CNI levels. Descriptive statistics were used for analysis.

RESULTS: Of 1328 total consults, 903 patients met inclusion criteria. In a preliminary analysis, 106 consults were evaluated by random sampling. The majority of patients were male (72, 68%) and the median age at the time of consult was 65 years (IQR 61-72). Tacrolimus was the most common CNI utilized (79, 75%). The most common type of transplant was lung (89, 84%), followed by liver (14, 13%), and kidney (3, 3%) and the median time since transplant being 44.4 months (IQR 7.3-101.2).

CONCLUSIONS: This study will help evaluate whether patients under a pharmacy-managed dosing service will achieve a higher TTR compared to the historical benchmark found by Ensor et al at UPMC Presbyterian. Final conclusions are pending.

Sophia Kue, PharmD

Sophia is a current PGY1 Pharmacy Resident at UPMC Presbyterian Hospital. She is from Cranston, RI and received her Doctor of Pharmacy degree in 2025 from the University of Rhode Island in Kingston, RI. Sophia is currently on track to complete a PGY2 residency in pediatrics with a specialty pathway in oncology at Rady Children's Hospital in San Diego, CA. In her free time, Sophia enjoys going on long walks and spending time with her cat, Sylvie.

Mentors: Carlo Iasella, PharmD, MPH, BCTXP, BCPS; Lauren Sacha, PharmD, BCTXP, BCPS; Ryan Rivosecchi, PharmD, BCCP; Cody Moore, PharmD, MPH, BCTXP, BCPS

Impact of polypharmacy on deutetrabenazine / deutetrabenazine XR utilization

Lang C, Iruru E, Relich T, Mangerie M

BACKGROUND: Deutetrabenazine is a prescription medication indicated for the treatment of chorea associated with Huntington's disease and tardive dyskinesia. Tardive dyskinesia is a movement disorder associated with exposure to certain medications, including antipsychotics and antidepressants, which are also frequently used in Huntington's disease. Use of multiple agents within these classes may further increase risk for tardive dyskinesia. There is an opportunity to better understand how deutetrabenazine is used for Huntington's disease versus tardive dyskinesia and to examine patterns of potentially aggravating medications before and after deutetrabenazine initiation.

METHODS: This retrospective, claims-based, observational study characterized deutetrabenazine utilization among Medicare members with at least one claim from January 2022 through December 2025. Data on prior and concomitant use of antipsychotics, antidepressants, and other aggravating medications were collected to assess utilization trends. Analyses examined deutetrabenazine use among members with and without polypharmacy and aggravating medications. The primary outcome was identification of the main indication for deutetrabenazine use. Secondary outcomes included determination of drug classes or medications associated with higher deutetrabenazine utilization and assessment of polypharmacy-related patterns. IRB Exemption #: 14782

RESULTS: A total of 130 Medicare members (71.5% female) initiated deutetrabenazine during the study period, with utilization increasing over time. Neurologists prescribed deutetrabenazine most frequency (42%), followed by psychiatrists (34%). Polypharmacy involving potentially aggravating medications was common. All three targeted medication classes, including antidepressants, antipsychotics/antimanic agents, and antianxiety agents, were represented among utilizers. Among members initiating deutetrabenazine in 2023 or later (N=87), prior medication use in 2022 included antidepressants (74%), antipsychotic/antimanic agents (57%), and antianxiety agents (36%).

CONCLUSIONS: Deutetrabenazine utilization increased steadily over the study period, with a larger share of members appearing to be treated for Huntington's disease than for tardive dyskinesia based on specialty patterns. Many utilizers had prior or concurrent exposure to medications associated with movement-disorder risk, with antidepressants representing the most frequently used class. These patterns highlight the need for additional research to better understand antidepressant-related tardive dyskinesia risk and to clarify how use of antidepressants, antipsychotic/antimanic agents, and antianxiety agents relates to deutetrabenazine use.

Presented at the AMCP 2026 Annual Meeting in Nashville, TN.

Chase Lang, PharmD, MBA

Chase earned his dual-degree PharmD and MBA at West Virginia University. He began his professional career as a Clinical Pharmacist at Memorial Health System before transitioning to his current role as a PGY1 Managed Care Resident at CVS Caremark. After residency, he plans to pursue a role as a Clinical Advisor, where he can use his clinical experience and business acumen to deliver comprehensive healthcare solutions.

Mentors: Taylor Relich, PharmD; Marina Mangerie, PharmD

Controlled substance utilization and monitoring practices in outpatient geriatric care centers

Lee S, Grimes A, Proddutur B

BACKGROUND: The CDC has provided some guidance on opioid monitoring for patients on chronic opioids, regular controlled substance agreements (CSAs), Urine Drug Screens (UDS), Prescription Drug Monitoring Program (PDMP) checks, and providing naloxone. Currently, our two geriatric clinics have a standard process for PDMP checks and CSAs, though processes are not consistently reviewed and documented for all four metrics. While there is less guidance available for benzodiazepines (BZDs), these medications can increase the risk of falls and delirium in older adults, and our clinic aims to assess opioid and BZD utilization and monitoring and educate providers and staff on best practices.

METHODS: This is a pre-post intervention quality improvement project conducted across two outpatient geriatric primary care clinics. Prescribers/staff members were educated on the workflow/documentation with a presentation (prescribers only), emailed flyer, posters displayed in office, and personal reminders. An electronic health record was used to identify patients with prescribed opioids and/or BZDs between June 1, 2025, to September 30, 2025 (pre-intervention) and November 17, to March 14, 2026 (post-intervention). Patients included were taking opioids and/or BZDs for >3 months prescribed by physicians within our primary care clinic. Patients were excluded if they were in hospice or receiving prescriptions from palliative care/psychiatry. Data collected was age, medication used, duration of use, compliance/documentation of annual CSAs, ordering/collection of annual UDS, PDMP checks, naloxone counseling/dispensing, and number of visits. Patients were separated by high and low utilizers, determined by whether they obtained more or less than two 28 day fills in a 90-day period. The primary outcome is the proportion of patients who met all four metrics pre- and post- intervention on chart review. Secondary outcomes include the proportion of patients meeting each criterion, and number of visits. Analysis consisted of descriptive statistics.

RESULTS: Eleven prescribers and seven staff members completed the education. There were 134 patients identified as receiving opioid/BZD prescriptions in the pre-period, of which 32 patients were included. Only one patient complied with all metrics. In the post-period, 152 patients were identified, and 31 were eligible. Two patients complied with all metrics.

CONCLUSIONS: Few patients consistently met all four utilization and monitoring metrics, and use of standardized documentation was not consistent. Some ways to improve this include additional electronic prompts. There are opportunities to continue to evaluate optimal populations for more advanced monitoring, including stratifying patients by high/low utilization, and by further developing risk categories.

Sydney Lee, PharmD

Sydney received her degree from the University of Pittsburgh School of Pharmacy and is currently a PGY2 Pharmacy Resident in Geriatrics at UPMC St. Margaret, where she completed her PGY1. She is interested in deprescribing and palliative care and is pursuing a specialty pharmacy position after residency.

Mentors: Amy Grimes, PharmD, BCPS, BCGP; Brittany Proddutur, MD

Pharmacogenomics in older adults: Estimating relative utility of actionable drug-gene pairs and provider perspectives

Lin CN, Baumgartner MA, Berenbrok LA

BACKGROUND: Pharmacotherapy management in older adults is complex due to age-related physiological changes, polypharmacy, and increased susceptibility to adverse drug reactions. The rapidly aging population requires clinicians to be knowledgeable in pharmacogenomics (PGx) to deliver personalized, safe, and effective care. PGx is guided by evidence-based recommendations and enables individualized prescribing, improves treatment success, and reduces harm. This project aims to estimate the utility of actionable drug-gene pairs in an older adult population, provide PGx education to geriatric clinicians, and assess clinicians' perspectives on PGx implementation in geriatric care.

METHODS: This two-part project was conducted at UPMC St. Margaret within two affiliated Geriatric Care Centers (GCCs). A retrospective review of the electronic health record (October 1, 2023, to October 1, 2025) was conducted in established patients age ≥ 65 years with active prescriptions for pre-selected Clinical Pharmacogenetics Implementation Consortium (CPIC) Level A drugs commonly included on multi-gene PGx panels. Data included medication, dose, indication, and patient demographics (age, race). CPIC phenotype frequency tables were used to estimate the prevalence of actionable PGx variants in the sample population. Thereafter, we deployed pre- and post-educational intervention surveys that assessed GCC clinicians' attitudes, confidence, and perceived barriers to PGx testing. The educational intervention was a pharmacy resident–led presentation covering foundational PGx concepts and estimated actionable PGx variants in the population aforementioned.

RESULTS: Among 428 geriatric patients evaluated at two GCCs, 46.7% or more were likely to have actionable PGx recommendations based on the highest prevalence observed across relevant gene–drug groups in current clinical guidelines. Paroxetine, tricyclic antidepressants, clopidogrel, and statins were identified as highest priority medications, defined as the top agents most likely to yield actionable CPIC recommendations if prescribed within this population. Survey responses from 10 clinicians indicated that testing cost and reimbursement concerns were the most significant barriers to PGx adoption, while integration of PGx results into the electronic health record was the most influential factor supporting clinicians' willingness to order PGx testing for geriatric patients.

CONCLUSIONS: Nearly half of the GCC population carried actionable PGx variants. As an informative test, PGx testing offers a strong opportunity to improve prescribing safety and medication outcomes across older adult populations.

Presented at the Society for Teachers of Family Medicine, New Orleans, LA, May 5, 2026.

Ching Nung "Selina" Lin, PharmD

Selina Lin is a PGY1 pharmacy resident and first-year Faculty Development Fellow at UPMC St. Margaret. She received her Doctor of Pharmacy degree from Massachusetts College of Pharmacy and Health Sciences in Boston, MA. Her professional interests include diabetes management, pharmacogenomics, academia, global health, and geriatrics. This upcoming year, Selina plans to continue her training as a PGY2 Geriatrics Pharmacy Resident at UPMC St. Margaret.

Mentors: Megan Baumgartner, PharmD, BCPS; Lucas A. Berenbrok, PharmD, MS, FAPhA

Evaluating cefazolin for surgical prophylaxis in orthopedic patients with reported cephalosporin allergy: Safety and outcomes

Long NG, Feick KA, Goldman JD, Hitchcock AM

BACKGROUND: Cefazolin is the guideline-recommended first-line agent for perioperative prophylaxis in most orthopedic surgeries. Historically, clinicians have avoided cefazolin in patients labeled with beta-lactam allergies due to concerns about cross-reactivity. Recent evidence shows that cefazolin possesses a unique R1 side chain, allowing safe administration in patients with IgE-mediated penicillin allergies. However, no clear guidance addresses using cefazolin in patients with documented cephalosporin allergies, despite the low theoretical risk of cross-reactivity. The objective of this study was to determine if cefazolin can be used safely in patients with documented cephalosporin allergies.

METHODS: This multicenter, retrospective, observational cohort study was conducted across seven hospitals in Central Pennsylvania. Adults who underwent elective orthopedic surgery between 10/01/2025 and 12/31/2025 were screened for inclusion. Patients were excluded if they lacked a documented cephalosporin allergy, had a documented cefazolin allergy, or did not receive perioperative antibiotics. Those who received perioperative cefazolin were compared with those who received alternative prophylactic antibiotics. Collected data included patient demographics, surgical procedure and location, allergy characteristics, and clinical outcomes. The primary outcome was the incidence of documented allergic reactions within 30 days following perioperative antibiotic administration. Secondary outcomes, also assessed within 30 days, included acute kidney injury (AKI), surgical site infection (SSI), Clostridioides difficile infection (CDI), and hospital readmission. Categorical outcomes were calculated via Chi-square or Fisher's exact test. All statistical tests were two-tailed, and a P-value < 0.05 was considered statistically significant.

RESULTS: Of 935 patients screened, 69 patients met inclusion criteria. Most included patients (81%) received cefazolin perioperatively. No differences in baseline characteristics were identified. The most common procedure was arthroplasty (25%), with hip (36%) as the most common anatomical location. Cephalexin was the most commonly reported cephalosporin allergy (34%), with hives (30%) and unspecified rash (28%) being the most frequently documented reactions. No allergic reactions occurred up to 30 days following the receipt of the perioperative antibiotic (P = 1), and no statistically significant differences were identified for all 30-day secondary clinical outcomes.

CONCLUSIONS: Cefazolin administration in patients with documented cephalosporin allergies was not associated with an increased risk of allergic reactions, and clinical outcomes were similar regardless of the prophylactic antibiotic used. These findings suggest cefazolin is likely safe for perioperative prophylaxis in patients with documented cephalosporin allergies, though additional research is required to validate these findings.

Noah Long, PharmD

Noah is currently a PGY1 resident at UPMC Harrisburg. He received his Doctor of Pharmacy from the University of Maryland Eastern Shore School of Pharmacy. He is most interested in infectious diseases and cardiology and is looking to pursue a career as a clinical pharmacist after completing his post-graduate training.

Mentors: Ally Hitchcock, PharmD, AAHIVP; Kristin Feick, PharmD, BCCCP

Comparison of phenobarbital loading dose strategies for alcohol withdrawal syndrome

Mannino, A, Baumgartner, MA, D'Amico, F, Eubanks, M, Ordons, B

BACKGROUND: Alcohol withdrawal syndrome (AWS) accounted for 15% of 8.5 million emergency department visits from 2021 to 2023. Per recent guidelines, benzodiazepines (BZDs) are indicated as first line treatment for AWS, and phenobarbital may be considered an alternative treatment option for severe withdrawal. Recent studies have compared phenobarbital to BZDs as an alternative for withdrawal treatment that showcases favorable phenobarbital outcomes, such as decreased hospital length of stay (LOS). However, the preferred phenobarbital loading dose strategy to treat AWS is unknown. The purpose of this study was to determine the preferred phenobarbital loading dose strategy between a single intravenous (IV) loading dose or a load given over 6 hours via an institutional order set.

METHODS: This was an IRB approved, retrospective cohort study performed at a 249-bed community teaching hospital. Patients who received phenobarbital for AWS from January 1, 2024, to December 31, 2025, were included. Patients either received a 6 to 15 mg/kg intramuscular (IM) loading dose over 6 hours via an institutional order set or a single 10 mg/kg IV loading dose. An institutional scoring system for phenobarbital was utilized to obtain a baseline withdrawal assessment score (WAS) to determine AWS severity. The primary outcome was to determine the total dose of additional as needed (PRN) phenobarbital after the initial loading dose. Secondary outcomes included additional phenobarbital and non-phenobarbital administration frequency, LOS, incidence of mechanical ventilation (MV), and intensive care unit (ICU) admission.

RESULTS: 80 patients were included; 34 patients received the institutional order set dosing and 46 received the single IV loading dose. The median dose of additional PRN phenobarbital administered was significantly lower in the single IV loading dose group compared to the institutional order set group (64.8 mg vs 334.5 mg, p=0.04). The median frequency of additional phenobarbital administration was also significantly less in the single IV loading dose group compared to the institutional order set group (1 vs 7, p=0.003); similar results were seen for the frequency of administration of non-phenobarbital agents (0 vs 2, p=0.05). There was no difference in LOS (3.6 days vs 4.9 days, p=0.010), incidence of MV (2 vs 2, p=0.76), or ICU admission (9 vs 12, p=0.10).

CONCLUSIONS: A single phenobarbital loading dose of 10 mg/kg required less additional PRN phenobarbital compared to giving a similar mg/kg loading dose over 6 hours using an institutional order set. There were no differences in safety outcomes with either loading dose strategy.

Presented at Society of Teachers of Family Medicine Annual Conference in New Orleans, LA on May 4, 2026.

Alexandra Mannino, PharmD

Alexandra is a graduate from the University of Pittsburgh School of Pharmacy. She is currently a PGY1 Pharmacy Resident and a first-year faculty development fellow at UPMC St. Margaret. Alexandra also committed to the PGY2 Ambulatory Care Pharmacy Residency at UPMC St. Margaret. After residency, Alexandra wishes to obtain an outpatient ambulatory care position within a primary care setting or specialized setting.

Mentors: Megan Baumgartner, PharmD, BCPS; Brianna Ordons, PharmD, BCPS, BCCCP

Evaluating the adoption and outcomes of a vancomycin dosing protocol in the home infusion setting

Mazeski KM, Frey L, Zielke M, Meredith C

BACKGROUND: Vancomycin in home infusion is commonly monitored using a trough-based approach due to testing limitations, cost, and patient burden. In this model, a weekly vancomycin level is drawn prior to when the next dose of vancomycin is administered. Limited research evaluates standardized vancomycin dosing protocols within home infusion, where access and monitoring differ from inpatient practice.

METHODS: This study was designed to review an internal dosing protocol for managing patients on vancomycin therapy. It was approved by the Quality Review Board, and retrospective data was collected with the initial goal to compare protocolized outcomes to historical records. Using internal report generation, charts were pulled from the initiation date of the protocol (October 30th, 2024) through September 16th, 2025. Included patients were at least 18 years old, not pregnant, and had at least one documented vancomycin trough level. Primary outcomes were incidence of therapeutic trough levels, rate of acute kidney injury (AKI), and therapy extensions. Secondary outcomes included pharmacist compliance with the protocol. The research team evaluated pharmacist compliance to the protocol by evaluating their recommendations and documentation retrospectively. Data was assessed using descriptive analysis with central tendency.

RESULTS: 51 entries were assessed for inclusion to the study. 28 (54.9%) instances of documented protocol note types were appropriately utilized for vancomycin dosing. Of the 28, an additional three were excluded due to lack of consistent laboratory data and accidental duplication, leaving 25 assessments meeting inclusion criteria for evaluation. These 25 assessments represented dosing opportunities across 18 patients, with four patients having multiple vancomycin dosing encounters in which the protocol was utilized. There were AKIs identified. Across all 25 dosing opportunities, 17 (68%) were subtherapeutic, 3 (12%) were therapeutic, and 5 (20%) had no trough available for evaluation. Of the 25 dosing opportunities, 12 (48%) aligned with protocol recommendations. No patients had therapy extensions; however, two patients had therapy discontinued prematurely for reasons unrelated to AKI. Of the 25 pharmacist notes associated with dosing opportunities, 5 (20%) were incomplete; compliance with the protocol was roughly 50%. Due to the size of the cohort, it is not feasible to evaluate whether the rate of AKI is less compared to historical rates.

CONCLUSIONS: Additional studies are warranted to determine factors limiting pharmacist adoption and compliance to the protocol. Further assessment of the selected vancomycin dosing webtool, and dosing interventions should occur to determine the reasoning as to why therapeutic trough was not achieved.

Presented at the American Society of Hospital Pharmacists Midyear Clinical Meeting 2025 and the National Home Infusion Association Annual Conference 2026.

Kathryn Mazeski, PharmD

Kathryn graduated from Duquesne University School of Pharmacy with a PharmD in 2025. She also has a BS from the Pennsylvania State University (class of 2018). She is now the PGY1 resident at CarepathRx where she spent the last year developing a strong interest in home infusion pharmacy services. After residency, Kathryn plans to stay in home infusion with a strong interest in biologics and specialty infusions.

Mentors: Leita Frey, PharmD, BCPS; Megan Zielke PharmD, BCCCP; Claire Meredith, PharmD

Four-factor prothrombin complex concentrate dosing for perioperative bleeding in cardiac surgery utilizing cardiopulmonary bypass

Metheney HM, Suh K, Sultan I, Subramaniam K, Thoma F, Rivosecchi RM

BACKGROUND: Four-factor prothrombin complex concentrate (4F-PCC) has demonstrated advantages over fresh frozen plasma in cardiac surgery for the management of perioperative bleeding; however, the optimal dosing strategy has not been well established. In 2025, our institution implemented a dosing strategy of 1000 factor XI International Units (IU) with optional redosing protocol. The aim of this study was to compare the efficacy and the associated cost of the 1000 IU dosing strategy compared to a previously used fixed dose of 1500 IU.

METHODS: This was a single-center, retrospective, pre-post study of adult patients undergoing cardiac surgery requiring cardiopulmonary bypass (CPB) at UPMC Presbyterian Hospital. 4F-PCC charge data from April 20, 2024, to October 20, 2025, were screened for intraoperative administration. Patients were grouped by initial dose: the pre-implementation group received 1500 IU prior to January 20, 2025, and the post-implementation group received 1000 IU. Patients receiving 4F-PCC for heart transplantation, durable ventricular assist device procedures, non-cardiac surgery, or anticoagulation reversal were excluded. The primary outcome of this study compared successful hemostatic response, defined as no hemostatic interventions between one and 24 hours post 4F-PCC, for noninferiority between dosing strategies with prespecified margin of 10%. Hemostatic interventions included surgical re-opening of the chest, repeat 4F-PCC dosing, or transfusion of allogenic blood products (excluding red blood cells) post-procedure. Secondary endpoints included a cost analysis of all hemostatic therapies and cumulative postoperative chest tube output. Outcomes were compared using generalized linear models with family and link.

RESULTS: A total of 936 patients were evaluated for inclusion with 341 patients meeting criteria: 154 in the 1000 IU group and 187 in the 1500 IU group. Non-valvular aortic procedures were the most common with 190 patients (55.7%) total. Successful hemodynamic response occurred in 68.2% and 69% for the 1000 IU and 1500 IU group, respectively (p=0.87). The adjusted absolute risk difference in hemodynamic response was −2.24% (CI 95% -11.54, 7.06%) for 1000 IU vs 1500 IU. The adjusted mean difference in total costs of hemostatic therapies was -$844 per patient (95% CI -$1237, -$452), favoring the 1000 IU strategy. No significant differences were observed in chest tube output within the first 6 hours (362.97 vs 343.79 mL, p=0.87) or 24 hours post-procedure (814.63 vs 784.99 mL, p=0.60).

CONCLUSIONS: A reduced 1000 IU 4F-PCC dosing strategy achieved similar hemostatic effectiveness and postoperative bleeding outcomes compared with a 1500 IU dose, with reduction in total hemostatic costs driven by 4F-PCC acquisition savings.

Hannah Metheney, PharmD

Hannah is a PGY2 Critical Care Pharmacy Resident at UPMC Presbyterian and completed her PGY1 Pharmacy Residency at UPMC Hamot. She received her PharmD from Lake Erie College of Osteopathic Medicine School of Pharmacy. Some of her current interests include trauma, cardiovascular, and emergency medicine. After completing her PGY2 program, she will work as a Critical Care Clinical Pharmacist at UPMC Hamot.

Mentors: Ryan Rivosecchi, PharmD, BCCCP; Kangho Suh, PharmD, PhD

Evaluation of naloxone access and existing barriers in transitions of care

Molnar CS, Taylor AM

BACKGROUND: Opioid overdose is a leading cause of accidental death in the United States. Patients at high risk for opioid overdose should be prescribed naloxone to have available to reverse an overdose. Despite the recommendations for providing naloxone to individuals at high risk of opioid overdose, naloxone is not always offered or readily available. Hospital discharge represents a key opportunity to provide naloxone and counseling to expand its availability in the community. This research aims to assess naloxone nasal spray access post-discharge and patient reported barriers to access. To our knowledge, this is the first study assessing the accessibility of and barriers to naloxone as a component of transitions of care.

METHODS: This research study was conducted at a community hospital between October 1, 2025 and February 28, 2026. Patients admitted to one of the hospital's interdisciplinary teaching services were identified as high risk of opioid overdose and counseled on naloxone prior to hospital discharge by the pharmacy team. During the 30-day period following discharge, patients were contacted via telephone to conduct a survey on naloxone access and identify potential barriers to naloxone access post-discharge. Patients were excluded from the analysis if they declined informed consent, were unable to participate in the survey due to hearing or speech impairment, did not have an active telephone number available in the electronic health record, or were unable to be reached after two telephone call outreach attempts. The primary outcome was the number of participants that obtained naloxone within 30 days of hospital discharge. The secondary outcome was barriers to naloxone access after hospital discharge which included cost, perception naloxone was not needed, product availability, time constraints preventing pharmacy visit, transportation, and unawareness of indication/importance.

RESULTS: Out of the 43 participants for whom naloxone was sent upon discharge, 79.1% (34) completed the follow-up telephone survey. Among surveyed participants, 38.2% (13) obtained naloxone post-discharge. Among those who did not obtain naloxone, the most commonly reported barrier was the perception that naloxone was not needed (26.5%). Other barriers included cost (17.6%), pharmacy availability issues (8.8%), transportation limitations (5.9%), time constraints (2.9%), and limited awareness of its indication or importance (2.9%).

CONCLUSIONS: Less than half of the high-risk patients who naloxone was sent for were able to obtain post-discharge. The most frequent barrier to access was the perception that naloxone was unnecessary, highlighting a need for enhanced patient education to improve naloxone uptake and community access.

Presented at the Society for Teachers of Family Medicine, New Orleans, LA, May 3, 2026.

Camryn Molnar, PharmD

Camryn is a PGY2 ambulatory care pharmacy resident and second-year Faculty Development Fellow at UPMC St. Margaret. She received her Bachelor of Science degree from the University of Mary Washington in Fredericksburg, VA, and her Doctor of Pharmacy degree from Virginia Commonwealth University School of Pharmacy in Richmond, VA. Her professional interests include anticoagulation management, ambulatory care, and community outreach. Upon completion of residency, Dr. Molnar will be starting as a Senior Clinical Pharmacist specializing in Anticoagulation with Inova Health System in the Northern Virginia/Washington DC area.

Mentor: Alexandria Taylor, PharmD, BCPS

Medicare Part D benefit design changes before and after the Inflation Reduction Act

Mundy Z, Mangerie M, Relich T

BACKGROUND: The Inflation Reduction Act (IRA) introduced major reforms to Medicare Part D prescription drug coverage beginning in 2024, including a $2,000 annual out-of-pocket (OOP) cap and a shift in financial responsibility from the federal government to plan sponsors. In 2025, federal policies restricted premium increases; however, by 2026, the annual OOP cap increased to $2,100 and premiums were permitted to rise under the Part D premium stabilization demonstration parameters. These phased changes may have influenced plan design and beneficiary costs. In response, Part D plans may have adjusted premiums, deductibles, or medication cost sharing.

METHODS: A serial cross-sectional study will be conducted using data from 2019 to 2026. The study population will include Medicare Advantage plans with drug coverage and Medicare Part D stand-alone prescription drug plans. Primary outcomes include mean monthly premiums, annual deductibles, and the proportion of select medications subject to coinsurance versus copayments across formulary tiers.

RESULTS: The mean annual Part D deductible changed from $191.68 in 2019 to $428 in 2026 for MA-PD plans, from $340.48 in 2019 to $497.47 in 2026 for PDPs, and from $197.98 in 2019 to $432.93 in 2026 overall. The mean monthly Part D premium changed from $28.34 in 2019 to $14.90 in 2026 for MA-PD plans, from $59.05 in 2019 to $62.06 in 2026 for PDPs, and from $29.53 in 2019 to $17.93 in 2026 overall. Averaged across all selected drugs, the percent of plans that subject a member to coinsurance prior to the catastrophic coverage phase was 2.94% in 2019 and 68.21% in 2026 for MA-PD plans, 32.21% in 2019 and 87.05% in 2026 for PDPs, and 13.51% in 2019 and 70.45% in 2026 across both plan types.

CONCLUSIONS: Across the study period, the Part D program exhibited a clear, policy-driven shift in benefit design as plans adapted to the evolving Part D structure to maintain premium stability. Increases in deductibles, higher prevalence of coinsurance, and adjustments to the distribution of cost-sharing corresponded with IRA-related changes in liability and the introduction of an annual OOP cap. As the Part D program continues to transition under the IRA, ongoing evaluation of benefit design will be important to understand how regulatory changes influence plan behavior, cost-sharing patterns, and member experience across the marketplace.

Presented at AMCP Annual in Nashville, TN on April 13 – 16, 2026.

Zane Mundy, PharmD

Zane earned his Doctor of Pharmacy degree from the University of Pittsburgh School of Pharmacy in 2025. As a Pharmacy Resident, Zane gains broad experience across key PBM functions, with interests in utilization management development, formulary administration, clinical program development, analytic consulting services, financial forecasting, clinical account management, and government services operations. He plans to pursue a role in client services post-residency.

Mentors: Marina Mangerie, PharmD; Taylor Relich, PharmD

Needs assessment and pharmacist protocol for HIV PrEP pharmacist monitoring service

Naumovski I, Ballard SL

BACKGROUND: Pre-exposure prophylaxis (PrEP) using oral antiretroviral medications (Truvada [FTC/TDF] and Descovy [FTC/TAF]) is a highly effective strategy for preventing human immunodeficiency virus (HIV) acquisition. The CDC recommends best practices for effective use of PrEP including lab monitoring and prescription timing. A 2019 medication use evaluation (MUE) and education survey identified care gaps and resident education preferences. Completion of ongoing lab testing was low (e.g., HIV completed with 41.5% of refilled prescriptions), and residents expressed preference for experiential learning. This 2-part quality improvement project at an urban family medicine residency practice includes an updated assessment of PrEP utilization, followed by implementation of a pharmacist protocol to improve compliance with the guidelines.

METHODS: Eligible residency clinic patients aged 18 and older who received PrEP prescriptions between July 1, 2024, and June 30, 2025, were identified through an Epic report. A MUE with retrospective chart review assessed ordering rates of labs and prescribing practices in accordance with the CDC guidelines. The primary outcome measures included adherence to HIV, STI, renal, lipid, hepatitis screenings, and 90-day prescribing limits. An HIV PrEP pharmacist protocol within the health system was adapted to meet clinic needs. Primary care providers (PCPs) of patients eligible for pharmacist management were notified regarding eligibility. For referred patients, pharmacists conduct lab monitoring, lead educational visits with adherence assessments, and order refills. Service metrics and medication use will be evaluated. To accommodate resident preference, resident physicians complete one scheduled experience in PrEP management with pharmacist precepting.

RESULTS: The baseline MUE identified 42 total patients and 95 prescriptions ordered for PrEP; the majority (94.7%) having an indication for sexual risk. In the 20 instances of initiation, compliance with recommended lab ordering ranged from 95% (HIV) to 30% (lipid panel). In an analysis of 75 refills, monitoring labs were ordered between 55.1% (HIV) to 17.9% (hepatitis C). HIV lab results were successfully obtained in only 47.4% of refills. All prescriptions had appropriate doses and directions, and most refills (67.5%) were 90-day supplies, but many were out of compliance with recommended supply based on lack of recent monitoring. The pharmacist protocol for PrEP management was approved by clinic administration. Recruitment began on February 27 and is ongoing.

CONCLUSIONS: MUEs conducted in 2019 and 2025 demonstrated similarly low adherence with CDC guideline recommendations for lab monitoring and prescribing practices. These MUE results and program education needs influenced development of a pharmacist PrEP protocol and workflow.

Igor Naumovski, PharmD

Igor is the current PGY2 ambulatory care resident at UPMC Shadyside, where he also completed his PGY1 pharmacy residency. Dr. Naumovski earned his Doctor of Pharmacy degree from Duquesne University School of Pharmacy. Following residency, he will practice as a clinical pharmacist and family medicine faculty member at the Latterman Family Health Center and UPMC McKeesport Family Medicine residency.

Mentors: Stephanie L. Ballard, PharmD, BCACP

Evaluating contraception management in women of childbearing age prescribed tirzepatide in a family medicine program

Orji D, Farrah R, Moyer K

BACKGROUND: While an effective antidiabetic and weight loss medication, tirzepatide carries a specific warning for women of childbearing age or reproductive potential. The mechanism of this interaction remains unclear; however, it may be attributed to the glucose-dependent insulinotropic polypeptide (GIP) component impacting the absorption of oral contraceptives. The American Diabetes Association (ADA) advises that individuals with diabetes who are of childbearing potential should have their family planning options reviewed regularly to ensure effective contraception is both implemented and maintained. Although the American College of Obstetricians and Gynecologists (ACOG) has not issued a formal stance on tirzepatide, it recommends limiting GIP/GLP-1 exposure during the periconceptional period by contraception to avoid unnecessary exposure. This study aims to evaluate contraceptive methods among patients of childbearing age (18–49 years) who are prescribed tirzepatide in a family medicine residency program.

METHODS: A retrospective cohort study was conducted among women of childbearing age (18–49 years) who were patients at a residency-affiliated family health center (FHC). The study timeframe spanned from June 1, 2022, to October 15, 2025, and included patients who were prescribed tirzepatide or whose contraception was managed by the FHC while receiving tirzepatide. Eligible patients were required to be receiving tirzepatide for an approved indication, including type 2 diabetes, obesity, obstructive sleep apnea, or other weight-related conditions. Statistical analysis was performed using descriptive methods.

RESULTS: A total of 147 women of childbearing age were prescribed tirzepatide at family health centers for various indications, including FDA-approved indications. The most common indication was weight loss. Mean patient age was 37 years, with an average BMI of 45 kg/m^2 and a mean baseline A1c of 6.5%. Among the 68 patients concurrently using hormonal contraception while prescribed tirzepatide, 35% were using oral contraceptives. The most common contraceptive methods were oral contraceptives, intrauterine devices (IUDs), and implants.

CONCLUSIONS: Patterns of contraceptive use suggest an over-utilization on oral contraceptives, highlighting the need for counseling on family planning and contraception in patients taking tirzepatide. Given potential concerns about oral contraceptive effectiveness, greater consideration should be given to LARC when appropriate, as these methods provide reliable, low maintenance pregnancy prevention.

Diamond Orji, PharmD

Diamond received her PharmD from the University at Buffalo School of Pharmacy in Buffalo, NY. She completed her PGY1 pharmacy residency at UPMC Mercy, Pittsburgh, PA. Currently completing her PGY2 in ambulatory care at UPMC St. Margaret, Pittsburgh, PA. Her professional interests include diabetes, transitions of care and cardiology. Her post-residency plans are pending at this time.

Mentors: Roberta Farrah, PharmD, BCPS, BCACP and Karen Moyer, MD

Assessing adherence to guideline-recommended therapy for patients requiring ASCVD prevention

Peters H, Rebitch C, Smith R

BACKGROUND: Optimizing lipid lowering therapy through evidence-based recommendations is integral to reducing cardiovascular risk. Despite evidence-based guideline statements regularly being updated, gaps still exist in ensuring optimal disease state management. The primary objective was to identify patients appropriate for lipid lowering therapy optimization within an underserved primary care clinic. The secondary objective is to initiate a clinical pharmacist-led protocol to optimize lipid lowering therapy for identified patients.

METHODS: A retrospective chart review was conducted on patients who were seen at UPMC Matilda Theiss Family Medicine clinic from January 1, 2024 to December 31, 2025 and met the following criteria: 18 years and older, primary prevention patients with one or more of the following: LDL >190, Type 2 Diabetes, ASCVD Risk of 7.5% or greater. Secondary prevention patients were also assessed which included the following: history of myocardial infarction, angina, ischemia, stroke, transient ischemic attack, abdominal aortic aneurysm, and peripheral artery disease.

RESULTS: 364 patients met criteria for chart review. Of these, 79.95% were primary prevention and 20.05% were secondary prevention. 67.3% of patients identified were diagnosed with type 2 diabetes and 4.67% had LDL >190. For secondary prevention patients; MI 27.4%, Peripheral Artery Disease 19.18%, Ischemic Stroke 16.44%, Coronary Artery Stenosis 13.7%, Angina 10.96%, TIA 6.85%, and AAA 1.34%. Between both primary and secondary groups, 31.8% were identified as not being on lipid lowering therapy. 47% of patients did not have a lipid panel within 12 months, and only 25% of patients had a documented lipid goal within their chart.

CONCLUSIONS: This project identified gaps in care related to documentation and lab monitoring related to ASCVD prevention. Next steps include providing education to the clinic providers and completing outreach to close the care gap for patients not currently on lipid lowering therapy.

Hannah Peters, PharmD

Hannah obtained her PharmD from Cedarville University School of Pharmacy in 2022. She completed her PGY1 in Community with University of North Carolina Health and is completing her PGY2 with UPMC in a Global Health Ambulatory Track. Her professional interests include serving the underserved, global health, and cardiology. Post residency, Hannah hopes to continue to work in the ambulatory care setting helping patients obtain quality care no matter their situation.

Mentor: Catherine Rebitch, PharmD

Rituximab for the treatment of EBV viremia in cardiothoracic transplant recipients

Pikounis EM, Horn ET, Iasella CJ, Johnson BA, Hage CA, Moore CA

BACKGROUND: In cardiothoracic transplant recipients, a detectable Epstein-Barr (EBV) viral load is associated with the development of post-transplant lymphoproliferative disease (PTLD). PTLD can cause significant morbidity and mortality after solid organ transplantation. EBV-driven B-cell lymphoproliferation is associated with most PTLD cases in the setting of concomitant immunosuppression. Few interventions are known to reliably decrease EBV viral load after solid organ transplantation outside of maintenance immunosuppression reduction. Rituximab, a chimeric monoclonal antibody that targets CD20 on B-cells, has been utilized in clinical practice to treat EBV viremia. Currently, there is limited guidance on the use of rituximab in cardiothoracic transplant recipients. The purpose of this study is to evaluate the efficacy and safety of rituximab for managing EBV viremia in cardiothoracic transplant recipients.

METHODS: This was a retrospective, observational study involving adult cardiothoracic transplant recipients admitted to UPMC Presbyterian between September 1 and September 30, 2025, who received at least one dose of rituximab for the preemptive treatment of EBV viremia. Patients who were less than 18 years old, pregnant, or received rituximab for treatment of PTLD were excluded from the study. EBV viral load data of all units were accepted, with data presented as copies/mL or logarithmic values converted to international units/mL (IU/mL) utilizing our institution's conversion guidance. Data regarding EBV viral load trajectory were utilized for analysis, while demographic information, such as time from transplant, EBV serostatus, induction type, and immunosuppression regimen, was also collected.

RESULTS: A total of 30 treatment courses with rituximab were included in the study, represented by 27 unique patients. Most patients received a lung transplant (88.9%), received basiliximab induction (66.7%), were EBV seropositive (66.7%), and received one dose of rituximab (76.7%). The median EBV viral load pre- and post-administration of rituximab therapy were 85,918 (IQR: 29,663-242,716) IU/mL and 0 (IQR: 0-8,146) IU/mL, respectively. 23 (76.7%) patients were able to achieve an undetectable EBV viral load, with 13 (43.3%) of those patients achieving an undetectable viral load at the initial post-rituximab recheck. Of the 30 treatment courses with rituximab for EBV viremia, 5 (16.7%) patients developed infections within 30 days of therapy, while 1 (3.33%) ultimately developed PTLD.

CONCLUSIONS: The utilization of rituximab for EBV viremia has shown to reduce viral loads in cardiothoracic transplant recipients, potentially limiting the development of PTLD in the future. The majority of patients did not develop any infections within 30 days of rituximab administration, highlighting a favorable safety profile for the therapy.

Eleni Maria Pikounis, PharmD

Eleni is a PGY2 Solid Organ Transplant Pharmacy Resident at UPMC Presbyterian. She is originally from Baltimore, Maryland and received her Doctor of Pharmacy from the University of Maryland School of Pharmacy. Her professional interests include transplant and infectious diseases. Upon completing her PGY2, Eleni will continue to work within the field of transplant with the goal of continuing research to improve post-transplant outcomes.

Mentors: Ed Horn, PharmD, FCCP; Carlo Iasella, PharmD, MPH, BCTXP, BCPS; Cody Moore, PharmD, MPH, BCTXP, BCPS

Portability of pharmacogenomic results in electronic health records across health systems: A local analysis

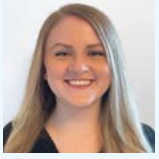
Polkowski KA, Empey PE

BACKGROUND: Pharmacogenomic (PGx) testing guides medication selection and dosing with lifelong clinical utility; however, storage and dissemination of results in the electronic health record (EHR) remains a longstanding challenge. While many institutions have implemented clinical decision support (CDS) locally, significant gaps in interoperability persist as patients transition care across institutions. This analysis examined PGx data flowing into UPMC via Epic's Happy Together to identify barriers to seamless cross-institutional integration.

METHODS: Leveraging our institution's established clinical pharmacogenomics service, a retrospective analysis of external variant level data was conducted to evaluate the frequency and accuracy with which discrete PGx data were successfully transmitted and mapped within the local receiving EHR. Each record was assessed for adherence to PGx data standards, translations, and concordance of key data fields relative to the original PGx report. A manual chart review was performed to validate automated data mapping. The primary outcome was the rate of correct discrete data field mapping, defined as complete and accurate representation of all PGx result components in the receiving EHR without loss or alteration of clinically relevant data. Secondary endpoints include genes tested, source institutions, and actionability defined as a predicted phenotype with CPIC or FDA prescribing guidance.

RESULTS: Results are pending.

CONCLUSIONS: Results are pending. However, preliminary findings reveal inconsistencies in the portability of PGx results, suggesting that EHR-mediated transmission of PGx data remains variable and incompletely realized. Future work will aim to characterize the system-level and structural factors that facilitate or impede PGx portability, with the ultimate goal of ensuring that clinically actionable genetic results follow patients across the care continuum.



Kathleen Polkowski, PharmD, MBA

Kathleen is a Clinical Pharmacogenomics Fellow. She earned a Doctor of Pharmacy degree in 2024 from the Medical University of South Carolina (MUSC) in Charleston, SC. She staffs inpatient and outpatient clinics at UPMC, and her interests include pharmacogenomics, large-scale population research, and integration, implementation, and standardization of PGx into electronic health records. After completing her fellowship, Kathleen will return to MUSC as a clinical faculty member to develop a pharmacogenomics service.

Mentors: Philip E Empey, PharmD, PhD; James C Coons, PharmD; Lucas Berenbrok, PharmD, MS, BCACP, FAPhA

Impact of corticosteroids on bivalirudin dosing in pediatric patients with ventricular assist device inflammation

Richetti SD, Ordons K, Kibler AV, Carl AL, Zinn M

BACKGROUND: Ventricular assist devices (VAD) are used for end-stage heart failure as a bridge to transplant. VAD support requires anticoagulation to mitigate thrombus formation, which may occur in the setting of VAD inflammation due to a systemic inflammatory response syndrome. Corticosteroid therapy lowers C-reactive protein (CRP) and fibrinogen inflammatory markers in VAD inflammation, but data is inadequate regarding the impact of corticosteroids on bivalirudin dosing requirements. The aim of this study is to describe the corticosteroid impact on bivalirudin dosing in the setting of VAD inflammation in pediatric patients.

METHODS: This retrospective chart review evaluated pediatric patients <18 years of age admitted to UPMC Children's Hospital of Pittsburgh between January 1, 2021, and June 30, 2025. Patients were included if they had a Berlin EXCOR® VAD or CentriMag®/PediMag® VAD, utilized bivalirudin as the primary anticoagulant, and received a corticosteroid bolus for VAD inflammation. Patients were excluded if they received maintenance corticosteroid therapy at the time of VAD implantation, implanted with HeartMate III® LVAD, on bivalirudin for indications other than VAD anticoagulation, or on corticosteroid courses for indications other than VAD inflammation. The primary outcome is percent time within the activated partial thromboplastin time (aPTT) therapeutic window. Secondary outcomes assess corticosteroid impact on bivalirudin dosing, inflammatory markers, monitoring, and safety outcomes including bleeding and thrombosis. A Chi-Squared analysis was performed for categorical data and Wilcoxon-signed rank test for paired, continuous data. Statistical analysis was performed using JA statistical software.

RESULTS: Fifty patients reviewed and 18 patients were included in this analysis. The primary outcome demonstrated a non-significant increase in time within the aPTT therapeutic window in the 5-day period during (57%) and after (63%) the steroid course, compared to the 5-day period prior (49%). Bivalirudin median dose (mg/kg/hr) was significantly higher (p=0.007) during (0.52) and after (0.72) the steroid course, compared to the 5-day period prior (0.35). Bivalirudin dose adjustments were consistent over analysis period at a median of 1.54, 1.48, and 1.3 in the 5-day period before, during, and after the steroid course, respectively. CRP and fibrinogen levels decreased due to steroid course initiation. 3 (16.7%) patients experienced major bleeding episodes, 5 (27.8%) experienced thrombosis, with no stroke incidence.

CONCLUSIONS: Steroid course initiation increased time within bivalirudin aPTT therapeutic goal, improved inflammatory markers, and led to significantly higher bivalirudin dosing requirements over the analysis period. Expanded data collection is necessary to draw further conclusions.

Presented at the Pediatric Pharmacy Association Annual Conference in Arlington, VA on April 10, 2026.

Salvatore Richetti, PharmD

Salvatore attended the University of Pittsburgh School of Pharmacy and completed PGY1 residency training at UPMC Mercy, Pittsburgh, PA. He is currently a PGY2 resident pharmacist at UPMC Children's Hospital of Pittsburgh. His professional interests include critical care and emergency medicine. Salvatore's plans following residency are to continue as a clinical pharmacist specialist at Children's Hospital.

Mentors: Kevin Ordons, PharmD, BCCCP; Alexandra Kibler, PharmD, BCPS, BCPPS; Ann Carl, PharmD, BCPPS; Matthew Zinn, DO

Improving medication adherence in the Medicaid population through community pharmacist-provided services

Salvati S, McGrath S, Linn K, Kirisci K, Bhosle M, Coley K

BACKGROUND: The Pennsylvania Pharmacists Care Network (PPCN) is the Pennsylvania Chapter of CPESN USA, a national pharmacy clinically integrated network that supports the provision of community pharmacist-provided services. In 2022, PPCN established a payor program with a Medicaid Managed Care Organization (MCO) to provide adherence services to health plan members including medication synchronization, medication reconciliation, adherence packaging, and home delivery. PPCN pharmacists document these services in the Pharmacist eCare Plan (PeCP), however medication adherence cannot be evaluated using PeCP data alone. The objective of this study is to evaluate medication adherence using both PeCP and claims data in patients who received community pharmacist-provided adherence services as part of a Medicaid MCO payor program.

METHODS: This was a quasi-experimental, pre/post study that evaluated medication adherence for patients who received pharmacist-provided adherence services as part of the Medicaid MCO payor program. The baseline (i.e., pre) period was August 1, 2020 – July 31, 2022. The intervention (i.e., post) period was August 1, 2022 – December 31, 2023, when PPCN pharmacists were providing medication adherence services as part of the payor program. Medication adherence was measured before and after the initiation of the payor program using Proportion of Days Covered (PDC) for three targeted medication classes that align with quality metrics: RASAs, Statins, and noninsulin diabetic medications (NIDM). PDC was calculated at the individual drug level using a prescription-based approach. Two-sided paired t-tests were used to compare the percentage of change in PDC for each of the three target medication classes overall and for baseline nonadherent patients (PDC < 80%). Regression analyses were used to assess if any factors impacted the likelihood of baseline nonadherent patients achieving a PDC above 80% during the intervention period.

RESULTS: There were 1,361 Medicaid patients that met study inclusion criteria. Average PDC across all three target drug classes increased significantly during the intervention period. Furthermore, in baseline nonadherent patients, average PDC increased significantly for all three drug classes from the baseline to intervention periods: RASA 63% to 80%; Statins 60% to 84%; NIDM 62% to 80%. Patients on RASAs or statins with baseline PDC <80% that received medication adherence packaging services were more likely to achieve a PDC of at least 80% during the intervention period.

CONCLUSIONS: This study demonstrates that community pharmacist-provided adherence services as part of a Medicaid MCO payor program positively impacted patient adherence as measured by PDC for RASAs, Statins, and NIDMs.

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Sydney H. Salvati, PharmD

Sydney is the Community Leadership and Research Fellow at the University of Pittsburgh School of Pharmacy. She is originally from Johnstown, Pennsylvania, and completed her PharmD at the University of Pittsburgh School of Pharmacy. Sydney's professional interests include pediatric immunization services, medical billing, and community pharmacy practice transformation. Her research focuses on the implementation and evaluation of community pharmacist-provided services.

Mentors: Kim Coley, PharmD, FCCP; Stephanie McGrath, PharmD

Evaluation of blood product transfusion rates among patients who receive tranexamic acid for femur or pelvic fracture surgery

Sergi R, Pursglove M, Chiappelli A, McCormick P

BACKGROUND: Tranexamic acid is an antifibrinolytic agent utilized for prevention or management of significant bleeding, including secondary to trauma. It has also been used in the operative setting for prevention of blood loss and transfusion with mixed results. Despite the existing literature surrounding tranexamic acid use in orthopedic fractures, there is limited data regarding the use of preoperative tranexamic acid administration in femur and pelvic fractures, and particularly limited data regarding its use when these fractures are a result of traumatic injury. Additionally, previous studies have used varying dosing strategies, with some studies using a standard dose and others using a weight-based strategy. This study aims to investigate the difference in intraoperative and postoperative blood product transfusion rates in patients with femur and pelvic fractures who received preoperative tranexamic acid versus those who did not.

METHODS: This was a retrospective chart review of patients admitted to UPMC Mercy between January 1, 2021, and September 12, 2025. Patients were included if they were 18 years of age or older, and if they underwent surgery for femur or pelvic fractures. Patients were excluded if they received blood products prior to or concurrently with tranexamic acid administration, if they refused blood products, or if they were incarcerated. The primary outcome was the need for blood product transfusion. Secondary outcomes included the total volume of intraoperative and postoperative blood product transfusion, the total number of units administered, and estimated blood loss.

RESULTS: A total of 300 patients were reviewed, and 283 were included. Blood product transfusion was required in 29 of the 120 patients who received tranexamic acid, and 55 of the 163 patients who did not receive tranexamic acid (24.2% vs 33.7%; p=0.081). There were no significant differences in median transfused blood volume (p=0.650) or median estimated blood loss (p=0.270).

CONCLUSIONS: Administration of tranexamic acid did not result in a significant difference in intraoperative or postoperative blood product transfusions. These results suggest that the administration of tranexamic acid, and the dosing strategy utilized, may not significantly impact the need for blood product transfusion among patients undergoing surgery for femur or pelvic fractures.

Rylan Sergi, PharmD

Rylan received her Bachelor of Science in Pharmaceutical Science and Doctor of Pharmacy from the University of Pittsburgh School of Pharmacy in Pittsburgh, Pennsylvania. She is currently a PGY1 pharmacy resident at UPMC Mercy. Her areas of interest include internal medicine and substance use disorders, and she will be staying at Mercy next year to complete a PGY2 in Internal Medicine through Duquesne University.

Mentors: Marci Pursglove, PharmD; Abby Chiappelli, PharmD, BCCCP; Pamela McCormick, PharmD, BCPS, BCEMP

Evaluating benzodiazepine and antiepileptic drug dosing for seizure cessation in the emergency department

Silbert OE, Benzio ZT, Michlinski AN, Reese EM

BACKGROUND: Seizures are a neurologic emergency requiring rapid, weight-based benzodiazepine administration, yet up to 55% of patients nationwide receive subtherapeutic dosing, potentially delaying seizure control and increasing complications. This study evaluates emergency department benzodiazepine and antiepileptic dosing patterns and adherence to evidence-based guidelines, underscoring that in seizure management, time is brain.

METHODS: This retrospective cohort study evaluated emergency department patients at UPMC Hamot who received a benzodiazepine for seizure cessation from September 2024 to September 2025. Patients were included if they were actively seizing and received an initial benzodiazepine dose in the emergency department for seizure cessation. Patients younger than 28 days old, patients with psychogenic non-epileptic seizure (PNES) activity, patients with do not intubate (DNI) orders, and patients who received a benzodiazepine dose for any indication other than seizure cessation were excluded. The primary outcome was the number of patients who received an initial guideline-recommended weight-based benzodiazepine dose for seizure cessation. Secondary outcomes addressed the number of benzodiazepine doses required until seizure cessation occurred, antiepileptic drug dosing, and supplemental oxygen requirements.

RESULTS: A total of 44 patients were included in this study. The primary event occurred in one patient who subsequently required supplemental oxygenation via intubation and mechanical ventilation. Of the included patients, 29 (65.9%) experienced seizure cessation after any initial benzodiazepine dose and achieved seizure cessation. 15 (34.1%) of patients required additional benzodiazepine doses to achieve seizure cessation. 27 (61.4%) of patients required supplemental oxygen at any point following administration of any benzodiazepine dose. 12 (27.3%) of patients received a guideline-recommended weight-based antiepileptic drug dose.

CONCLUSIONS: This study did not include enough patients to be able to determine if the use of guideline-recommended initial weight-based benzodiazepine dosing for seizure cessation for patients actively seizing in the emergency department is appropriate based on the risk of subsequent intubation and mechanical ventilation. Individual patient factors may influence the dose selection in critical situations.

Presented at the American Society of Health System Pharmacists (ASHP) Annual Midyear Clinical Meeting and Exhibition in Las Vegas, NV on December 10, 2026.

Olivia E. Silbert, PharmD

Olivia is a current PGY1 acute care resident pharmacist at UPMC Hamot in Erie, Pennsylvania. She received her Doctorate of Pharmacy and Bachelor of Science in Pharmacy Foundations from Duquesne University School of Pharmacy in Pittsburgh, Pennsylvania. Olivia's professional interests include trauma, emergency medicine, and academia. Upon completion of her residency, Olivia plans to pursue an inpatient clinical pharmacist position in Philadelphia, Pennsylvania.

Mentors: Zachary T. Benzio, PharmD, BCEMP; Ariel N. Michlinski, PharmD; Erin M. Reese, DO, FACEP

Evaluation of clinical outcomes of esketamine therapy in a hospital-based program for treatment-resistant depression

Stewart S, Akerberg H, Lupu A, Nguyen J, Temelie A, Fabian TJ

BACKGROUND: Treatment-resistant depression (TRD) leads to chronic symptom burden, high relapse rates, and significant functional impairment, highlighting the need for improved treatment strategies. Esketamine nasal spray (Spravato) is an FDA approved medication for TRD with a novel mechanism of action compared to traditional antidepressants. This project aims to evaluate clinical outcomes within a hospital-based esketamine program over a six-year period to inform and optimize care pathways for individuals with TRD undergoing esketamine therapy.

METHODS: This was a retrospective quality improvement project conducted in an outpatient, hospital-based esketamine clinic between January 1, 2020 and December 31, 2025. Patients were eligible if they received at least two esketamine treatments during the study period. Baseline demographic information (age, sex, race) and clinical data were collected via retrospective chart review, including antidepressant treatment history, current pharmacotherapy, and prior interventional psychiatry treatments. Esketamine treatment characteristics were recorded, including induction dosing and titration schedules, maintenance dosing and frequency, and changes in depression rating scales (PHQ-9 and HDRS) throughout treatment. Treatment response was defined as a ≥50% reduction in depression rating scale scores. Treatment status and reasons for discontinuation were also documented. The primary outcome was time to treatment response. Secondary analyses of baseline characteristics, prior treatment history, and esketamine treatment patterns were also performed.

RESULTS: A total of 195 patients were included (mean age 46.3 years; 63.6% female; 92.8% White). Most patients (96.4%) had failed more than three prior antidepressant trials, and 98.4% had prior exposure to selective serotonin reuptake inhibitors. At baseline, patients were receiving a mean of one concurrent antidepressant, and 40.5% were on augmentation therapy, most commonly with atypical antipsychotics. Prior interventional treatments included transcranial magnetic stimulation (23%), electroconvulsive therapy (17.4%), and intravenous ketamine (9.7%). Patients received a mean of 26.6 esketamine treatments, with maintenance dosing most frequently every two weeks (38.9%). Overall, 58.9% achieved treatment response (≥50% reduction in depression rating scale scores), with a mean time to response of about 4 weeks (8.1 treatments). At analysis, 32.8% of patients remained active on esketamine treatment. Among those who discontinued, the most common reasons were lack of efficacy (38.2%), patient preference (29.7%), and loss to follow-up (23.6%). Additional subgroup and longitudinal analyses are ongoing.

CONCLUSIONS: Esketamine treatment demonstrated favorable, relatively rapid response rates in a real-world treatment-resistant depression population. These findings provide insight into potential predictors of treatment response and can inform individualized care strategies to optimize clinical outcomes.

Sophia Stewart, PharmD

Sophia earned her degree from the University of Pittsburgh School of Pharmacy in 2025. She is currently completing a PGY1 residency at UPMC Western Psychiatric Hospital and will begin a PGY2 psychiatric pharmacy residency there in July. Her professional interests include treatment-resistant depression and geriatric psychiatry, and following residency, she plans to practice as a psychiatric clinical pharmacist in an academic medical center.

Mentors: Hannah Akerberg, PharmD; Ana Lupu, PharmD; Tanya J. Fabian, PharmD, PhD, BCPP; Andreea Temelie, PharmD, BCPP

Neonatal outcomes associated with beta lactam versus non-beta lactam Group B Streptococcal prophylaxis

Walker VL, McCullough J, Oakes A, Nero J

BACKGROUND: Beta lactam antibiotics are recommended first line for preventing the vertical transmission of Group B Streptococcus (GBS) during vaginal deliveries. Roughly 10% of the US population reports penicillin allergies. Cefazolin is recommended for low-risk penicillin allergies. Clindamycin can be used for patients with penicillin allergies and high risk of anaphylaxis if the isolate is susceptible, but additional testing is required. Vancomycin can also be used in cases of high-risk penicillin allergies or unknown GBS status. This project aims to identify whether maternal GBS prophylaxis with non-beta lactams (clindamycin and vancomycin) corresponds with adverse neonatal outcomes.

METHODS: This was a retrospective chart review of obstetric patients 18 years or older admitted to UPMC Magee-Womens Hospital between January 2021 and December 2025 who were GBS status positive or unknown, received antibiotic prophylaxis during labor, and delivered vaginally. Patients diagnosed with chorioamnionitis or who underwent cesarean delivery were excluded.

Neonatal outcomes of interest included NICU admissions, length of stay, rate of positive blood cultures, and duration of antibiotic therapy. Discern reports were used to extract data and a PGY1 resident reviewed patients' charts for eligibility. Demographic data including pregnant patient age, weight, gestational age at delivery, documented antibiotic allergies and associated reactions were collected, as well as data about the prophylactic antibiotic used (dose, time of first administration, time of delivery, total doses prior to delivery). Descriptive and inferential statistics will be used for data analysis.

RESULTS: Pending formal analysis.

CONCLUSIONS: Pending formal analysis.

Veronica Walker, PharmD

Veronica is a current PGY1 pharmacy resident at UPMC Magee-Womens Hospital. Prior to residency, Veronica graduated from Duquesne University School of Pharmacy in 2025. She is passionate about antimicrobial stewardship and has remained interested in infectious diseases since pharmacy school. Following residency, Veronica plans to work in a hybrid inpatient clinical pharmacist role in Pittsburgh, PA.

Mentors: Jenna McCullough, PharmD, BCPS; Amber Oakes, PharmD, BCPS; Jessica Nero, PharmD, BCPS

The impact of a pharmacist-led AIMS monitoring service

Zecopoulos A, Ryan C, Cullen M, Temelie A, Clark C, Thacker E, Crabtree R, Fabian TJ

BACKGROUND: Tardive dyskinesia (TD) is a serious and often underdiagnosed adverse effect of antipsychotic therapy. Clinical guidelines recommend routine screening using the Abnormal Involuntary Movement Scale (AIMS); however, screening is inconsistently performed. An initial assessment at our institution of over 1,000 patients prescribed antipsychotics between November 1, 2023, and May 31, 2024, showed only 21 patients (1.9%) had an AIMS assessment. The goal of this study was to pilot a pharmacist-led AIMS assessment service to improve assessment rates, particularly among pediatric and high-risk inpatient populations.

METHODS: This two-phase, prospective study evaluated the impact of a pharmacist-led Abnormal Involuntary Movement Scale (AIMS) monitoring service in an acute psychiatric hospital. Baseline data (January 15–May 11, 2024) were obtained via retrospective chart review. Phase 1 (January 15–May 11, 2025) implemented pharmacist-performed AIMS assessments on select inpatient units for patients receiving scheduled antipsychotics with ≥3 tardive dyskinesia (TD) risk factors; all patients <18 years were included. Phase 2 (January 12–March 26, 2026) expanded the service hospital-wide, with pharmacists, residents, and supervised interns conducting AIMS for patients on antipsychotics >6 months, ≥24 hours after admission. The primary outcome was the rate of attempted or completed AIMS assessments pre- versus post-intervention.

RESULTS: Pre-implementation, AIMS monitoring was minimal, with 6.6% completed and 0.9% attempted assessments. Post-implementation, AIMS completion and attempt rates significantly increased to 21.3% and 10.6%, respectively ($p < 0.001$). One case of TD (1.4%) was identified. Subgroup analyses showed significant improvements among pediatric (7.5% to 20%) and high-risk patients (4.3% to 58.7%) (both $p < 0.05$). During Phase 2, 1,021 patients were screened, with 202 meeting inclusion criteria; 16.3% of AIMS were completed, 26.2% were not clinically appropriate or refused, and 57.4% were discharged prior to completion.

CONCLUSIONS: Pharmacist-led AIMS assessments addressed a critical gap in TD monitoring for psychiatric inpatients who had historically received minimal screening despite guideline recommendations. A targeted, pharmacist-led intervention integrated into routine workflows improved TD screening across vulnerable populations. Results from this quality improvement project will provide insight into the impact of a pharmacist-led AIMS consultation service on screening rates and identification of tardive dyskinesia in psychiatric inpatients with a history of antipsychotic use.

Angeleki Zecopoulos, PharmD

Dr. Angeleki Zecopoulos received her PharmD from the Medical University of South Carolina, in her hometown of Charleston, SC. She completed her PGY1 Pharmacy Residency at UPMC Western Psychiatric Hospital and is currently a PGY2 Psychiatric Pharmacy Resident. Her clinical and research interests include severe mental illness, drug induced movement disorders, and forensic psychiatry. Outside of work, Angeleki enjoys hanging out with her pet cat, her co-residents, and watching reality TV.

Mentors: Marissa Cullen, PharmD BCPP; Andreea Temelie, PharmD, BCPP; Tanya J. Fabian, PharmD, BCPP, PhD; Christine Clark, PharmD, BCPP; Emily Thacker, PharmD

PHARMACY RESIDENCY & FELLOWSHIP PROGRAMS

PHARMACY RESIDENCY PROGRAMS

Post Graduate Year 1 (PGY1)

Managed Care at CVS Health
Director: Angela Pieprzak, PharmD, BCPS

Managed Care at UPMC Health Plan
Director: Ashley Modany, PharmD

Pharmacy at CarepathRx
Director: Leita Frey, PharmD, BCPS

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

Pharmacy at UPMC Hamot
Director: Christine Zdaniewski, PharmD, BCPS

Pharmacy at UPMC Harrisburg
Director: Renee Bogdan, PharmD, BCPS

Pharmacy at UPMC Magee-Womens Hospital
Director: Jessica Nero, PharmD, BCPS

Pharmacy at UPMC Mercy
Director: Taylor Miller, PharmD

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

Pharmacy at UPMC Shadyside
Director: Michele F. Hebda, PharmD, BCPS, CTTS

Pharmacy at UPMC St. Margaret
Director: Alexandria Taylor, PharmD, BCPS

Pharmacy at UPMC Western Psychiatric Hospital
Director: Matthew Joseph, PharmD, BCPS

PGY1/PGY2 Health-System Pharmacy Administration and Leadership

UPMC Presbyterian Shadyside
Director: Amanda Korenoski, PharmD, MHA, BCCCP

Post Graduate Year 2 (PGY2)

Ambulatory Care at UPMC Presbyterian Shadyside
Director: Carly Gabriel, PharmD, BCACP

Ambulatory Care Global Health at UPMC Presbyterian
Director: Martha Ndung'u, PharmD, BCACP

Ambulatory Care Family Medicine at UPMC Shadyside
Director: Stephanie Ballard, PharmD, BCPS

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

Cardiology at UPMC Presbyterian
Director: Ryan Rivosecchi, PharmD, BCCCP

Critical Care at UPMC Presbyterian
Director: Lara Groetzinger, PharmD, BCCCP

Emergency Medicine at UPMC Mercy
Director: Pamela J. McCormick, PharmD, BCPS

Geriatrics at UPMC Shadyside/RxPartners
Director: Christine Ruby-Scelsi, PharmD, BCPS, BCGP, FASCP

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

Oncology at UPMC Shadyside
Director: Timothy L. Brenner, PharmD, BCOP

Psychiatric Pharmacy at UPMC Western Psychiatric Hospital
Director: Andrea Temelie, PharmD, BCPP

Solid Organ Transplantation at UPMC Presbyterian
Director: Cody Moore, PharmD, MPH, BCTXP, BCPS

FELLOWSHIP PROGRAMS

Antiretroviral Clinical Pharmacology at the University of Pittsburgh
Director: Aaron Devanathan, PharmD, PhD, AAHIVP

Clinical Pharmacogenomics Fellowship at the University of Pittsburgh
Director: Philip Empey, PharmD, PhD, FCCP

Community Pharmacy Leadership and Research at the University of Pittsburgh
Director: Kim C. Coley, PharmD, FCCP

Health Economics and Outcomes Research at the University of Pittsburgh
Director: Kangho Suh, PharmD, PhD

Health-System Pharmacy Administration and Leadership at UPMC
Director: Amanda Korenoski, PharmD, MHA, BCCCP

Infectious Diseases at UPMC
Director: Rachel Marini, PharmD, BCIDP

Medication Safety and Pharmacovigilance
Director: Sandra L. Kane-Gill, PharmD, MS, FCCM, FCCP

Public Health Pharmacy
Director: Joni C. Carroll, PharmD, BCACP, TTS