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ABSTRACTS

# 2024 ACCP Annual Meeting October 12–15, 2024

## ADVANCES IN INTERNATIONAL CLINICAL PHARMACY PRACTICE, EDUCATION, OR TRAINING

### Education/Training

### Mon-31. A career companion masters degree: A new approach to growing public health education for pharmacy practice in Kenya

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**Service or Program:** The Purdue Kenya Partnership (PKP), based in Eldoret Kenya, whose mission is to advance patient care alongside education and research, has supported pharmacy service growth and development within several local education programs. However, a gap remained for public health (PH) training in conjunction with pharmacy. While there are PH degrees offered within local universities, PKP recognized the need for part-time education that allowed pharmacists to continue working while also gaining PH training.

PKP leveraged an established relationship with Purdue Global, an online university offering a blended polysynchronous Master in Public Health (MPH), to create a Kenya-based cohort for the MPH program.

**Justification/Documentation:** Eleven pharmacists participated in the initial cohort. They continued working in their respective practice settings, avoided travel expense costs associated with in-person degrees, and worked in a culturally diverse, international cohort while also working with local colleagues. Each participant desired the ability to grow individual patient care into programs that impact a wider array of patients around broader PH issues.

The MPH curriculum, a 56-credit online program, can be completed in 1 year to 18 months, and includes a capstone project. Purdue Global desired to make this program accessible and offered fee waivers to all participants, credit-waivers for professional experience along with transfer credits from work completed during professional and graduate coursework.

**Adaptability:** This program, adapted from a fellowship plus MPH model, could be adapted to other countries and cohorts as a companion degree for working professionals. Cohorts can be comprised of individuals in the same program or even within a given country.

**Significance:** As pharmacy has evolved within Kenya, there was a need to increase the PH knowledge and opportunities for Kenyan pharmacists to enhance care impact and program reach. This program addressed educational needs in PH and allowed participants to advance the role of pharmacists in Kenya.

### Sun-36. An interprofessional, healthcare collaborative service in Medellin, Colombia to promote a sustainable, primary care model for community wellness

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**Service or Program:** The International Health Service Collaborative, an initiative within USF Health International, serves as a platform for participants to contribute to global health awareness. Together with Universidad CES, they engage in medical and public health education and provide primary care to the residents of Comuna 2 in Medellin, Colombia. The development of the program consists of three phases: planning, implementation, and evaluation that occurs annually.

**Justification/Documentation:** Recognizing that access to healthcare is limited and challenging for most residents in the community, the program yielded significant results this year, with over 430 individuals being seen and ~280 benefiting from educational initiatives. The project demonstrated the power of interdisciplinary collaboration and addressed healthcare disparities. Tangible outcomes included increase access to care, strengthening community bonds, and enduring partnerships with the local university.

**Adaptability:** By partnering with a local university, the program is establishing a long-term, sustainable care model and improve their overall health of the community. Each year a gap analysis is performed to determine needed services. In addition, effort is made to seek out partners that may assist with filling needs beyond the partnership's ability. A variety of services are provided including internal medicine, pediatrics, ophthalmology, dentistry, gynecology, psychiatry, and

  

nutrition. Each service was customized to meet the needs of the community.

**Significance:** A major achievement was the movement from the traditional pharmacy pathway that relies heavily on dispensing and industry roles within Colombia to an environment that fosters pharmacy involvement with clinical decision-making. Implementation of new services and roles for pharmacists was a necessity to help meet the needs. An on-site pharmacy was present for dispensing, counseling and education. Additional areas of pharmacist involvement included conducting cardiovascular risk assessment, home health visits, diabetes education, and inclusion into the internal medicine and pediatric teams. This demonstrates the paradigm shift of the pharmacists' role in Colombia.

### Tues-40. Workload impact and assessment of learning description updates following 2024 ASHP competency areas, goals, and objectives (CAGOs) harmonization

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**Service or Program:** This project assesses the workload impact on residency directors (RPD) and preceptors due to the harmonization of Postgraduate Year One (PGY1) Competency Areas, Goals, and Objectives (CAGOs) in 2024. It also explores developing a standardized annual assessment for consistent documentation and evaluation of Learning Experience Description (LED) updates and approvals within the program.

**Justification/Documentation:** Primary preceptors updated LEDs to align with the newly harmonized PGY1 CAGOs and implemented other updates. LEDs were categorized by learning experience type (Site, System, Hybrid) and rotation type (Elective, Required, Longitudinal Required, Longitudinal Elective). Preceptors were surveyed on changes made to LED, rated on a 5-point Likert scale from "No Changes" to "A Great Deal of Changes." Survey data included time spent, number of learning objectives before and after updates, reasons for changes, and general comments.

**Adaptability:** The data will quantify changes to LEDs and assess the workload on RPDs and preceptors. This framework can be adapted to other institutions to standardize the annual assessment of changes and develop strategies to support residency staff.

**Significance:** Our findings indicate that LEDs were most impacted by the alignment of learning objectives with the new CAGOs, particularly in required clinical, drug use policy, and clinical forum rotations. In total, roughly 30 h were spent by the preceptors and RPDs (excluding approval time). No LEDs required a "Great Deal of Changes" beyond objective alignment, but "Much" changes were noted for objective alignment and changes in primary preceptors. These "Great Deal of Changes" and "Much" changes required approximately 20 min more per LED (75 min vs. 55 min), with survey completion taking 9 min, and PharmAcademic updates taking 30 min on average per LED. This project will inform future strategies for managing workload, documenting changes, and ensuring the continuous improvement of program quality.

### Sat-41. Problem-based learning improves the performance of pharmacy interns in objective structured clinical examinations within a hospital setting

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**Service or Program:** In a hospital setting in Taiwan, an introductory pharmacy practice experience (IPPE) program is offered. This program incorporates problem-based learning (PBL) sessions focusing on 'patient education and consultation in tuberculosis (TB) treatment', along with objective structured clinical examination (OSCE) to assess the performance of IPPE students. This retrospective analysis aimed to evaluate the impact of PBL sessions on TB treatment on OSCE scores.

**Justification/Documentation:** Between 2020 and early 2024, a total of 39 students participated in the study, with 35 assigning to the PBL group and 4 to the lecture group. The maximum achievable score on the OSCE was 30. OSCE questions covered topics such as preventing tuberculosis exposure, medication safety and adherence, and pharmacist-patient interaction. Statistical analysis was conducted using SPSS version 29, with $p < 0.05$ suggesting significant difference. The mean OSCE scores (standard deviation) for the PBL group and lecture group were 25.69 (1.84) and 23.75 (1.26), respectively ($p = 0.049$). Students in the PBL group demonstrated a significant increase in OSCE scores and outperformed those in the lecture group.

**Adaptability:** The PBL model has been standardized for the topic of 'patient education and consultation in TB treatment' within an IPPE rotation hospital in Taiwan. This standardized PBL approach holds potential for extension to other areas within IPPE rotations, facilitating enhanced student learning outcomes. Additionally, the training of standardized patients remains a crucial focus.

**Significance:** The IPPE students in the PBL group demonstrated improved OSCE scores and exhibited superior performance in addressing TB-related issues. Further evaluation will continue with advanced pharmacy practice experiences (APPE) students over the next few years.

## Health Services Research

### Sun-66. Promoting universal health coverage by integrating the revolving fund pharmacy model with the national hospital insurance fund in western Kenya

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**Service or Program:** Since 2012, the Revolving Fund Pharmacy (RFP) model has served as a back-up medication supply chain for the Ministry of Health (MOH) in western Kenya. In this model, RFPs stock essential medications and ensure medications are consistently available to patients at a slightly higher price than the MOH, whenever the MOH pharmacies experience stock-outs. In this study, we describe the integration of the RFP model into the MOH pharmaceutical supply chain via the national hospital insurance fund (NHIF) – the main national insurance program in Kenya.

**Justification/Documentation:** The lack of a reliable and affordable pharmaceutical supply chain is a barrier to achieving Universal Health Coverage (UHC). Without consistent access to medications, patients struggle to manage chronic illnesses as sporadic availability leads to poor outcomes at increased costs. To limit the financial burden on patients, the RFP program worked with the MOH in three counties – Uasin Gishu, Busia, and Bungoma – to establish RFP-NHIF integrated programs, which allow active and valid NHIF beneficiaries to receive drugs at no cost. Between 2022 and 2023, these RFP-NHIF integrated programs served 9068 unique NHIF beneficiaries and dispensed 439 451 units of medications. Chronic disease medications constituted 59%, 37%, and 75% of the medications dispensed in Uasin Gishu, Busia, Bungoma respectively, which highlight the variability in disease burden and supply chain capacity within different health facilities. The average cost to NHIF per patient per month ranged between USD $0.2 and $1.2.

**Adaptability:** We successfully integrate the RFP model into NHIF in three counties. This integration has the potential to be adapted and expanded to other counties in Kenya.

**Significance:** Medication availability and coverage must be a priority for comprehensive health insurance coverage globally. Integrating novel supply chain models, such as the RFP, into UHC ensures availability, affordability, and adherence to medications among patients and bolsters UHC in Kenya.

## Peri-Operative Care

### Sat-82. Enhancing Physicians' Acceptance of Pharmacist Intervention: the 7-Step Systemic Approach

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**Service or Program:** The impact of pharmaceutical care is proportional to physicians' acceptance rates of pharmacist interventions, yet research on maximizing these rates is limited. At Vinmec Healthcare System in Vietnam, the approval rate of surgeons for interventions on antibiotic duration in appendectomy was only 31%, highlighting a need for improvement. To address this, our clinical pharmacists developed a 7-step systematic intervention program to reduce discrepancies in patient care plans between pharmacists and surgeons. This program, based on Quality Improvement methodologies such as the Plan-Do-Study-Act (PDSA) model, was overseen by the Chief Medical Officer for execution support and quality assurance.

**Justification/Documentation:** The 7-step systematic intervention program followed this order: (1) Audit and detect problems, (2) Collect physicians' and experts' opinions, (3) Review guidelines and research, (4) Propose a protocol using the Delphi technique, (5) Analyze outcomes of a proposal, (6) Furnish a protocol, and (7) Routinely assess outcomes of a new protocol. Implementing this program led to significant improvements, notably resolving contentious issues between pharmacists and surgeons. Following the systematic intervention, the acceptance rate for interventions on antibiotic duration in appendectomy surged to 94%, demonstrating the efficacy of this approach.

**Adaptability:** With a well-structured methodology and proven positive results, this program has been widely implemented at Vinmec's Med-Surg unit to boost provider approval of pharmacist interventions. Depending on the detected clinical problem, additional stakeholders beyond surgeons and pharmacists, such as the AMS team or infection prevention and control, may be necessary. Successful program execution relies on identifying and engaging relevant stakeholders, with a clinical pharmacist taking a leadership role.

**Significance:** The 7-step systematic intervention program developed by Vinmec clinical pharmacists has yielded prominent outcomes in enhancing physician acceptance rates of pharmacist interventions and improving pharmaceutical care delivery. This highlights the crucial role of structured, evidence-based strategies in optimizing interprofessional collaboration and ensuring high-quality patient care.

## Women's Health

### Sun-93. On demand ambulatory care: An innovative pharmacist-led, fully virtual service to prescribe hormonal contraception

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**Service or Program:** In 2022 Intermountain Health launched a virtual contraception service. We created a collaborative practice agreement (CPA) allowing pharmacists to prescribe hormonal contraception, and refer for injectable or implanted device, or further evaluation directly to an obstetrician. A patient completes an online form, results are

routed to a remote pharmacy technician who registers the patient for a pharmacist visit. The pharmacist reviews the intake information and conducts a telephone visit. After assessment the pharmacist develops a care plan, then send a prescription for contraception, if applicable, to the Intermountain Home Delivery Pharmacy for mailing to the patient.

**Justification/Documentation:** With recent legislative changes expanding pharmacist prescribing of contraception in Utah, and limited access identified (average 10 week wait to see provider for contraception), pharmacy services partnered with women's health to develop a new service. The state's department of health and governor's office also expressed support due to gaps in women's care and challenges in a rural state, facilitating negotiation with two large payers to fund the service fee.

**Adaptability:** Pharmacists have received 387 intake forms and successfully cared for 349 patients (189 new prescriptions, 7 referred to higher levels of care, and many receiving counseling but ultimately not requiring a new prescription; 29% were new patients to Intermountain Health). To allow for better accessibility via virtual visits and expansion to other states, we created a CPA instead of using the current state.

**Significance:** Intermountain Health, like other established systems, faces competition from new entrants aiming to draw away simple services, such as contraception in exchange for more costly care. The success of this project has catalyzed development of new virtual pharmacy services to avoid loss of and bring in new patients. Expanding to naloxone, erectile dysfunction, hair loss, simple infectious diseases, etc., efforts are underway to move throughout Intermountain Health's multi-state footprint.

## CASE REPORTS

### ADR/Drug Interactions

#### Mon-1. Severe hypoglycemia secondary to beta-cell hyperplasia in the setting of tirzepatide use: A case report

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**Introduction:** Tirzepatide, a glucose-dependent insulinotropic polypeptide(GIP)/glucagon-like peptide (GLP-1) receptor agonist, increases insulin secretion in response to nutrients and reduces circulating glucagon. Although low rates (≤1%) of severe hypoglycemia have been reported in clinical trials of tirzepatide, GLP has been associated with increased beta cell proliferation and non-insulinoma pancreatogenous hypoglycemia. This is the first reported case of severe hypoglycemia secondary to beta cell hyperplasia in the setting of tirzepatide use.

**Case:** A 58-year-old female with a past medical history of type 2 diabetes mellitus presented with severe hypoglycemia of 24 mg/dL. Home medications of metformin, tirzepatide, and insulin degludec were held, and a dextrose 10% infusion was initiated. Despite high infusion rates and continuous enteral nutrition, she remained intermittently hypoglycemic, with blood glucose levels reaching 52 mg/dL. Endocrinology was consulted. Insulin, beta-hydroxybutyrate, and C-peptide levels were inappropriate during confirmed hypoglycemic episodes, prompting consideration of an insulinoma. Imaging was negative for a pancreatic tumor, leading to the diagnosis of insulin-mediated hypoglycemia secondary to beta-cell hyperplasia. She was initiated on diazoxide on hospital day 23, with resolution of her hypoglycemia upon titration to 15 mg/kg/day and was discharged on hospital day 30.

**Discussion:** Our patient's severe and prolonged hypoglycemia was possibly associated with tirzepatide (Naranjo Scale 3). Non-insulinoma pancreatogenous hypoglycemia is characterized by insulin hypersecretion and subsequent hypoglycemia in the absence of an insulinoma. While rare, most cases are thought to be secondary to GLP-1-induced pancreatic cell hyperplasia occurring after bariatric surgery. Although beta cell hyperplasia has not been directly linked with incretin-based therapies, exenatide has been associated with a possible increased risk of pancreatic neuroendocrine tumors. Long term adverse effects of GLP-1 and GIP receptor agonists are not fully known.

**Conclusion:** Incretin-based therapies, particularly tirzepatide, may be associated with beta cell hyperplasia and insulin hypersecretion. Severe hypoglycemia risks should be considered for these agents.

### Adult Medicine

#### Tues-8. Severe, unexplained thyrotropin elevation in long-standing, refractory hypothyroidism

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**Introduction:** Refractory hypothyroidism requires higher doses of levothyroxine than what is estimated by body weight with detailed investigation into potential causes. The objective of this report is to describe treatment of a patient with refractory hypothyroidism without a definitively known cause and its effect on thyroid level outcomes.

**Case:** A 73-year-old male known to a family medicine practice was transferred to the emergency department from clinic and subsequently admitted for chief complaint of bilateral lower extremity edema. The patient's NT-proBNP level was 40 pg/mL (0–375 pg/mL), thyroid-stimulating hormone (TSH) level was 225.5 μIU/mL (0.45–4.5 μIU/mL) and free T4 level was <0.10 ng/dL (0.82–1.77 ng/dL). He reports adherence to 300 μg levothyroxine by mouth daily. With consultation of an endocrinologist, the patient was treated with intravenous therapy (200 μg levothyroxine, 10 μg liothyronine, and 50 mg hydrocortisone). The patient continued 50 μg levothyroxine intravenously for 6 days and was discharged. Levels were repeated 1 month after discharge with continuation of home levothyroxine (300 μg by mouth once daily), TSH (0.15 mIU/mL) and free T4 (1.9 ng/dL). Repeat free T4 level was 1.9 ng/dL at six-month follow-up.

**Discussion:** The patient's physical exam and imaging was normal. His TSH had peaked at 321 μIU/mL during his care. Adherence has been verified multiple times through the patient and external sources. He does not have major disease states known to contribute to refractory hypothyroidism (ie., celiac disease). Little is known on how intravenous levothyroxine will affect levels over time. In this patient case, oral therapy was not controlling the patient's hypothyroidism despite proper administration technique and increased doses. Intravenous therapy reduced the patient's TSH and raised the free-T4 level, which has been maintained for the last 6 months.

**Conclusion:** This case demonstrates the ongoing and acute difficulty in treating patients with refractory hypothyroidism, especially without a definitive cause.

## Ambulatory Care

### Sun-28. Adverse renal effects of dulaglutide and milk-alkali syndrome: A complex clinical case

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**Introduction:** Glucagon-like peptide receptor agonists (GLP-1RA) have emerged as an innovative treatment for type 2 diabetes (DM2). Published case reports, including dulaglutide, have noted an association with acute kidney injury (AKI).[1–9]

**Case:** This case describes a 58-year-old male with DM2 and chronic kidney disease, who presented to the emergency department with nausea and vomiting leading to AKI and hypercalcemia. One month prior the dose of dulaglutide was escalated from 0.75 mg weekly to 3 mg weekly. Subsequently, the patient reported use of calcium carbonate to treat gastrointestinal symptoms. Notably, the patient discontinued dulaglutide 2 weeks prior to admission yet continued to treat symptoms with calcium carbonate. Dulaglutide, its prolonged elimination half-life and excessive calcium carbonate use were pivotal considerations raising suspicions of their contribution to AKI. The Naranjo adverse drug reaction probability scale indicated a probable relationship (score of 5) between AKI and dulaglutide.[14] Upon admission serum creatinine was 13.84 mg/dL, a tenfold increase from baseline, and calcium was 15.1 mg/dL. Renal biopsy revealed nephrocalcinosis, suggesting a link between hypercalcemia and calcium carbonate. Milk-Alkali Syndrome, seen in excessive calcium and alkali consumption, was considered.[10,12]

**Discussion:** The authors believe AKI and MAS occurred within several weeks of a dulaglutide dose escalation. AKI was likely a direct result of volume depletion in the setting of nausea and vomiting related to dulaglutide dose escalation with MAS resulting from excessive calcium carbonate consumption.

**Conclusion:** With a national shortage of GLP1-RAs medications, necessitating patients to transition to alternative GLP1-RAs formulations, it is imperative that healthcare providers exercise careful titration procedures when initiating or adjusting GLP1-RAs to ensure optimal therapeutic outcomes and patient safety. Patient counseling regarding the use over-the-counter products for treatment of gastrointestinal symptoms should occur. Pharmacists are uniquely positioned to recognize potential drug interactions and adverse effects, providing essential guidance to patients and prescribers.

## Cardiovascular

### Mon-15. Impact of primidone CYP3A4 induction on ticagrelor's pharmacodynamics: A case report

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**Introduction:** Use of cytochrome P450 (CYP) 3A4 enzyme-inducers, including primidone, is contraindicated with ticagrelor. In patients with acute coronary syndromes (ACS), reviewing home medications prior to $P2Y_{12}$ inhibitor administration is not always feasible. With a previous report describing stent thrombosis with concomitant primidone, the purpose of this report is to determine the impact of primidone on ticagrelor's pharmacodynamic profile utilizing the VerifyNow platelet aggregation assay.

**Case:** An 83-year-old man presented to an outside hospital with complaints of chest pain and diagnosed with a non ST-elevation myocardial infarction. On day one of admission, he received ticagrelor 180 mg and was continued on 90 mg twice daily. On day seven, he transferred and underwent left heart catheterization receiving two drug-eluting stents to the left anterior descending coronary artery. The drug–drug interaction between the patient's prior-to-admission primidone 50 mg three times daily and ticagrelor was discovered by the team's pharmacist. A VerifyNow assay 23 h after the last ticagrelor dose resulted as 76 $P2Y_{12}$ reaction units (PRU). Eight hours later, he was switched to clopidogrel with a 600 mg loading dose followed by 75 mg once daily.

**Discussion:** The case provides evidence regarding use of primidone in a patient with ACS receiving ticagrelor. The findings contrast with a

report demonstrating ticagrelor failure when combined with primidone. One explanation could be CYP2C19 phenotype variability. CYP2C19 metabolizes primidone to phenobarbital, with phenobarbital primarily responsible for primidone's CYP enzyme-inducing properties. Patients who are CYP2C19 rapid metabolizers, in theory, have higher levels of phenobarbital compared with slow or normal metabolizers, with this patient plausibly representing the latter group.

**Conclusion:** Out of an abundance of caution, primidone use with ticagrelor should be avoided to reduce stent thrombosis risk. If ticagrelor must be used in combination with primidone, PRU levels should be monitored to ensure adequate antiplatelet activity.

## Endocrinology

### Sun-48. Possible cholelithiasis linked to liraglutide and safe subsequent use of semaglutide and tirzepatide without cholecystectomy: A case report

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**Introduction:** This case report presents a unique instance of cholelithiasis possibly linked to liraglutide, followed by the safe use of semaglutide and tirzepatide without a cholecystectomy. Recent literature suggests glucagon-like peptide-1 receptor agonists (GLP-1RAs) may increase the risk of gallbladder disease, yet guidance for their use in such patients, particularly those without cholecystectomy, is limited. This underscores the need to better understand these agents' safety profiles to improve risk assessment and patient care.

**Case:** A 65-year-old black female with type 2 diabetes, on metformin, jardiance, insulin aspart, and insulin glargine, started liraglutide therapy. Despite this, her glycated hemoglobin (HbA1c) worsened (10.4%–13.9%) and she did not lose weight. After 27 months on liraglutide, she presented with sharp right upper quadrant (RUQ) pain. Imaging revealed cholelithiasis without acute cholecystitis. She declined cholecystectomy, and liraglutide was discontinued. Due to poor glycemic control, semaglutide was initiated 3 months later for 22 months, followed by tirzepatide for 12 months, with no recurrence of gastrointestinal or hepatobiliary symptoms despite cholelithiasis noted in subsequent imaging. Notably, her glycemic control improved (HbA1c decreased to 7.3%) with tirzepatide therapy.

**Discussion:** This case contrasts existing literature by demonstrating safe and effective GLP-1RA therapy continuation without cholecystectomy, despite active cholelithiasis. Strengths include improved glycemic control with tirzepatide and no further RUQ pain or hepatobiliary symptoms. Limitations stem from scant guidance on initiating or continuing GLP-1RA therapy with active gallbladder disease. A hypothesis could explore whether specific patient characteristics predict favorable outcomes with current gallbladder issues or if certain GLP-1RAs pose higher risks, refining treatment strategies.

**Conclusion:** This case suggests possible safe continuation of GLP-1RA therapy without cholecystectomy despite cholelithiasis, supporting the conclusion that it could be safe to continue or start GLP-1RA therapy in patients with current gallbladder disease. However, further research is necessary before definitive conclusions can be drawn.

## Hematology/Anticoagulation

### Sun-58. Warfarin resistance in young female patient due to rare genetic variant—A Case Report

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**Introduction:** Most genetic variants within the enzymes that metabolize warfarin result in increased sensitivity to warfarin necessitating decreases in warfarin dosing. Identification of new variants are leading to increased understanding of the genetic basis of warfarin resistance. One variant, the VKORC1 D36Y variant, is being reported more frequently in the literature. This case report defines warfarin resistance and details how the VKORC1 D36Y variant affects warfarin sensitivity.

**Case:** A young North African woman with a mechanical mitral valve presented to the anticoagulation clinic in August 2019 to manage her warfarin therapy. Previously lost to follow-up, the patient restarted warfarin 20 mg daily and therapeutic enoxaparin injections. Persistent subtherapeutic INRs resulted in a referral to hematology and genetic testing. The testing results showed heterozygosity for the VKORC1 D36Y mutation. After testing, her weekly warfarin dose was titrated up to 630 mg/week.

**Discussion:** Warfarin resistance is defined as the administration of warfarin doses greater than or equal to 80–140 mg/week. Recently discovered genetic variants in the VKORC1 enzyme has led to increased understanding of the mechanisms underscoring warfarin resistance. One particular variant, D36Y, reflects a change of aspartic acid to tyrosine at position 36 within the luminal loop.

First described in 2006, Loebstein, et al., later described the prevalence of the D36Y variant in a patient population with stable INRs. Seven out of 15 patients deemed warfarin resistant had the variant, requiring more than 70 mg warfarin/week. Lastly, the D36Y variant frequently presents in individuals of Ethiopian, Ashkenazi Jewish, and North African descent.

**Conclusion:** Within the last 20 years, the VKORC1 D36Y variant has demonstrated significance with respect to warfarin resistance, particularly in patients of Mediterranean descent. Clinicians should recommend testing for this variant when assessing patients deemed warfarin resistant. Further research is warranted to include this variant in future clinical pharmacogenomic guidelines.

## Infectious Diseases

### Sat-68. Tigecycline use in fulminant *Clostridium difficile* colitis refractory to standard care: A case report

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**Introduction:** *Clostridium difficile* is a leading pathogen in healthcare-acquired infections. Current guidelines for treating fulminant *C. difficile* infections (CDI) with ileus recommend vancomycin retention enema (VE) or rectal fecal microbiota transplant (FMT), though these treatments can be difficult to administer or may be refused. We present a case using tigecycline to treat fulminant CDI refractory to initial therapy when rectal options are refused.

**Case:** A 58-year-old male with amyotrophic lateral sclerosis presented with pneumonia and gastrointestinal bleeding. Empiric cefepime was initiated, later escalated to meropenem and sulfamethoxazole/trimethoprim based on cultures. A percutaneous endoscopic gastrostomy (PEG) tube was placed on day 5. On day 9, the patient tested positive for toxigenic C. difficile, and fidaxomicin was administered via the tube. After clinical deterioration, treatment was switched to vancomycin via tube and IV metronidazole. VE was ordered due to persistent ileus; however, the patient refused VE after 3 days and could not tolerate tube therapy due to abdominal pain and ileus. FMT and surgical interventions were not recommended or were declined. With worsening hypotension and persistent ileus, IV tigecycline was initiated as salvage therapy on day 16, leading to improvement in vital signs and resolution of ileus.

**Discussion:** Tigecycline has demonstrated in vitro efficacy against CDI, but its clinical significance remains inconclusive. Some case reports and retrospective analyses suggest higher cure rates with tigecycline, while other studies indicate no significant benefits and potential increases in mortality. Both SHEA/IDSA and ESCMID guidelines provide weak, low-grade evidence for tigecycline in fulminant CDI refractory to standard therapy, citing retrospective studies and noting the lack of controlled trials. Treatment options are limited for patients unable or unwilling to take medications enterally or rectally.

**Conclusion:** With recurrent and refractory CDI cases becoming more common, tigecycline merits further study for fulminant CDI when standard therapy fails or VE/FMT are not viable options.

## Medication Safety

### Tues-80. Ceftriaxone-induced cardiac arrest: A case report within a community hospital system

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**Introduction:** Ceftriaxone is a commonly used third-generation cephalosporin antibiotic that is well-tolerated and can be administered as an intravenous (IV) push. Anaphylaxis to ceftriaxone is rare, and there have been limited post-marketing reports of dermatologic reactions that range in severity. Ceftriaxone-induced cardiac arrest is rare, and there have been six case reports world-wide of ceftriaxone-induced cardiac arrest, two of which were fatal. Proposed explanations of ceftriaxone-induced cardiac arrest include Kounis Syndrome and the combination of proton pump inhibitors (PPI) with ceftriaxone.

**Case:** We report three ceftriaxone-induced cardiac arrests occurring over 5 months in a community hospital system. Patients included are a 46-year-old female, a 53-year-old male, and a 65-year-old male. No patients had an allergy to ceftriaxone and all patients had documentation of previously tolerating ceftriaxone. Each patient received 1 gm of ceftriaxone via IV push for different indications, including urinary tract infection, community acquired pneumonia, and spontaneous bacterial peritonitis. One patient had a PPI as a home medication while another patient was started on a PPI while inpatient. All three patients scored a three on the Naranjo Adverse Drug Reaction Probability Scale, indicating that the reaction was possibly caused by ceftriaxone. Ultimately, two of these patients expired.

**Discussion:** When comparing the cases presented in this report, there were no obvious alternative causes for cardiac arrest. Our hospital system had previously switched from administering certain antibiotics doses as IV piggyback to IV push due to fluid shortages; however, after considering the outcomes of these three patients, we reverted to administering ceftriaxone via IV piggyback.

**Conclusion:** Ceftriaxone-induced cardiac arrest is not well defined in literature, but the three cases presented in this report may indicate that when ceftriaxone is administered as an IV push or concomitantly with a PPI, it could be associated with cardiac arrest.

## Oncology

### Tues-87. Elevated copper levels following liposomal cytarabine and daunorubicin (CPX-351) in a pediatric patient requiring TPN: A case report

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**Introduction:** Liposomal cytarabine and daunorubicin (CPX-351) can be used for treatment of relapsed AML. Once reconstituted it contains 5 mg/mL copper gluconate and has a warning for copper overload in the prescribing information.

**Case:** A 9-year-old male was transferred to St. Jude Children's Research Hospital to pursue chemotherapy for relapsed AML presenting with abdominal distension, ascites, and abdominal mass concerning for chloroma. On arrival, he was receiving total parenteral nutrition (TPN) containing trace elements. Routine TPN labs obtained the following morning resulted a copper level of 153.5 ug/dL

(reference range: 75–153 ug/dL). He started CPX-351 a week later 59 mg/m$^2$ given on day 1, dose reduced to 30 mg/m$^2$ on days 3 and 5 with concern for rising total bilirubin. Trace elements were removed from TPN 2 days after the first CPX-351 dose secondary to rising bilirubin. Copper level collected 3 days after his first dose was elevated at 344.2 ug/dL. Copper level was repeated 7 and 16 days after he completed CPX-351 and remained elevated at 181 ug/dL and 176.3 ug/dL. Total copper gluconate dose from CPX-351 course was 360 mg (270 mg/m$^2$). This patient did not exhibit signs of copper toxicity and did not receive chelation therapy. No other causes for acute rise in copper level were identified. He clinically improved and was discharged on TPN 9 days after his last CPX-351 dose.

**Discussion:** This is the first pediatric report that trends copper levels following CPX-351. Two prospective adult studies, median age >60 years, reported a rise in copper levels 5–7 times baseline and decreased to baseline 6.5 and 10.4 days after the day 5 dose.

**Conclusion:** Patients requiring TPN following administration of CPX-351 may not require copper supplementation with trace elements and should have copper levels monitored as well as evaluation for signs of copper toxicity.

### Sun-72. Clinical outcomes of excluding folic acid in methotrexate therapy for adult multifocal skin langerhans cell histiocytosis: A case report

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**Introduction:** Langerhans' Cell Histiocytosis (LCH) is a rare disorder characterized by the abnormal proliferation of Langerhans cells. While methotrexate is a commonly used treatment for LCH, its use is often associated with adverse effects, particularly mucositis and fatigue. This case report highlights the potential benefit of incorporating folic acid supplementation into LCH treatment protocols involving methotrexate to mitigate these side effects and improve patient outcomes.

**Case:** A 62-year-old female with multifocal LCH involving the skin was treated with mercaptopurine and methotrexate. Despite showing a partial response in her skin lesions, she experienced severe mucositis and fatigue, likely exacerbated by the absence of folic acid supplementation. Her treatment regimen was reassessed, and folic acid 1 mg daily was added, which significantly alleviated her symptoms.

**Discussion:** This case underscores the interplay between treatment efficacy and side effect management in LCH. While methotrexate is an effective treatment option, its use without folic acid supplementation contrasts with established oncological guidelines, where folic acid is routinely prescribed to mitigate methotrexate-induced adverse effects. The addition of folic acid in this case resulted in significant symptom relief, suggesting a potential benefit in updating LCH treatment protocols to include folic acid supplementation alongside methotrexate therapy.

**Conclusion:** This case report generates the hypothesis that incorporating folic acid supplementation into LCH treatment protocols involving methotrexate therapy could improve patient quality of life and treatment outcomes by balancing efficacy with symptom management. Further research is warranted to investigate the potential benefits of this approach in a larger LCH patient population. Ultimately, this case highlights the importance of holistic treatment strategies and the need to reevaluate and update existing protocols for rare disorders like LCH based on clinical experience and emerging evidence.

## Pediatrics

### Sat-78. Treatment of peritoneal ascites with subcutaneous octreotide injections in a pediatric patient with Hennekam syndrome: A case report

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**Introduction:** Hennekam Syndrome (HS) is a rare genetic disorder characterized by maldevelopment of the lymphatic system, leading to intestinal lymphangiectasia (IL). Symptom management involves supportive care, but is often insufficient. Octreotide is a somatostatin analogue known to decrease splanchnic blood flow in cases of severe gastrointestinal bleeds. It is postulated subcutaneous octreotide may decrease IL-related ascites, preventing hospitalization. There are no published case reports regarding the use of octreotide in pediatric patients for this indication.

**Case:** A 3-year-old girl with HS and monthly hospitalizations for past 4 months, presented with dyspnea, abdominal girth of 103 cm (baseline: mid-60's) and 14.3 kg weight gain. Peritoneal drain output was 4200 mL within 12 h. Drain output from Day 2–6 was consistently 1000 mL/24 h, replaced with albumin at 0.5 mL per 1 mL output. Subcutaneous octreotide was initiated on Day 7 at 70mcg/kg/day. On Day 8, drain output decreased to 85 mL, but the patient complained of stomach pain. Octreotide was decreased to 18mcg/kg/day with a goal titration to 45mcg/kg/day. On Day 10, the patient's drain output remained negligible, and the drain was clamped. There was no reaccumulation of peritoneal fluid and the patient was discharged on Day 14 on subcutaneous octreotide. The patient did not require readmission for peritoneal ascites management for the next 10 months.

**Discussion:** Symptom management is key for reducing life-threatening edema in patients with HS. Although the exact mechanism of how octreotide reduces lymphatic output is unknown, octreotide inhibits gastrointestinal vasoactive proteins, reduces intestinal absorption of fat and stimulates the autonomic nervous system. In our case, octreotide significantly reduced peritoneal drain output after administration of only two doses. Adverse effects reported were minimal and resolved with daily dose reduction.

**Conclusion:** Subcutaneous octreotide administration at doses between 20 and 70 mcg/kg/day may reduce the need for hospitalization for peritoneal fluid drainage in patients with HS who fail traditional supportive care measures.

### Sat-79. Acute neurotoxicity in a pediatric patient treated with ceftaroline fosamil: A case report

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**Introduction:** Ceftaroline is a fifth-generation, broad-spectrum cephalosporin with activity against methicillin-resistant *Staphylococcus aureus* (MRSA). U.S. clinicians often use off-label higher dosing for severe or difficult-to-treat infections. Although reported adverse effects are generally mild, several case reports exist of adult patients with renal dysfunction experiencing neurotoxicity. This is the first case report of a pediatric patient developing ceftaroline-induced neurotoxicity.

**Case:** An adolescent male presented with acute kidney injury and septicemia due to perinephric abscess and septic emboli. Cefepime and vancomycin were initiated, and cultures resulted in vancomycin-sensitive MRSA. Vancomycin was continued with substantial clinical improvement. On Hospital Day 12, the patient developed persistent fevers and new chest pain and was transitioned to high-dose, renally adjusted ceftaroline. On ceftaroline Day (CD) 4, he endorsed headache and general malaise, with progressive sedation and decreased affect over the next 48 h. On CD 7, new bilateral foot numbness, fine hand tremors and auditory hallucinations were noted. The patient experienced new-onset delirium and more pronounced limb tremors the following day. On CD 9, ceftaroline was discontinued and linezolid and levofloxacin were initiated. The patient's mental status and tremors improved over the following days.

**Discussion:** Cephalosporin-induced neurotoxicity (CIN) is hypothesized to result from the binding of the cephalosporin beta lactam ring to neuronal $GABA_A$ receptors. Patient CIN risk factors include high-dose therapy, critical illness and renal dysfunction. A Naranjo score of 'probable' indicates likelihood of causality. Symptom onset and resolution also correspond with the timing of toxicity reported in literature. Pediatric high-dose and renal adjustment recommendations are extrapolated from adult data using pharmacokinetic (PK) modeling. However, new pediatric PK publications illustrate previous dosing recommendations may be inadequate.

**Conclusion:** Pediatric patients prescribed high-dose ceftaroline with renal dysfunction should be monitored closely for CIN. More robust clinical trials are needed to confirm appropriate dosing for pediatric patients.

## Psychiatry

### Tues-105. Case Report: Pharmacotherapy of Dextromethorphan use disorder with comorbid bipolar I disorder and a notable symptom of boredom by using modafinil and acamprosate

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**Introduction:** Limited literature exists detailing characteristics and pharmacotherapy for dextromethorphan use disorder in adults. This case report provides insight in the context of an inpatient psychiatric treatment and subsequent emergency department encounter.

**Case:** RG is a 49-year-old male with dextromethorphan use disorder, Bipolar I Disorder, and a notable symptom of boredom admitted to the psychiatric ward of the Raymond G. Murphy Medical Center following a dextromethorphan overdose with suicidal intent. After the patient's acute depressive symptoms subsided, modafinil was prescribed to address the patient's symptom of boredom, a likely contributor to his dextromethorphan use. Acamprosate was prescribed to treat cravings for dextromethorphan. Approximately 1 month post-discharge, the patient presented to the emergency room with a 127 beat-per-minute resting pulse, having used dextromethorphan in combination with his modafinil and acamprosate therapy.

**Discussion:** Due to the limited evidence existing regarding dextromethorphan use disorder and treatment of contributing underlying boredom, pharmacological mechanism was a key consideration in determining pharmacotherapy for this patient. In addition to the patient's endorsement of prior benefit, acamprosate was selected with the consideration that its NMDA receptor modulation may attenuate the cravings associated with DXM upon discontinuation, which is a NMDA receptor antagonist. Additionally, modafinil was postulated to benefit motivation based on a small randomized-controlled trial (Muller et al.) and combat boredom via dopaminergic pathway signaling observed in human PET scans. The latter likely contributed to tachycardia when the patient resumed dextromethorphan use.

**Conclusion:** Further investigation and empiric evidence is required to determine if NMDA modulating medications such as acamprosate may provide benefit to adult patients in dextromethorphan use disorder. Additionally, the benefit of modafinil to motivation, as well this possible drug interaction, merits further exploration. The therapy appears promising as, despite the resumption of dextromethorphan use and ensuing tachycardia, the patient remained motivated to continue the therapy.

## Transplant/Immunology

### Mon-101. Case report of voriconazole dose adjustments in severe hepatic impairment following liver transplant

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**Introduction:** Liver transplant recipients in chronic liver transplant rejection are expected to have decreased metabolism of any hepatically metabolized drug. This case report illustrates the use of

pharmacokinetic monitoring and empiric dose adjustments for treatment of suspected fungal infection with voriconazole in a patient with limited hepatic function.

**Case:** A 30-year-old female liver transplant recipient presented 9.5 months post transplant with elevated liver enzymes and marked cholestasis with worsening chronic liver rejection. Voriconazole treatment initiated based on high suspicion of invasive fungal infection. Total bilirubin was elevated greater than 40 mg/dL during treatment course. After initial unadjusted voriconazole dosage of 6 mg/kg every 12 h for two doses, the dose was reduced to 2 mg/kg every 12 h on day 3. After two doses of this reduced regimen, serum voriconazole level was 3.5 mcg/mL. Due to level drawn prior to estimated steady state, the dose was reduced to 2 mg/kg every 24 h on day 4. Following three doses of this regimen, the serum voriconazole trough level was within goal range at 3.3 mcg/mL. The patient then transitioned to hospice care.

**Discussion:** The adjustments in voriconazole dosage to maintain therapeutic concentrations were partially aligned with literature including the hepatic impairment population. Drug information references state to reduce maintenance dosing by 50% in mild to moderate hepatic impairment. The unique situation of this case gives rationale for early trough monitoring combined with both dose and frequency adjustments in patients with severe cholestasis.

**Conclusion:** Empiric reduction of voriconazole is indicated to avoid toxicity in patients with severe cholestasis from chronic liver transplant rejection. Drawing an early in therapy trough level is useful to assess for accumulation. The results of this case suggest a reduction in weight-based maintenance dosage to 2 mg/kg every 24 h with close monitoring of trough levels to confirm the dosing interval.

## CLINICAL PHARMACY FORUM

### Ambulatory Care

### Tues-24. Implementation and advancement of comprehensive medication management services within primary care settings in an integrated healthcare system

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**Service or Program:** St. Luke's health system, with two hospitals (257 and 25 beds) and over 40 clinics, serves northeastern Minnesota, northwestern Wisconsin, and the Upper Peninsula of Michigan. In spring 2024, St. Luke's merged with Aspirus Health, expanding to 19 hospitals, 130 outpatient locations, and nearly 14 000 team members.

At St. Luke's, a team of three clinical pharmacists developed and implemented three interprofessional primary care practice sites where they deliver comprehensive medication management (CMM) services. The foundation for these services began with the development of a family medicine practice by a clinical faculty member, which grew to include an additional faculty member and host pharmacy students and residents. In 2018, the team launched a PGY-2 residency program, with the graduate becoming St. Luke's first full-time ambulatory care clinical pharmacist and CMM supervisor.

The team worked to become credentialed, acquire practice privileges in both the hospital and clinics, and implement billing with Chronic Care Management and Medication Therapy Management CPT codes. CMM services are provided to patients who have commercial, Medicare, or Medicaid insurance, including those undergoing transitions of care and identified by various contracts (i.e., value-based care and commercial contracts).

**Justification/Documentation:** Primary care practice sites were strategically chosen to address national provider shortages and high burnout rates. Pharmacist-led CMM visits significantly enhanced patient care accessibility, clinical outcomes, interprofessional collaboration, and patient satisfaction. During the COVID-19 pandemic, services expanded to telehealth, improving access for rural and recently discharged patients.

**Adaptability:** This pharmacist-led CMM model can serve as a framework for primary care and rural settings nationwide, benefitting patients, providers, learners, and health systems alike.

**Significance:** Replication of this model strategically addresses provider shortages, burnout, and enhances patient satisfaction, clinical outcomes, and healthcare access. As a team, the advancement of progressive pharmacy practice, while also providing robust education to the future generation of pharmacists, can be achieved.

### Mon-8. SMART AMR: Integrating clinical pharmacists in population health teams to enhance asthma care

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**Service or Program:** The SMART AMR program integrates clinical pharmacists into the population health team to optimize asthma management by improving the asthma medication ratio (AMR) and promoting the use of Single Maintenance and Reliever Therapy (SMART) for asthma patients. The program incorporates clinical decision support tools (CDSTs) to guide prescribing practices towards evidence-based SMART therapy in ambulatory care settings across a multi-state healthcare system.

**Justification/Documentation:** Asthma remains a significant public health issue, often exacerbated by suboptimal medication use and management strategies. This program addresses the need for enhanced asthma management by leveraging the expertise of clinical pharmacists. The effectiveness of the program is evidenced by quantitative measures, including an increased AMR and higher rates of SMART therapy prescriptions. Preliminary results indicate a 5%

improvement in patients reaching AMR goals and a 51% increase in SMART prescribing. Qualitative feedback from patients highlights improved asthma control and patient satisfaction.

**Adaptability:** The SMART AMR program is designed to be generalizable across various healthcare settings. The use of CDSTs is integral, ensuring that the program can be seamlessly implemented in other healthcare networks with similar resources. It is tailored to the needs of the asthma patient population and can be delivered by equivalently qualified clinical pharmacists in collaboration with healthcare teams.

**Significance:** The SMART AMR program advances the role of clinical pharmacists in optimizing asthma care. By demonstrating the impact on AMR and the adoption of SMART therapy, it underscores the value of pharmacists on population health teams. The program provides a model that can be replicated and scaled to enhance asthma care surrounding patient satisfaction, quality metrics, and clinical outcomes.

### Sun-12. Implementation of pharmacist-led tobacco cessation classes in a primary care clinic

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**Service or Program:** The pharmacy team at a primary care office led modified, in-person Freedom From Smoking® (FFS) classes with the addition of personalized pharmacotherapy. FFS® is a comprehensive, cognitive, behavior-oriented program that utilizes group interaction and support developed by the American Lung Association. Pharmacists met with patients individually during session 2 of the class to prescribe medication for tobacco cessation. Follow up was provided throughout the remainder of the 8 sessions and several weeks thereafter. Adult patients who were current tobacco users were recruited through the primary care clinic and by informing practitioners about the service for referral. Providers order a consult to pharmacy for tobacco cessation, which serves as the referral to the classes and allows the pharmacists to prescribe and adjust tobacco cessation medications.

**Justification/Documentation:** Despite efforts by large corporations to decrease tobacco use rates, high levels of tobacco use continue within the United States and healthcare costs related to tobacco are increasing. Developing programs to help patients quit tobacco is imperative and FFS® is a widely available program for tobacco cessation. Pharmacists embedded in ambulatory clinics or pulmonary clinics are in prime positions to help combat the ongoing tobacco epidemic. The model described here is reproducible in other clinic settings and the measure of success, tobacco abstinence, can be easily collected.

**Adaptability:** Any healthcare provider, including pharmacists, can become a certified FFS® trainer and class sizes can scaled to fit the specific clinic environment. Having a consult agreement in place for prescribing pharmacotherapy can ensure a continuum of care.

**Significance:** Since the beginning of 2024, all patients enrolled in the classes have quit tobacco use. The addition of personalized pharmacotherapy management to structured, proven, tobacco cessation classes enables pharmacists to bridge the gap between the effectiveness of both tobacco cessation counseling and medication use to ensure tobacco cessation.

## Critical Care

### Sun-81. Evaluation of optimization strategies for tenecteplase time-to-administration at a large academic medical center

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**Service or Program:** A pilot program was implemented at our institution incorporating pharmacists attending adult medical emergencies (AME) to carry and mix tenecteplase at bedside for high-risk pulmonary embolism (PE) or cardiac arrest secondary to suspected PE between July and December 2023. This expands the current process for pharmacist response to inpatient unit AMEs to provide documentation and medication-related needs for the AME team during day and evening hours (0700–2300) on weekdays.

**Justification/Documentation:** Yale-New Haven Hospital transitioned from alteplase to tenecteplase as the formulary thrombolytic agent in December 2022. Historically, if patients required thrombolytics for any indication, a call was made to central pharmacy, the medication was prepared in the IV room, and delivered to the unit for administration. In July 2023, a pilot was started to decentralize the preparation of tenecteplase for high-risk PE and cardiac arrest secondary to suspected PE to reduce time from order placement to drug administration and limit drug waste. Pre-pilot (01/2023–06/2023) time-to-administration with tenecteplase was 29.5 mins ($N = 2$), whereas during the pilot (07/2023–12/2023), all doses were administered prior to order entry ($N = 3$). Waste was compared between a historic period using alteplase (07/2022–07/2023) in which six doses were requested and not administered, as compared to one dose during the tenecteplase decentralized pilot period (07/2023–12/2023).

**Adaptability:** Pharmacists attending AMEs can expedite time-to-administration for thrombolytics in critical patient care situations. In addition to this, pharmacists also are able to provide stewardship of institutional resources by reducing medication-related waste.

**Significance:** This service decentralizes thrombolytics within the inpatient setting while expanding pharmacist clinical services. The reduction in time-to-administration overcomes a major barrier in patients receiving critical medication. Due to inability to return unused doses, reduction in waste is necessary with tenecteplase. The decentralization of tenecteplase led to a reduction in waste representing a potential annualized cost savings of $91195.30 (average wholesale cost of tenecteplase).

## Drug Information

### Tues-37. Harmonization of collaborative practice across an integrated health system

*Sarah Yost, Pharm.D., BCPS, BCACP*[1], Elizabeth Sebranek, Pharm.D., BCPS, BCGP[2], Kathryn Simpson, Pharm.D., MBA[1], Linda Iriye, Pharm.D.[3] and Meryl Biksacky, Pharm.D[1]
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**Service or Program:** Intermountain Healthcare merged with a large health system, resulting in Intermountain Health growing to 60 000 caregivers across seven states. Policies and procedures related to collaborative practice agreements (CPAs) differed across sites. Medication policy and compliance experts created and implemented a standardized process for developing and maintaining existing CPAs to improve quality, maintain compliance with varying state laws, and provide clear expectations.
**Justification/Documentation:** Enterprise-wide implementation of a standardized policy and procedure for CPAs was assigned by pharmacy leadership. A workgroup conducted a gap analysis to evaluate varying CPA processes and review supplementary materials. The work group created a new policy blending both organizations' processes into one policy and procedure document. This harmonized policy was applicable to adult and pediatric and outpatient and inpatient practice sites. The new policy is flexible and inclusive of all areas where CPAs are used to deliver patient care.
A significant portion of the work included a review of collaborative practice-related laws in the seven states where Intermountain is currently located. Due to varying state laws, a procedural table was incorporated into the harmonized policy that listed out requirements for pharmacists and providers, in addition to record-keeping requirements. Language in the policy was intentionally broad to apply to all current and possible future states.
Supplemental materials were revised or created, including a CPA Request Form, a CPA Protocol Manual Template, a CPA Development Checklist, and a CPA Frequently Asked Questions and Workflow. These documents complied with various state laws and set up standard expectations for all pharmacy caregivers.
**Adaptability:** Health systems may benefit from a standardized approach to creating and maintaining CPAs.
**Significance:** A flexible policy and procedure that is applicable to all areas of pharmacy and is compliant with multiple state laws helps to optimize and standardize patient care delivery.

## Education/Training

### Sun-40. Development of a research traineeship to promote the advancement of pharmacist researchers

*Chanda Mullen, PhD*, Gretchen Sacha, Pharm.D., BCCCP, FCCM and Amanda Hansen, Pharm.D., MHA, FACHE, FASHP, CPC
*Department of Pharmacy, Cleveland Clinic, Cleveland, OH*

**Service or Program:** The Pharmacy Research Traineeship (PRT) is an 18-month program for pharmacists committed to incorporating research into their careers. PRT guides trainees through the completion of a retrospective study from ideation to publication. Each trainee is expected to submit an abstract for conference presentation and a manuscript for publication.
**Justification/Documentation:** Many pharmacists participate in research however, there remains limited methods to advance and develop their research skills. PRT fills a gap in what is offered for pharmacy research professional development within the institution. It addresses identified barriers to completing research including lack of dedicated time for research, research educational resources, and availability of research mentorship. A total of 80 h of dedicated research time is awarded to each trainee over the course of the program. Trainees participate in bi-monthly research topic discussions allowing for direct application of skills to their concurrent research project. Mentorship is provided to each trainee by the program faculty.
**Adaptability:** PRT faculty is comprised of seven pharmacy department researchers who share their expertise through topic discussions and mentorship. Bi-monthly 90-min sessions are led by a faculty member and all trainees are expected to attend regularly. Sessions are offered virtually and are recorded to enable asynchronous learning and use of content for future program cycles. To ensure sustainability and continuous improvement of the PRT model feedback from trainees, faculty, leadership, and external peers is elicited.
**Significance:** PRT has the potential to provide a best practice model for pharmacy research education. PRT promotes the advancement of pharmacist researchers by providing them the skills necessary to complete research. Upon completion trainees are well equipped to engage in research that impacts evidence-based practice, patient outcomes, quality of patient-centered pharmacy practice and pharmacoeconomics. This high impact research can then be disseminated in local and national forums.

## HIV/AIDS

### Sat-46. Beyond the counter: Integrating pharmacy students in a community pharmacy HIV testing pilot program

Brandon Garcia, Pharm.D., Sruthi Lakshminarayanan, 2025 Pharm.D. Candidate, Prenin George, 2026 Pharm.D. Candidate and *Michelle Jeon, Pharm.D*
*Philadelphia College of Pharmacy, St. Joseph's University, Philadelphia, PA*

**Service or Program:** This ongoing grant-funded pilot program implemented point-of-care Human Immunodeficiency Virus (HIV) testing and referral services in two community pharmacies within priority neighborhoods in Philadelphia. The program was designed by Philadelphia College of Pharmacy faculty and Sunray Drugs staff to address an unmet need for HIV testing access. Testing services were provided

by pharmacists and technicians. Two pharmacy students assisted with concept design and administrative tasks. Testing was offered regardless of utilization of other pharmacy services.

**Justification/Documentation:** The City of Philadelphia identified priority neighborhoods with the highest incidence of new HIV diagnoses in 2019. This program has expanded HIV testing services within these neighborhoods by offering walk-in testing, a more accessible service compared to traditional appointment-based testing. All administered tests were submitted to a national Centers for Disease Control and Prevention (CDC) reporting system by student pharmacists. Students were also involved in pre-implementation planning, promotion of services to local communities, and assessment of services via tester feedback.

**Adaptability:** Optimal pharmacy testing sites can be identified by locating zip codes lacking adequate HIV services. Both pharmacists and technicians can administer HIV testing, counseling, and referrals. Training can be obtained through the CDC and HIV test manufacturers at no cost. Community pharmacies should utilize consultation areas equipped with privacy dividers and sound machines to increase privacy. Pharmacy staff can incorporate walk-in HIV testing services into routine workflow while maintaining confidentiality of patients.

**Significance:** A total of 12 rapid HIV tests were conducted between September 2023 and May 2024. Student pharmacists were instrumental in maintaining pharmacy sites by conducting weekly control tests, reporting results, and ensuring adequate inventory of supplies. Piloting this clinical service in targeted areas of need in the city of Philadelphia allowed expansion of access to free HIV tests without requiring significant changes in pharmacy workflow or staffing.

## Infectious Diseases

### Tues-74. Optimizing antimicrobial therapy in gram-negative bloodstream infections (BSI) with a pharmacist-led blood culture identification and monitoring protocol

Daniel Ilges, Pharm.D., BCIDP, Jenna Reynolds, Pharm.D., BCPS, *Jacob Schwarz, Pharm.D., MBA, BCIDP, BCCCP, BCPS, FAzPA*, Teresa Seville, M.D. and Andrew Bryan, M.D., Ph.D
*Mayo Clinic, Phoenix, AZ*

**Service or Program:** The Mayo Clinic Arizona pharmacy service, along with infectious diseases and clinical microbiology, sought to decrease time to effective antibiotic therapy in hospitalized adult patients with Gram-negative bloodstream infections (GNBSI) at a 368-bed academic medical center. A protocol was implemented in which positive blood cultures tested by microbiology using the FilmArray® BCID2 panel are immediately routed to pharmacist in-basket with 24/7 coverage. Pharmacy staff intervene and recommend antimicrobial modifications based on an institutional guidance document.

**Justification/Documentation:** The BCID2 panel tests for 33 pathogens and 10 resistance markers. Results are available within 2 h from gram stain. Rapid diagnostic tests can lead to earlier initiation of effective antimicrobials leading to improved patient outcomes, including decreased mortality and hospital length of stay. Prior to the implementation, the median time to effective therapy in patients with GNBSIs currently on ineffective therapy was 30 h. The team sought to decrease this time by at least 50% to a goal time of less than 15 h. In the first month of post-implementation, the median time to escalation was 2.9 h ($n = 5$). There were 118 results reviewed by pharmacy staff within this period, culminating in 70 recommendations, of which 80% were accepted. 58/ 118 (49%) of notes contained at least one recommendation.

**Adaptability:** The protocol and procedure were implemented at an academic medical center and leverages all pharmacy staff including staff pharmacists across all shifts, as well as clinical specialists. The protocol in collaboration with other services can lead to a decrease in time to effective antimicrobial treatment in hospitalized patients.

**Significance:** This protocol highlights the importance of interdepartmental collaboration, as well as the impact of pharmacists on the healthcare team The use of rapid diagnostic tests and appropriate support can lead to a significantly decreased time to effective antimicrobial therapy.

### Tues-78. Social media in promoting accurate influenza vaccine information

*Alejandro Vazquez, Pharm.D.* and Nicole Henry, Pharm.D
*Department of Pharmacy Practice, University of Arizona College of Pharmacy, Phoenix, AZ*

**Service or Program:** A social media campaign was initiated that helped clarify and debunk influenza vaccine misinformation. Videos were produced and shared on social media (Instagram and Linkedin). Each video had a different theme and was developed to reflect a specific vaccine related myth/misinformation. The videos were produced by students and faculty at the University of Arizona College of Pharmacy, using a smart device.

**Justification/Documentation:** The COVID-19 pandemic was a time where misinformation and distrust in the healthcare system resulted in an increase in vaccine hesitancy and skepticism. Social media outlets allowed for rapid spread of misinformation, which contributed to this hesitancy. Many are obtaining their news and information more often from social media, and often, fact checking lags behind sharing of this misinformation. Considering this, it was hypothesized that providing truthful information that was accurate, easily digestible, and enjoyable to watch would provide a benefit for viewers and help to quell vaccine hesitancy in the audience. Metric data from the social media sites were collected to determine reach of the videos.

**Adaptability:** These videos were produced on smart devices and uploaded directly to the corresponding social media sites. They will be promoted more heavily during flu season, to help with uptake of vaccines. Over time, a library of videos will be generated that can be promoted during different times of the year, and to different audiences.

**Significance:** Clinical pharmacists are becoming more integrated into outpatient settings and are often involved in educating on and administering vaccines in the United States. Vaccine hesitancy and misinformation can lead to less reception of vaccines and can lead to outbreaks of communicable infections. While previous efforts have been made to evaluate the effect of social media on vaccine hesitancy, generating content for dissemination on these platforms has not been extensively studied.

### Sat-48. Optimizing antimicrobial therapy in bloodstream infections (BSI) with a Pharmacist-driven blood culture identification protocol

Denisse Garcia Zavla, Pharm.D.[1], Hailey Wang, Pharm.D., BCPS[1], Jacob Schwarz, Pharm.D., MBA, BCIDP, BCCCP, BCPS, FAzPA[2], Mikali Shedd, Pharm.D., BCEMP[1] and *Rachel M Belcher, Pharm.D., BCCCP*[1]

*(1)Pharmacy Services, Yuma Regional Medical Center, Yuma, AZ (2)Mayo Clinic, Phoenix, AZ*

**Service or Program:** The clinical pharmacy service, in collaboration with microbiology and laboratory services, at a 406-bed community hospital in Yuma, Arizona sought to decrease unnecessary and/or inappropriate use of broad-spectrum antimicrobial agents in hospitalized adult patients with bloodstream infections (BSI). A pharmacist-driven blood culture identification protocol was created in which positive blood cultures tested by microbiology using the FilmArray® BCID2 panel, are directly reported, upon final result, to the clinical pharmacist. The pharmacist then interprets the BCID2 result, microorganism, and reported resistance markers (if any), to make targeted antimicrobial treatment recommendations to providers for optimal antimicrobial therapy.

**Justification/Documentation:** The BCID2 panel tests for 43 targets associated with BSI and 10 antimicrobial resistance genes in about an hour from positive blood culture. Rapid identification of microorganisms responsible for blood stream infections (BSI) and associated resistance markers are crucial for the early initiation of effective antibiotics, thus improving patient outcomes, reducing mortality, and antimicrobial stewardship efforts. Implementation of this protocol demonstrated a drastic reduction in the use of broad-spectrum antibiotics by 88% upon initial implementation.

**Adaptability:** This pharmacist-driven protocol was implemented at a community hospital, situated in a geographically rural southwestern community that serves a diverse population including residents along both sides of the U.S.—Mexico border. The recommendations, in collaboration with microbiology services and the use of rapid diagnostic tests (RDTs), (BCID2), led to an increase in optimized antimicrobial therapy and could be implemented at other healthcare systems.

**Significance:** This protocol emphasizes the importance of interprofessional collaboration as well as highlights that clinical pharmacists are integral members of the health care team and are uniquely positioned to contribute to antimicrobial stewardship. Further, the use of RDTs can greatly reduce the time to optimal antimicrobial therapy.

## Oncology

### Mon-83. From paper to practice: Implementing preemptive Dihydropyridine dehydrogenase (DPYD) testing & pharmacogenomic (PGx)-guided dosing to reduce serious treatment-related adverse events (TRAEs) in gastrointestinal malignancies

*Mari Cayabyab, Pharm.D.*[1], Glenda Hoffecker, Pharm.D.[2], Lisa A. Varughese, Pharm.D.[2], Victoria Wittner, MPH[2], Jean De Dieu Ndayishimiye, Pharm.D.[3], Xingmei Wang, MS[4], Joseph Bleznuck, NA[5], Rachel Hatch, Pharm.D.[1], Donna Capozzi, Pharm.D.[6], Avni Santani, Ph.D.[7], Hakon Hakonarson, MD, PhD[8], Ryan Massa, MD[9], Nevena Damjanov, MD[10], Nandi Reddy, MD[11], Randall Oyer, MD[11], Ursina Teitelbaum, MD[12] and Sony Tuteja, Pharm.D., MS, BCPS[13]

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**Service or Program:** The FDA updated package labeling for 5-fluorouracil and capecitabine to highlight the increased risk of TRAEs for *DPYD* variant carriers. Pharmacists from the Penn Medicine Center for Genomic Medicine and gastrointestinal oncology championed efforts to employ preemptive *DPYD* testing for patients receiving fluoropyrimidine (FP) therapy. In a collaborative effort with clinical, laboratory, and informatics colleagues, our team was able to: (1) develop an expanded *DPYD* panel test to include variants found non-European populations, (2) integrate discrete results into the electronic health record (EHR) with clinical decision support (CDS), and (3) incorporate preemptive testing into clinical workflow.

**Justification/Documentation:** Preemptive *DPYD* testing is standard practice in Europe and is recommended by the European Medicine Agency (EMA), but not in the United States. In the Implementing Pharmacogenetic Testing in Gastrointestinal Cancers (IMPACT-GI) study, we measured implementation outcomes and found 57.4% feasibility (the number of PGx results returned prior to cycle 1 of chemotherapy) and 100% fidelity (the number of times providers adjusted dosing

according to patient genotype) when results were returned prior to cycle 1. Compared to a historical population of *DPYD* variant carriers, the rate of TRAEs requiring admission, emergency department or oncology evaluation center visits decreased from 50% to 38%. PGx-guided FP dose reduction led to decreased treatment modification (13% vs. 70%) and treatment discontinuation (13% vs. 40%).

**Adaptability:** This service was implemented in an ambulatory oncology setting at three sites in our health system. Strong stakeholder buy-in (e.g., providers, information technology services, and laboratory) is vital for this multidisciplinary effort.

**Significance:** Pharmacists play a key role in implementing PGx services to further optimize chemotherapy and improve patient safety. PGx-guided dosing for *DPYD* variant carriers led to decreased severe TRAEs, treatment modifications, and treatment discontinuations compared to a historical population. We anticipate this model will improve patient safety as we expand to other oncology care sites.

### Pharmacogenomics/Pharmacogenetics

#### Sun-80. Pharmacist-led implementation of pharmacogenomic services for behavioral health in outpatient, collaborative settings

Morgan Freas, Pharm.D.[1], *Samantha Socco, Pharm.D.*[1], Kale Hanavan, Pharm.D.[1], Ellen Jones, Pharm.D., BA Music & Theatre[2] and Sue Paul, BS Pharm[3]

*(1)Myriad Genetics, Mason, OH (2)Department of Pharmacy Practice, Harding University College of Pharmacy, Searcy, AR (3)SyneRxgy Consulting, LLC, Cincinatti, OH*

**Service or Program:** A pharmacogenomic (PGx) testing service was implemented in two ambulatory collaborative practice settings that provide behavioral health services, including a federally qualified community health center in Cincinnati, Ohio, Crossroads Health Center, and a direct primary care practice in Searcy, Arkansas, OneLife Direct Care. Both settings integrated a pharmacist into the patient care process to provide medication management while utilizing PGx testing.

**Justification/Documentation:** When treating mental health disorders, many factors influence medication selection. Due to a lack of objective information to inform treatment, prescribing often follows a trial-and-error approach, with patients having to trial several medications before ever achieving remission. Since genetic variation may play a role in how patients metabolize or respond to their medications, utilizing pharmacogenomic data may help reduce some of the trial-and-error process.

**Adaptability:** While the workflow and implementation of PGx into medication therapy management (MTM) services can vary based on practice setting, there are some key similarities in how PGx testing is utilized in the behavioral health treatment process. By comparing the implementation and workflow of PGx services in two different outpatient practices, pharmacists can adapt processes that might work best for their own outpatient settings. The reimbursement of pharmacist services related to PGx testing can also vary state to state, but different methods of billing for PGx testing services may be utilized in these ambulatory settings.

**Significance:** Pharmacists are ideally positioned to interpret and contextualize PGx results, given their extensive training in pharmacokinetics, pharmacodynamics, and MTM. Since the inception of these PGx services in 2016 at Crossroads and in 2022 at OneLife, 1451 patients and 146 patients have undergone PGx testing, respectively. Pharmacist-led implementation of PGx at both clinic sites demonstrated the feasibility of testing in a collaborative setting and increased patient confidence in the providers' medication selections.

## ENCORE PRESENTATIONS

### Adult Medicine

#### Tues-10. Pharmacist initiated naloxone discharge prescribing for high-risk patients

Michaela Wermers, Pharm.D.[1], *Ashley Sturm, Pharm.D.*[1], Sarah Mancini, Pharm.D.[1] and Breann Hogan, Pharm.D[2]

*(1)Department of Pharmacy, Mayo Medical Center, Rochester, MN (2) Department of Pharmacy, Mayo Clinic, Rochester, MN*

Presented at the Mayo Midwest Quality Conference, Rochester, MN, July 27, 2022.

### Cardiovascular

#### Sun-21. Real world assessment of sodium glucose cotransporter-2 inhibitor prescribing in hospitalized patients with heart failure

*Julianne Fallon, Pharm.D.* and Emily McElhaney, Pharm.D

*Department of Pharmacy, Cleveland Clinic, Cleveland, OH*

Presented at ASHP Pharmacy Futures 2024 in Portland, OR June 8–12, 2024.

### Critical Care

#### Mon-21. Opioid and sedative weaning and withdrawal in mechanically ventilated adults: An ALERT-ICU sub-study

*Scott Bolesta, Pharm.D., BCCCP, FCCP, FCCM*[1], Lisa Burry, Pharm.D., PhD[2], Marc Perreault, Pharm.D., MSc[3], Celine Gelinas, RN, PhD[4], Kathryn Smith, Pharm.D.[5], Federico Carini, MD[6], Rebekah Eadie, MPharm, MSc[7], Richard Riker, MD[5] and Brian Erstad, Pharm.D[8]

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Abstract published in Critical Care Medicine 52(1):p S452, January 2024. | DOI: 10.1097/01.ccm.0001002004.16896.e0

**Mon-22. International study of opioid and sedative use in patients with ARDS or COVID-19**

*Scott Bolesta, Pharm.D., BCCCP, FCCP, FCCM*[1], Marc Perreault, Pharm.D., MSc[2], Celine Gelinas, RN, PhD[3], Kathryn Smith, Pharm.D.[4], Jaycee Blair, Pharm.D., MBA[5], Kelcie Molchany, Doctor of Pharmacy Candidate[6], Nash Wenner, Pharm.D.[7] and Lisa Burry, Pharm.D., PhD[8]
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Abstract published Critical Care Medicine 52(1):p S454, January 2024. | DOI: 10.1097/01.ccm.0001002020.37277.cb

**Sat-31. Observation of opioid and sedative use in mechanically ventilated adults: An ALERT-ICU sub-study**

*Scott Bolesta, Pharm.D., BCCCP, FCCP, FCCM*[1], Kathryn Smith, Pharm.D.[2], Celine Gelinas, RN, PhD[3], Marc Perreault, Pharm.D., MSc[4], Lisa Burry, Pharm.D., PhD[5], Rebekah Eadie, MPharm, MSc[6], Federico Carini, MD[7], Richard Riker, MD[2] and Brian Erstad, Pharm.D[8]
*(1)Pharmacy Practice, Wilkes University, Wilkes-Barre, PA (2)Maine Medical Center, Portland, ME (3)McGill Uinversity, Montreal, QC, Canada (4)University of Montreal, Montreal, QC, Canada (5)Mount Sinai Hospital, Toronto, ON, Canada (6)Ulster Hospital, Dundonald, United Kingdom (7) University of Toronto, Toronto, ON, Canada (8)Pharmacy Practice and Science, University of Arizona R. Ken Coit College of Pharmacy, Tucson, AZ*

Abstract published in Critical Care Medicine 52(1):p S453, January 2024. | DOI: 10.1097/01.ccm.0001002012.25699.e3.

## Education/Training

**Mon-30. Impact of recruitment-focused strategies in improving diversity, equity, inclusion, and belonging in a pharmacy residency program**

*Marion Javellana, Pharm.D.*[1], Kayla Lawlor, Pharm.D., BCCCP[2], Anthony Scott, Pharm.D., MBA, FASHP[2] and Sara Gattis, Pharm.D., BCTXP[3]
*(1)Department of Pharmaceutical Services, Emory University Hospital, Atlanta, GA (2)Emory University Hospital, Atlanta, GA (3)Children's Healthcare of Atlanta, Atlanta, GA*

Presented at 2024 Southeastern Residency Conference in Athens, GA, April 25, 2024.

**Sun-42. Use of an observer-based assessment measuring individual interprofessional competency in a didactic case collaboration activity**

*Philip Rodgers, Pharm.D., FCCP*[1], Kimberly Sanders, Pharm.D., BCPS[2], Carol Haggerty, MS, DDS, MPH[3], Roxanne Dsouza-Norwood, RDH, MS[4], Allessandra Lowery, DDS[3] and Jackie Zeeman, Pharm.D[5]
*(1)University of North Carolina at Chapel Hill Eshelman School of Pharmacy, Chapel HIll, NC (2)Division of Practice Advancement and Clinical Education, University of North Carolina Eshelman School of Pharmacy, Chapel Hill, NC (3)UNC Adams School of Dentistry, Chapel Hill, NC (4)University of North Carolina Adams School of Dentistry, Chapel Hill, NC (5)Division of Practice Advancement and Clinical Education, Office of Strategic Planning and Assessment, UNC Eshelman School of Pharmacy, Chapel Hill, NC*

Presented at the American Association of Colleges of Pharmacy Annual Meeting, Boston MA, July 21–23, 2024.

## Endocrinology

**Sun-75. Effectiveness and safety of the SGLT2 inhibitors on renal outcomes in patients with type 2 diabetes: A nationwide observational cohort study in South Korea**

Junhyuk Chang, Pharm.D.[1], Chungsoo Kim, Pharm.D.[2], Heejung Choi, MD[3], Rae Woong Park, MD, PhD[4] and *Sukhyang Lee, Pharm.D., PhD*[5]
*(1)Department of Biomedical Informatics, Graduate School of Medicine, Ajou University, Suwon, Korea, Republic of (South) (2)Section of Cardiovascular Medicine, Department of Internal Medicine, Yale New Haven Hospital, Center for Outcomes Research and Evaluation, Yale University, School of Medicine, New Haven, CT (3)Department of Nephrology, Ajou University, School of Medicine, Suwon, Korea, Republic of (South) (4)Department of Biomedical Informatics, Ajou University, School of Medicine, Suwon, Korea, Republic of (South) (5)Division of Clinical Pharmacy, College of Pharmacy, Ajou University, Suwon, Korea, Republic of (South)*

Presented at the International Society for Pharmacoepidemiology, Berlin, Germany, August 24–28, 2024.

## HIV/AIDS

### Mon-64. Efficacy and safety of B/F/TAF in hispanic/latine adults with HIV-1 initiating first-line therapy: 5-year follow-up from two phase 3 studies

Claudia Martorell, MD, MPH[1], Olayemi Osiyemi, MD[2], Mezgebe Berhe, MD[3], Lizette Santiago, MD[4], Christopher Rosero, Pharm.D.[5], Fang Fang, MS[6], *Nathan Unger, Pharm.D.*[7], Jason Hindman, Pharm.D., MBA[7] and Moti Ramgopal, MD[8]
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Presented at the AIDS 2024: the International AIDS Conference, Munich, Germany, July 22–26, 2024.

### Mon-65. Real-world effectiveness and tolerability of bictegravir/emtricitabine/tenofovir alafenamide (B/F/*TAF*) in treatment-experienced (*TE*) people with *HIV* with a history of *CKD*

Ansgar Rieke, MD[1], Joss de Wet, MD[2], Vincenzo Esposito, MD[3], Ana Silva Klug, MD[4], Itzchak Levy, MD[5], John S Lambert, MD[6], Marta Boffito, MD, PhD, FRCP[7], Berend van Welzen, MD[8], Rachel Rogers, Pharm.D.[9], *Nathan Unger, Pharm.D.*[10], Tali Cassidy, PhD, MPH[11], Rebecca Harrison, MS[12] and Christine Katlama, MD[13]
*(1)Gemeinschaftsklinikum Mittelrhein, Kemperhof Koblenz, Koblenz, Germany, Koblenz, Germany, Koblenz, Germany (2)Spectrum Health, Vancouver, BC, Canada, Vancouver, BC, Canada (3)Infectious Diseases and Gender Medicine Unit, Cotugno Hospital, AO dei Colli, Naples, Italy, Napoli NA, Italy, Napoli NA, Italy, Italy (4)HIV and STD Unit (Infectious Disease Service), Hospital Universitari de Bellvitge-Bellvitge Biomedical Research Institute (IDIBELL), L'Hospitalet de Llobregat, Barcelona, Spain, Barcelona, Spain, Barcelona, Spain, Spain (5)Infectious Disease Unit, Sheba Medical Center, Tel Hashomer, Israel; Sackler Medical School, Tel Aviv University, Tel Aviv, Israel, Tel Aviv, Israel, Tel Aviv, Israel, Israel (6) Mater Misericordiae University Hospital, Dublin, Ireland; School of Medicine, University College Dublin, Dublin, Ireland, Dublin, Ireland, Dublin, Ireland, Ireland (7)HIV Department, Chelsea and Westminster Hospital Foundation Trust, London, UK; Department of Infectious Diseases, Imperial College London, London, UK, London, London, United Kingdom (8)Department of Infectious Diseases, University Medical Centre Utrecht, Utrecht, the Netherlands, Utrecht, Utrecht, Netherlands (9)Gilead Sciences, Inc., Foster City, CA, US, Foster City, CA (10)Gilead Sciences, Foster City, CA (11)Gilead Sciences, Stockley Park, UK, Stockley PArk, Uxbridge, Middlesex, United Kingdom (12)Gilead Sciences, Stockley Park, UK, Stockley Park, UK, Uxbridge, Middlesex, United Kingdom (13)Infectious Diseases Department, Sorbonne University, Hôpital Pitié-Salpêtrière, Paris, France, Paris, France, Paris, France, France*

Presented at the American Society of Nephrology Kidney Week; Nov 1–5, 2023.

## Infectious Diseases

### Sat-69. Remdesivir reduces mortality in immunocompromised patients hospitalized for COVID-19 across the pandemic and endemic eras

*Essy Mozaffari, Pharm.D., MPH, MBA*[1], Aastha Chandak, PhD[2], Robert L Gottlieb, MD PhD[3], Chidinma Chima-Melton, MD[4], Mark Berry, PhD[1], Alpesh Amin, MD, MBA, MACP, MHM, FACC, FRCP[5], Tobias Welte, MD[6], Paul E Sax, MD[7] and Andre C. Kalil, MD[8]
*(1)Gilead Sciences, Foster City, CA (2)Certara, Princeton, NJ (3)Baylor University Medical Center, Dallas, TX (4)University of California Los Angeles, Los Angeles, CA (5)University of California, Irvine, Irvine, CA (6) Hannover Medical School, Hannover, Germany (7)Brigham and Women's Hospital, Boston, MA (8)Internal Medicine, University of Nebraska Medical Center, Omaha, NE*

Presented at the ESCMID Global 2024 (formerly known as ECCMID), Barcelona, Spain, 27–30 April 2024.

### Tues-65. Diverse role of porins and $bla_{CTX-M}$ in mediating ertapenem resistance among carbapenem resistant enterobacterales

*Cody Black, Pharm.D., PhD*[1], Raymond Benavides, BA[2], Sarah Bandy, Pharm.D., PhD[2], Steven Dallas, PhD[3], Gerard Gawrys, Pharm.D.[4], Wonhee So, Pharm.D.[5], Alvaro Moreira, MD[3], Samantha Aguilar, Pharm.D.[4], Kevin Quidilla, Pharm.D.[2], Dan Smelter, Pharm.D., PhD[2], Kelly R Reveles, Pharm.D., PhD, BCPS[6], Christopher Frei, Pharm.D., MS, FCCP, BCPS[7], Jim Koeller, MS[8] and Grace Lee, Pharm.D., PhD[8]
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Presented at 13th Annual Frontiers of Translational Science Research Day, UT Health San Antonio, TX, May 2024; Presented at Translational Science 2024, April 2024; Las Vegas, NV.

## Neurology

### Mon-81. Evidence for a between-sex anti-seizure medicine (ASM) efficacy difference: Males respond better than females, as evidenced by valproate (VPA) suppression of EEG photoparoxysmal response (PPR)

*Ronald Reed, BS Pharm, Pharm.D., FCCP, FAES*[1] and Dorothee Kasteleijn- Nolst Trenite, MD, PhD, MPH[2]
*(1)Department of Clinical Pharmacy, School of Pharmacy, West Virginia University, Morgantown, WV (2)Faculty of Medicine & Psychology, University of Rome "Sapienza" II, Roma, Italy*

Published in Epilepsia 2023Nov; 64(S2):A1536, p520-1.

## Oncology

### Tues-84. Impact of coronavirus 2019 on breast cancer screening in African American women

*Jasmin Eugene, Pharm.D.*[1], LaKeisha Williams, Pharm.D., MSPH[1] and Elizabeth Howard, PhD, MSPH[2]
*(1)Xavier University of Louisiana College of Pharmacy, New Orleans, LA (2)Ochsner Xavier Institute for Health Equity & Research, New Orleans, LA*

Presented at the 17th Annual Health Disparities Conference, Xavier University of Louisiana, New Orleans, LA, April 2, 2024.

### Mon-84. Hospital admission for prostate cancer: A health disparity study of black and white men in the United States

*Henry Ogbeifun, MBBS, MPH*[1], Adriana Vargus, Pharm.D.[2], Corbyn Gilmore, BA, MSCI[3] and Christopher Frei, Pharm.D., MS, FCCP, BCPS[4]
*(1)Translational Science, University of Austin, San Antonio, TX (2)Division of Pharmacotherapy and Translational Sciences (PTSCI), The University of Texas at Austin College of Pharmacy and University of Texas Health Science Center School of Medicine, San Antonio, TX (3)8403 Floyd Curl Dr., South Texas Veterans Health Care System, San Antonio, Texas, San Antonio, TX (4)The University of Texas at Austin College of Pharmacy and University of Texas Health San Antonio Long School of Medicine, San Antonio, TX*

Presented at Pharmacy Research Excellence Day. April 9, 2024. UT Austin, Texas.

## Pharmacoeconomics/Outcomes

### Tues-95. Gout epidemiology, pharmacotherapy, healthcare utilization, and outcomes for United States Veterans Affairs patients from 2016 to 2022

*Adriana Vargus, Pharm.D.*[1], Jim Koeller, MS[1], Grace Lee, Pharm.D., PhD[1], Haridarshan Patel, Pharm.D., PhD[2], Brian LaMoreaux, MD, MS[3], Xavier Jones, BS[1] and Christopher Frei, Pharm.D., MS, FCCP, BCPS[4]
*(1)Division of Pharmacotherapy and Translational Sciences (PTSCI), The University of Texas at Austin College of Pharmacy and University of Texas Health Science Center School of Medicine, San Antonio, TX (2) Horizon Therapeutics (now Amgen), Deerfield, IL (3)Amgen Inc., Thousand Oaks, CA (4)The University of Texas at Austin College of Pharmacy and University of Texas Health San Antonio Long School of Medicine, San Antonio, TX*

Presented at The Professional Society for Health Economics and Outcomes Research, Atlanta, Georgia, May 5–8, 2024.

## Pharmacogenomics/Pharmacogenetics

### Mon-109. Pharmacogenomic implications of hereditary disease genes

Benjamin Duong, Pharm.D.[1], Jordan Brady, MS, CGC[2] and *Josiah Allen, Pharm.D*[3]
*(1)Nemours Children's Health, Wilmington, DE (2)Department of Precision Medicine and Genomic Health, St. Elizabeth Healthcare, Edgewood, KY (3)Department of Pharmacy, St. Elizabeth Healthcare, Edgewood, KY*

Presented at the Clinical Pharmacogenetics Implementation Consortium Annual Meeting, Philadelphia, PA, June 20–21, 2024.

### Tues-102. Correlation Between *CYP2C19* genotype and platelet reactivity units in patients receiving clopidogrel after acute ischemic stroke

*Rachael Stone, Pharm.D.*[1], Annie Smith, Pharm.D.[2], Andrew Weko, MPH[3] and Brad Worrall, MD, MSc[3]
*(1)Department of Pharmacy, University of Virginia Health, Charlottesville, VA (2)Department of Pharmacy, Yale New Haven Health, New Haven, CT (3)Department of Neurology, University of Virginia Health, Charlottesville, VA*

Published in Stroke. 2024;55:AWP150. Presented at the American Heart Association International Stroke Conference, Phoenix, AZ, Feb 6–9, 202.

### Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

#### Tues-104. Pharmacokinetics of SC furosemide (Furoscix) in CKD patients: A new option for outpatient diuresis

*Katie Luepke, Pharm.D., BCPS*[1], Christian Mende, MD, FACP, FACN, FASN, FASH, FAHA[2], Phani Kamineni, Pharm.D., MPH[3], Barbara Cornelius, BS[3], Matthew Goodwin, Pharm.D., MBA[4] and John Mohr, Pharm.D[3]

*(1)Medical Affairs, scPharmaceuticals, Atlanta, GA (2)University of San Diego California, La Jolla, CA (3)scPharmaceuticals, Burlington, MA (4) Medical Affairs, scPharmaceuticals, Burlington, MA*

Presented at the American Society of Nephrology Annual Meeting, Orlando, Florida, September 14–17, 2024.

### Transplant/Immunology

#### Tues-108. Transplant pharmacist participation in suitability evaluation using telehealth – Single center experience

Yiwen Chung, Pharm.D.[1], My Patterson, Pharm.D.[2], Benito Valdepenas III, Pharm.D., BCTXP, RN[1] and *Maya Campara, Pharm.D., BCTXP, FCCP, FAST*[1]

*(1)Department of Pharmacy Practice, University of Illinois at Chicago College of Pharmacy, Chicago, IL (2)University of Illinois at Chicago College of Pharmacy, Chicago, IL*

Presented at the International Conference of the Transplantation Society, Istanbul, Turkey, September 22–25, 2024.

## LATE BREAKING ORIGINAL RESEARCH

### Adult Medicine

#### Tues-5. Bleeding rates of apixaban versus unfractionated heparin in patients with acute kidney injury

Samuel Gerardi, Pharm.D

*Pharmacy, Kaleida Health, Buffalo, NY*

**Introduction:** Apixaban usage has grown steadily over the past decade. While guidance exist for chronic renal dysfunction, evidence is limited for acute kidney injury (AKI).

**Research Question or Hypothesis:** Is continuing apixaban versus switching to unfractionated heparin (UFH) in patients with AKI associated with fewer bleeding events without a difference in thromboembolic events?

**Study Design:** This retrospective cohort study compared the bleeding and thromboembolic events in apixaban treated patients receiving apixaban or switched to UFH after developing an AKI (AKIN Criteria II or III).

**Methods:** Patients admitted between 2018 and 2023 who received apixaban or UFH for ≥24 h in the setting of AKI were compared. The primary outcome was composite bleeding rates. Secondary outcomes included major bleeds, clinically relevant non-major bleeds, thromboembolic events, length of stay, and mortality. Demographics, medications, labs, and documentation related to bleeding and thromboembolic events were collected. Demographic and outcome data were analyzed using Mann–Whitney U test and Chi-squared test or Fisher's exact test.

**Results:** Medical records of 771 patients were screened and 110 patients included; 76 (69%) in the apixaban group and 34 (31%) in the heparin group. The heparin group had more patients admitted to the ICU, higher IMPROVE Bleed scores, and higher peak serum creatinine. There was no significant difference in bleeding proportions between apixaban and heparin groups (19.7% vs. 14.7%, $p = 0.527$). Fewer thromboembolic events were noted in the apixaban group (0% vs. 5.9%, $p = 0.035$). Apixaban-treated patients also experienced shorter hospital stays (7.62 vs. 12.11 days, $p = 0.018$) and lower mortality (7.9% vs. 29.4%, $p = 0.003$) compared to those switched to heparin.

**Conclusion:** Patients continued on apixaban after an AKI had no difference in bleeding rates than if they were switched to heparin. However, patients switched to heparin had higher rates of thromboembolism. Further research with larger cohorts is needed to establish a correlation.

### Ambulatory Care

#### Tues-13. Assessment of symptom changes in patients managed through a pharmacist-led COPD primary care program

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**Introduction:** Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disease characterized by breathlessness, cough, and mucus production. Patients' COPD symptoms are persistent and can acutely worsen, leading to life-threatening disease flares, termed exacerbations. International guidelines outline best practices to improve patient COPD symptoms; however, only one-third of patients receive guideline-directed therapy.

**Research Question or Hypothesis:** This evaluation explores the impact of pharmacists providing COPD best practices and medication management interventions on Veteran symptom improvement through a COPD primary care service.

**Study Design:** A program called COPD Coordinated Access to Reduced Exacerbations (COPD CARE) was created within the Department of Veterans Affairs to optimize the delivery of COPD best practices using pharmacists. The program aimed to improve the health outcomes of Veterans by implementing evidence-based practices tailored to COPD management. Service data from 328 Veterans who received the COPD CARE service were obtained from September 2020 to February 2024.

**Methods:** Veterans enrolled in the COPD CARE program received an initial Wellness Visit, during which best practices and interventions were delivered, and baseline COPD symptoms were measured. Symptoms were assessed using the COPD Assessment Test (CAT), measuring the impact of eight COPD symptoms on a patient's health, with scores ranging from 0 (best) to 40 (worst). Symptoms were measured again 1 month after the initial Wellness Visit. To evaluate the association between these interventions and symptomatic improvement, a chi-squared test of independence was conducted.

**Results:** A mean CAT score improvement of 3.2 points was observed between the Wellness Visit and subsequent visit [95% CI, −4.0 to −2.6]. Veterans who received a medication change by pharmacists were more likely to have a clinically meaningful ≥2 point CAT score improvement ($p < 0.001$).

**Conclusion:** The associations between medication changes made by pharmacists and COPD symptom improvement further promotes the role of pharmacists to optimize COPD management in primary care settings.

## Sun-13. Quantifying the impact of embedded pharmacist CMM services on PCP clinical workload burden and patient access

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**Introduction:** Comprehensive medication management (CMM) in primary care settings can improve patient outcomes and decrease costs for preventable hospitalizations and ER visits. Also, reports indicate CMM can decrease primary care physician (PCP) workload and promote professional satisfaction. Yet, there is little quantifiable data on the impact of embedded pharmacists in primary care teams to offset PCP clinical workload burden and expand patient access to PCP appointments.

**Research Question or Hypothesis**: Embedded pharmacist CMM services can reduce PCP clinical workload burden and improve patient access.

**Study Design:** Mixed-methods study at a health-system ACO; one embedded pharmacist was shared across 3 practices with 29 PCPs.

**Methods:** The embedded pharmacist met with PCP-referred patients by appointment and had collaborative practice agreements (CPAs) with PCPs for multiple chronic conditions. The pharmacist used CMM practice processes and met with patients until their therapy goals were achieved.

*Data inputs:* onsite workflow mapping using workload calculations verified with administrative/clinical leaders. Qualitative data was collected in an ACO leaders survey.

*Endpoints:* (1) pharmacist workload capacity for CMM patients/year, (2) PCP clinical workload reduction with CMM services, (3) additional PCP appointments opened up to improve patient access.

**Results:** *Capacity:* Embedded pharmacist can manage a panel of 640 patients/year for longitudinal CMM visits until patients' drug therapy goals are achieved (usually 4 patient-visits per year).

*PCP Clinical Workload:* Approximate reduction by 640–850 h/year with embedded pharmacist using a CPA to implement drug therapy changes/monitoring without requiring PCP review/approval.

*Patient Access:* Pharmacist-provided CMM services can open up 1920 PCP-patient appointments/year.

*ACO Leader Survey*: Embedded pharmacist CMM services informed strategic and operational planning, payer negotiations.

**Conclusion:** PCP clinical workload burden can be reduced when an embedded pharmacist provides CMM services using CPAs with primary care teams. Patient access can be expanded by opening up PCP appointments when patients with medication optimization and management needs are referred to the embedded pharmacist.

## Tues-12. Implementation of a training for community organizations to improve medication access

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**Introduction:** Medication optimization is critical to achieving desired clinical outcomes; however, medication insecurity is often a barrier. Studies suggest a quarter of patients report medication nonadherence due to unaffordability. Although resources to increase medication access exist, healthcare professionals do not receive routine training to address medication affordability. The Center for Health Excellence Quality and Innovation (CHEQI) designed a comprehensive medication access resource tool (MART) to equip community partners to bridge cost barriers.

**Research Question or Hypothesis:** The primary outcome was perceived need, confidence, and barriers to navigating medication access resources after receiving MART training.

**Study Design:** CHEQI collaborated with three community partners to offer live MART training: CICOA, Family Health Clinic – Monon and

Family Health Clinic – Delphi. Attendees were provided an optional post-presentation survey.

**Methods:** The study employed mixed-method research to assess clinic personnel perspectives on confidence and barriers to navigating medication access resources after training. The survey included a structured questionnaire in series of Likert scale and qualitative questions.

**Results:** Fifteen personnel from each partner site completed the post-presentation survey. Respondents included five social workers, four advanced practice nurses, two options counselors, two care coordinators, and one therapist. A majority of respondents reported their clientele mention medication cost-related barriers at least 1 to 3 times a month. All respondents strongly agreed/agreed that MART is an effective tool to access medication resources. MART training improved 14 respondents' confidence to discuss medication cost resources with their clientele. The most commonly perceived barrier to MART implementation in daily workflow was time limitation navigating through the tool. A majority of respondents recommend MART integration into regular work-based trainings to gain additional confidence.

**Conclusion:** Personnel-perceived confidence in navigating medication access resources was increased following initial MART trainings. This data supports the need and desire for routine training on medication access resources for non-pharmacy trained personnel to impact more patients.

## Cardiovascular

### Sun-22. Performance of the American Heart Association PREVENT™ cardiovascular risk calculator in older adults

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**Introduction:** The ability of the recently released American Heart Association PREVENT™ calculator to accurately assign 10-year atherosclerotic cardiovascular disease (ASCVD) risk in a modern cohort of older individuals, including those >79 years, is unknown.

**Research Question or Hypothesis:** Does PREVENT™ have better predictive performance than PCE for ASCVD events in a contemporary cohort of older adults?

**Study Design:** Post-hoc analysis of 18 297 adults from Australia and the U.S., aged ≥65 years, enrolled in the ASPirin in Reducing Events in the Elderly randomized preventive trial of aspirin, including post-trial observational follow-up to 2022.

**Methods:** ASCVD events (non-fatal myocardial infarction, fatal coronary heart disease, stroke), occurring in-trial and during follow-up were adjudicated by expert panel. The discriminative ability of both risk calculators was assessed by Harell's c-statistic following Cox regression. For calibration, predicted event numbers for PREVENT™ and PCE were calculated for 15 510 participants aged 65–79 years by multiplying 10-year predicted risk scaled for the actual length of follow-up of each participant by the total population, and compared with the number of observed events in-trial and follow-up. The analysis was repeated in 2787 participants aged >79 years.

**Results:** PREVENT™ showed superior discriminative performance compared to PCE (PREVENT™ vs. PCE, c-statistic: 0.793 vs. 0.740 $p < 0.001$ in participants aged 65–79 years; 0.854 vs. 0.799, $p < 0.001$ in those aged >79 years). Among participants aged 65–79 years, 1084 ASCVD events occurred; PCE predicted 3102 events (13.0% overestimate) while PREVENT™ predicted 1290 events (1.3% overestimate). For those >79 years, 355 ASCVD events occurred; PCE predicted 1067 events (25.5% overestimate) while PREVENT™ predicted 350 events (0.16% underestimate). PREVENT's discrimination and calibration were superior to PCE when subgroups of sex, country, and race were examined separately.

**Conclusion:** PREVENT™ is superior to PCE in predicting ASCVD events in older adults from the US and Australia, including those aged >79 years.

## Community Pharmacy Practice

### Mon-20. Exploring the patient perspective of community pharmacists delivering care to ethnically diverse individuals with disabilities

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**Introduction:** According to the Centers for Disease Control and Prevention (CDC), nearly one in four people live with a disability in the US, and 76.8% of adults with disabilities encounter barriers that prevent access to available healthcare and other services pertaining to wellness. To combat inequities, healthcare professionals are encouraged to provide patient-centered and culturally responsive care through culturally competent practices.

**Research Question or Hypothesis:** To obtain patient perception of pharmacists' cultural competency in providing care to ethnically diverse patients with disabilities in the community pharmacy setting.

**Study Design:** Prospective, cross-sectional, questionnaire-based study.

**Methods:** Respondents were recruited by Qualtrics to complete an anonymous, nationwide, online survey from August 7 to August 14, 2024. The survey asked for demographic information, frequency of encounters with the pharmacy, perception of quality of care based on their identities (ethnicity, disability), barriers in obtaining medications, and suggestions to improve services. The survey responses were reported using descriptive statistics along with median and interquartile range for the Likert portion.

**Results:** A total of 1218 respondents accessed the survey; 200 self-identified as white, non-Hispanic which served as the control and 1018 patients were from an ethnically diverse background with a disability ($n = 518$) or without disabilities ($n = 500$). Overall, the median age was 40 years and 66% of respondents were female. In all of the cohorts, over 50%–70% of respondents were satisfied with the quality of care provided by pharmacists and pharmacy staff. Barriers identified were communication issues (specific to hearing) and the limited physical space for patients in wheelchairs.

**Conclusion:** To improve health equity, patients suggested to increase diversity of staff members in the pharmacy along with training for pharmacists and staff in cultural humility and competency related to disabilities.

## Education/Training

### Sun-37. Longitudinal preceptor assessment in pharmacy experiential education using entrustable professional activities

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**Introduction:** Entrustable Professional Activities (EPAs) are measures of work that, when paired with entrustment-supervision (ES) scales, are used to assess a learner's performance.

**Research Question or Hypothesis:** Can EPA-based assessments by preceptors measure growth of pharmacy student performance across a pharmacy experiential curriculum?

**Study Design:** Retrospective, cohort.

**Methods:** Assessments using the 2016 AACP Core EPAs 1–6 coupled with an expanded ES scale during experiences in the third and fourth professional year UIC Pharm.D. students from fall 2020 to fall 2023 were analyzed. The primary outcome was the change in entrustment (ES growth) across an experiential curriculum of introductory and advanced pharmacy practice experiences (IPPE/APPE) as assessed by preceptors. Secondary outcomes were growth rates across different types of experiences (community, hospital, ambulatory care, inpatient medicine), training environments (academic medical centers [AMC] versus other healthcare settings [non-AMC]), and the order of these experiences. A conditional growth curve model and an ordinal mixed effects model were used to demonstrate the discrete decisions made for entrustment.

**Results:** A total 12 426 assessments were completed by 557 preceptors evaluating the performance of 509 students during the study period. The raw ES levels and unconditional curves showed growth over time of students from P3 to P4 year across all six EPAs. When comparing care setting, there was lower entrustment in inpatient than outpatient settings and at AMCs compared to non-AMCs across EPAs 1–6. There were no significant differences in P4 ES levels regardless of which P3 IPPE was taken first. However, when the first APPE was inpatient medicine, overall ES levels for EPA 3 during P4 APPEs were significantly higher than when the first APPE was ambulatory care, and significantly higher for EPA 5 when the first APPE was community.

**Conclusion:** With an expanded ES scale, EPA-based assessments by preceptors document learner growth over a pharmacy experiential curriculum.

### Tues-42. Longitudinal self-assessment of students in pharmacy experiential education using entrustable professional activities

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**Introduction:** Entrustable Professional Activities (EPAs) are measures of work that, when paired with entrustment-supervision (ES) scales, are used for student self-reflection of their performance.

**Research Question or Hypothesis:** Can EPA-based student self-assessments measure growth of pharmacy student performance across a pharmacy experiential curriculum?

**Study Design:** Retrospective, cohort.

**Methods:** Preceptor and student self-assessments using the 2016 AACP Core EPAs 1–6 coupled with an expanded ES scale during experiences in the third and fourth professional year UIC Pharm.D. students on rotation from fall 2020 to fall 2023 were analyzed. The primary outcome was the change in entrustment (ES growth) of

self-assessed performance across an experiential curriculum of introductory and advanced pharmacy practice experiences (IPPE/APPE). Secondary outcomes were growth rate differences from preceptors, across different types of experience (community, hospital, ambulatory care, inpatient), training environments (academic medical centers [AMC] versus other types [non-AMC], and rotation order. We used a conditional growth curve model and an ordinal mixed effects model to demonstrate the discrete decisions made for entrustment.

**Results:** We collected 10 098 self-assessments from 509 students and 12 426 assessments by 557 preceptors. The raw ES levels and unconditional growth curves showed growth over time from P3 to P4 year across all six EPAs. When comparing care setting and training environment, inpatient had lower ES scores than outpatient settings on EPAs 2, 4–6 and AMCs had lower ES scores than non-AMCs on EPA 6. Rotation order of IPPE experiences during P3 had no effect on P4 ES levels. The linear distribution shows clustering of assessments between preceptors and students over time. The mixed effects regression model shows a strong relationship between assessments between preceptors and students, which were the same nearly half of the time (48.4%), with preceptor assessment being higher than the student (63.9%) when different.

**Conclusion:** Paired with an expanded ES scale, EPA-based self-assessments document learner growth over a pharmacy experiential curriculum.

## Health Services Research

### Tues-54. Pharmacist role in examining social determinants of health and heart failure readmissions within the hospital readmission reduction program

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**Introduction:** Social determinants of health (SDOH) are fundamental drivers of chronic disease development and exacerbation. In 2022, Congestive Heart Failure (CHF) accounted for 13.9% of all-cause deaths and cost approximately $30.7 billion. Readmissions significantly contribute to costs, as 20%–25% of CHF patients are readmitted within 30 days of discharge. CHF is among the conditions targeted by the Centers for Medicare and Medicaid Services' (CMS) Hospital Readmissions Reduction Program. CMS also requires inpatient SDOH screenings and referrals. Pharmacists are uniquely positioned and equipped to address SDOH, yet SDOH assessment within pharmacy practice remains limited. This study examined the social determinants of CHF readmissions within a multidisciplinary research partnership initiated by a pharmacist, public health scientist, and Quality and Risk Management team.

**Research Question or Hypothesis:** What are the impacts of SDOH on 30-day CHF readmissions?

**Study Design:** This study utilized a participatory research approach and retrospective design.

**Methods:** This study analyzed an EPIC™-generated limited dataset with CHF hospitalizations between January 2021 and April 2024 at three Indiana urban hospitals. The primary outcome was 30-day readmission for CHF. Independent variables included SDOH, demographics, health behaviors, and health outcomes. Statistical analysis comprised descriptive, bivariate (Chi-Square), and multivariate (Binary Logistic Regression) analyses ($p < 0.05$) in SPSS 29.0. This study was exempted by the Indiana University Human Research Protection Program (IRB #14040).

**Results:** The sample comprised 5489 patients with CHF, predominantly White (63.8%), 65+ years old (76.2%), and publicly insured (91.8%). The 30-day readmission rate was 22.4%. Bivariate analysis revealed significant ($p < 0.05$) associations between 30-day readmissions and ethnicity, sex, language, hospital, insurance type, food insecurity, and depression risk. Food insecurity remained significant (OR = 2.128; $p = 0.033$) in multivariate analysis.

**Conclusion:** Food insecurity was a significant predictor of 30-day readmission. Pharmacists can contribute to SDOH screenings, data analysis, and interventions. Future research should evaluate pharmacist-driven SDOH initiatives in various practice settings.

### Sun-56. Application research of Pharmacist Intervention Evaluation (PIE) System in Chinese clinical pharmacists' intervention practice

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**Introduction:** Identification and intervention of drug-related problems (DRPs) is a cornerstone for pharmaceutical care. An effective classification system of DRPs enables to identify the origin of DRPs and improve performance management of pharmacists. However, a standardized DRPs classification system tailored to the Chinese healthcare environment has not been established.

**Research Question or Hypothesis:** To establish and validate Pharmacist Intervention Evaluation (PIE) System, which is a modified Pharmaceutical Care Network Europe (PCNE) DRPs classification system, and further compared the efficacy, acceptability, and feasibility with PCNE system in tertiary hospitals in China.

**Study Design:** Prospective, multi-center, observational study design.

**Methods:** PIE system, consisting of 6 primary and 27 secondary categories, was constructed and validated through expert consensus and multi-center prospective studies. A total of 529 DRP reports were identified, intervened, and recorded by clinical pharmacists according to PCNE and PIE systems, respectively. The classification efficacy, acceptability, and feasibility of the two systems were compared.

Multivariate regression analysis was employed to identify factors associated with classification efficacy of PIE system.

**Results:** PIE system achieved a significant higher classification efficacy than PCNE system (90.54% vs. 73.72%, $p < 0.05$). Better acceptability and feasibility were also exhibited in PIE system compared with PCNE system (4.2 ± 0.83 vs. 3.7 ± 1.07, $p = 0.113$). Multivariate regression analyses identified drug prescribing (OR = 8.768, $p = 0.000$) and dispensing process (OR = 8.178, $p = 0.000$) as two vital factors associated with DRPs classification in PIE system.

**Conclusion:** PIE system, a modified DRPs classification system that fitted Chinese healthcare settings was established and validated. PIE system demonstrated higher classification efficacy, acceptability, and feasibility than PCNE system in Chinese tertiary hospitals. Drug prescribing and dispensing process are the factors that dominated the classification efficacy in PIE system.

## Infectious Diseases

### Mon-70. Pharmacokinetic evaluation of sulbactam-durlobactam in a critically ill patient on continuous venovenous hemofiltration infected with carbapenem-resistant *Acinetobacter baumannii-calcoaceticus*

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**Introduction:** Sulbactam-durlobactam is a novel, preferred antibiotic for the treatment of carbapenem-resistant *Acinetobacter baumannii-calcoaceticus* (CRAB) infections. Current package labeling and drug databases do not provide dosing guidance for patients requiring continuous renal replacement therapy, but ex vivo studies suggest both drugs are freely cleared. Herein, we present the first pharmacokinetic assessment of sulbactam-durlobactam during continuous venovenous hemofiltration (CVVH) in a patient with CRAB bacteremia and ventilator-associated pneumonia (VAP).

**Research Question or Hypothesis:** What is the recommended dosing regimen for sulbactam-durlobactam during CVVH?

**Study Design:** In vivo pharmacokinetic analysis.

**Methods:** A 59-year-old patient (BMI 60 kg/m$^2$) with a prolonged hospitalization in the surgical ICU required CVVH and developed CRAB bacteremia secondary to VAP. Sulbactam-durlobactam 2 g q4h infused over 3 h was initiated based on ex vivo study guidance and the patient's prescribed effluent dose. CVVH was performed via NxStage System One with a 1.6 m$^2$ polyethersulphone membrane filter. Effluent and blood flow rates were 6 L/h and 250 mL/min, respectively, with net hourly fluid removal rate of 25 mL/h and no residual urine output. The sulbactam-durlobactam MIC for the isolate was determined by reference broth microdilution, and whole genome sequencing (WGS) was performed to characterize resistance mechanisms. Steady-state pre, post-filter blood, and effluent samples were collected on three different dosing intervals to characterize plasma exposure and estimate the sieving coefficient (SC).

**Results:** The sulbactam-durlobactam MIC was 4/4 mg/L (susceptible). WGS revealed PBP-1b and PBP-3 mutations. The sulbactam and durlobactam SC ranged from 0.59 to 0.78 and 0.59 to 0.66, respectively, across three different filters. The selected sulbactam-durlobactam dose achieved 100% T > MIC and resulted in microbiological cure with repeat blood cultures demonstrating CRAB clearance; however, the patient was later transitioned to comfort care.

**Conclusion:** Sulbactam-durlobactam monotherapy was associated with microbiologic clearance in a patient with CRAB bacteremia and VAP. An aggressive dosing regimen of 2 g q4h consistent with the prescribed CVVH effluent rate was successful in achieving high T > MIC exposure in plasma.

### Sun-62. Assessment of pharmacist-initiated polymerase chain reaction result interventions on sepsis outcomes

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**Introduction:** Prompt, appropriate antibiotic therapy is critical in treating bacterial sepsis. Identification of the organism from a blood culture takes days, but this process can be expedited with polymerase chain reaction (PCR) assays, which detect bacterial DNA and their resistance genes within twenty-four hours of drawing blood. Part of clinical pharmacists' workflow is to interpret sepsis PCR results and make recommendations to the patients' medical team on how to escalate or deescalate antibiotic therapy based on the identified organism. The pharmacist-initiated change in therapy was evaluated to determine its effect on outcomes in sepsis.

**Research Question or Hypothesis:** To determine how pharmacists' sepsis PCR interventions affect length of stay (total and ICU), ICU admissions, and in-hospital mortality.

**Study Design:** Institutional Review Board-approved, multicenter, retrospective chart review.

**Methods:** Adult patients with sepsis who had a positive PCR test intervened on by a pharmacist between October 1, 2016 and September 30, 2023 were identified for randomized inclusion. Data was collected by reviewing electronic medical records.

**Results:** Patients with antibiotic therapy changes from pharmacist PCR interventions had a significantly shorter hospital stay (median

7 vs. 9 days, $p = 0.0228$). ICU admissions were lower with escalation compared to no change (38.2% vs. 56.2%, $p = 0.0124$), but no difference was observed with deescalation (60.0% vs. 56.2%, $p = 0.7133$). Changes in antibiotic therapy (escalation or deescalation) did not impact in-hospital mortality, ICU length of stay, or SAPS II score. Patients without therapy changes were younger (median 64 vs. 58 years, $p = 0.0156$). Higher SAPS II scores were associated with increased in-hospital mortality (median 30 vs. 28, $p = 0.0619$). Analyze-it Software Ltd. was used for statistical analysis.

**Conclusion:** The act of escalating antibiotic therapy based on PCR results significantly reduced total length of hospital stay and ICU admissions. Patients who were younger were less likely to receive a change in therapy.

## Oncology

### Mon-82. High-throughput screening identifies ADRA2A activation as a potential mechanism to enhance ovarian cancer cell sensitivity to carboplatin

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**Introduction:** Ovarian cancer (OvCa) has a poor prognosis with a 5-year survival rate of ~ 50%. Treatment includes surgery and chemotherapy consisting of carboplatin (CP) and paclitaxel. Despite initial responses, resistance frequently develops, leading to recurrence. A high-throughput screen (HTS) by our lab identified 308 compounds that could resensitize OvCa cells to CP. The present study aimed to validate several lead compounds that targeted the adrenoceptor ADRA2A.

Research Question or Hypothesis: Activation of ADRA2A enhances the chemotoxicity of carboplatin in OvCa tumor cells.

**Study Design:** Quantitative measurement of cell viability by MTT absorbance or number of colonies formed in response to drug treatments was performed. Cells were treated with CP ± ADRA2A compounds and compared to control (no treatment), CP-only control, or combination CP + ADRA2A drug.

**Methods:** The HTS screen used a compound library to identify drugs that may alter CP-induced cytotoxicity. In HTS, the cells were treated with the IC50 dose of CP (400 μM) and each compound (50 μM) for 48 h. Viability was measured by MTT absorbance. CP dose curves (1-2000 μM) were tested alone and in combination with ADRA2A agonists xylazine, dexmedetomidine, and clonidine (50 or 100 μM) to assess their effects on CP IC50 values. Colony formation was evaluated using the IC50 of CP (1 μM) ± 25 μM ADRA2A compound. Cytotoxicity was also measured using cells with ectopic ADRA2A overexpression.

**Data Analysis:** GraphPad Prism 10 was used for statistical analysis by One-Way ANOVA or Student's t-test ($p < 0.05$), and IC50 values were calculated by dose–response nonlinear regression.

Results: Pharmacologic activation or genetic upregulation of ADRA2A significantly enhanced CP cytotoxicity, as indicated by reduced CP IC50 values and fewer colonies formed compared to CP alone.

Conclusion: Activating ADRA2A may increase OvCa tumor cell sensitivity to CP, offering a novel mechanism to enhance CP treatment efficacy. Further in vivo evaluation of ADRA2A is warranted.

## Other

### Tues-90. Peer-assisted telemedicine for hepatitis C is more effective in those with unstable housing: Secondary outcomes of a randomized controlled trial

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**Introduction:** Unstable housing is associated with lower odds of hepatitis C virus (HCV) treatment and cure. Additional challenges in those with housing instability include medication theft and lack of medication storage.

**Research Question or Hypothesis:** We hypothesized that the telemedicine for HCV (TeleHCV) treatment model is most effective among those with unstable housing and that use of medication storage lockers and frequency of peer engagement is associated with higher rates of HCV initiation and cure.

**Study Design:** This is a sub-analysis of a randomized controlled trial comparing peer-facilitated TeleHCV to enhanced usual care for HCV treatment and cure.

**Methods:** Poisson regression with robust standard error estimation was utilized with HCV viral clearance as the outcome, treatment assignment as the exposure, and housing status the effect modifier of interest. Secondary exposures were frequency of peer contacts and use of a medication storage and delivery locker.

**Results:** 141 of 203 participants were unstably housed. Viral clearance was less likely among participants with unstable housing; 48/141 (34%), vs. 31/62 (50%) among stably housed (RR = 0.68, 0.49–0.96, $p = 0.026$). Among TeleHCV, unstably housed participants were more likely to attain HCV cure compared to stably housed participants ($p$ for interaction between treatment assignment and housing status = 0.022). Unstably housed participants in TeleHCV were more

likely to attain viral clearance compared to those in the usual care arm (RR = 6.47, 3.12–13.43, $p < 0.001$). There was no association between locker utilization and HCV treatment initiation or cure by housing status (p values for interactions = 0.63 and 0.7, respectively).

**Conclusion:** TeleHCV was approximately three times more effective at increasing the rate of HCV viral clearance among unstably housed participants than housed participants. Despite an unclear effect on outcomes, medication lockers allowed participants to receive medications in a system that would have otherwise excluded them.

## Pain Management/Analgesia

### Tues-91. Sub-dissociative ketamine: Improved pain control in patients receiving continuous low-dose naloxone for spinal cord protection during endovascular thoracoabdominal aortic aneurysm repair

*Eric Johnson, Pharm.D., MBA, BCCCP*[1], Daniel Davenport, PhD[2], Jimmi Kolpek, Pharm.D.[3], Eric Endean, MD[4], David Minion, MD[4], Joseph Bobadilla, MD[2] and Sam Tyagi, MD[4]

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**Introduction:** Spinal cord ischemia (SCI) leading to paresis or paraplegia is a known risk associated with thoracoabdominal aortic aneurysm (TAAA) repair. Preventative SCI bundles that include the use of continuous low-dose naloxone (cLDN-bundle) reduce this risk but may result in higher opioid requirements and more pain. Sub-dissociative ketamine (SDK) provides opioid-sparing analgesia and is not antagonized by naloxone. This study examines whether SDK improves pain control for patients receiving a cLDN-bundle as part of a TAAA repair.

**Research Question or Hypothesis:** Does SDK lower pain scores and opioid requirements in patients receiving a cLDN-bundle as part of a TAAA repair?

**Study Design:** Randomized, double-blind, placebo-controlled trial.

**Methods:** Twenty patients undergoing endovascular TAAA repair with a 48-hour cLDN-bundle were randomized to an infusion of SDK ($n = 10$) at 0.2 mg/kg/hour or placebo (n = 10). The study infusion was started at induction and continued for 48 h postoperatively. The primary and secondary outcomes were mean oral morphine equivalents (OMEs) and pain scores for the first 48 h postoperatively, assessed in 6-h intervals. Overall mean outcomes were compared between the SDK and placebo groups using a repeated measures general linear mixed model with an auto-regressive covariance structure. Statistical significance was set to $p < 0.05$.

**Results:** The 6-hr estimated mean OMEs were lower in the SDK group at 14.7 mg (95% CI 8.6–20.8) compared to 33.0 mg (95% CI 26.9–39.1) in the placebo group, $p = 0.019$. Six-hour estimated mean pain scores were also lower in the SDK group at 1.9 (95% CI 0.4–3.4) versus 4.2 (95% CI 2.6–5.8) with placebo, $p = 0.040$. No adverse events were seen in the SDK group.

**Conclusion:** This study demonstrated that patients undergoing endovascular TAAA repair in conjunction with a cLDN-bundle required fewer OMEs and reported lower pain scores with the use of an SDK infusion, versus placebo.

## Pharmacogenomics/Pharmacogenetics

### Mon-108. Whole genome sequencing in a diverse cohort identifies genetic predictors of response to SGLT2i

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**Introduction:** SGLT2 inhibitors (SGLT2i) reduce the risk of major adverse cardiovascular and kidney outcomes in type 2 diabetes, heart failure and chronic kidney disease. Numerous genetic variants influence the efficacy and safety of medications, but none are identified for SGLT2i. The All of Us program conducted whole genome sequencing in a diverse cohort consisting of 80% participants from underrepresented populations. Genomic research is essential for identifying novel variants linked to drug response.

**Research Question or Hypothesis:** How does genetic variation in SLC5A2, the gene encoding the SGLT2 transporter, influence the effects of SGLT2i on glucose-lowering?

**Study Design:** Retrospective cohort study.

**Methods:** All of Us participants who were taking an SGLT2i, had available short-read whole genome sequencing data and hemoglobin A1c (HbA1c) values were included. SGLT2i use was identified from linked health data. There were 14 451 genetic variants within 200 kilobases of the SLC5A2 gene start and stop positions. Primary endpoint was the change in HbA1c from prior to SGLT2i initiation up to 60–150 days after initiation. Elastic net regression with adjustment for age, sex and the first 16 principal components and 10-fold cross-validation was used to identify SLC5A2 variants, significantly associated with HbA1c changes.

**Results:** The cohort included 1267 participants with mean age of 66 years, including 48% men, 51% women and 2% other gender, 54% White, 19% Black, 3% Asian and 25% other race/response. Mean baseline HbA1c was 7.8% and the mean change in HbA1c was −0.5% (mean time between baseline and follow-up: 115 days). Elastic net regression identified three variants, significantly associated with a greater reduction in HbA1c after starting an SGLT2i: chr16:31363214:C:G (minor allele frequency (MAF): 31%; beta coefficient: −0.005), chr16:31382223:C:T (MAF: 43%; beta coefficient: −0.029) and chr16:31382228:CT:C (MAF: 29%; beta coefficient: −0.026).

**Conclusion:** Genetic variation in SLC5A2 may influence the effects of SGLT2i on HbA1c lowering. External validation of these findings is needed.

## Substance Abuse/Toxicology

### Mon-105. Bridging the gap: Shaping first responder perspectives on harm reduction

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**Introduction:** The University of Louisiana at Monroe Harm Reduction Education and Referral for Opioid Overdose Reversal (ULM H.E.R.O) Training Program is an evidence-based, harm reduction program provided to first responders with the aim of decreasing stigma regarding harm reduction strategies for opioid use disorder and increase referrals to treatment recovery centers. Currently, there is no available scale to assess a change in attitudes for harm reduction.

**Research Question or Hypothesis:** Is there a positive change in attitudes towards harm reduction strategies for opioid use disorder using a newly developed harm reduction attitude scale (HRAS)?

**Study Design:** A total of 99 Louisiana first responders participated in this study. The HRAS scale was developed using a Likert scale question format. Training sessions covered topics related to stigma and harm reduction for opioid use and opioid overdoses.

**Methods:** Data were collected using the HRAS survey administered before and after training sessions. Survey questions included attitudinal questions towards harm reduction methods. *T*-tests and Marginal Homogeneity tests were used on questions to gauge changes in correct responses and the proportions of responses. Data were analyzed using Stata MP 18 software.

**Results:** Results from a paired t-test on the mean scores of the HRAS show that there was a statistically significant increase in the mean scores from pre- to post- training after attendees completed the training session ($+7.44$, $p \leq 0.001$). We also found that most (15 out of 22) of the questions increased in the proportion of positive answers, some by as much as 36%–37% ($p \leq 0.001$) from before to after the training, the remaining having either non-significant changes or marginally positive increases.

**Conclusion:** The findings support the conclusion that the ULM HERO training improved perceptions towards harm reduction strategies about opioid use and treatment of overdoses in a positive direction. We are currently validating the HRAS for future use.

## Transplant/Immunology

### Mon-100. Assessment of tacrolimus trough concentration changes in liver transplant recipients stopping invasive fungal infection prophylaxis

*Joshua Wiegel, Pharm.D.*[1] and Kelby Drogemuller, Pharm.D. Candidate 2025[2]

*(1)Department of Pharmacy, UW Health, Madison, WI (2)School of Pharmacy, University of Wisconsin Madison, Madison, WI*

**Introduction:** Invasive fungal infections are a common complication following liver transplant with several risk factors identified in the literature. At our institution, patients who meet any high-risk criteria are given a 14-day course of fluconazole 400 mg daily. The impact on our institution's invasive fungal infection rates utilizing this strategy have been previously published and resulted in significantly fewer fungal infections with prophylaxis at 1 year. Fluconazole is well known to inhibit cytochrome P450 3A4 (CYP3A4) and therefore interact with medications that are metabolized by CYP3A4, such as tacrolimus which is the preferred calcineurin inhibitor in liver transplant recipients due to improved rejection and graft survival rates compared to cyclosporine. There are conflicting reports on the impact of fluconazole on tacrolimus concentrations.

**Research Question or Hypothesis:** Evaluate the impact of tacrolimus concentrations when stopping invasive fungal infection prophylaxis with fluconazole in liver transplant recipients.

**Study Design:** Retrospective chart review of adult liver transplant recipients transplanted between 5/1/2023 to 4/30/2024 who met high risk criteria for development of invasive fungal infections and were treated with a standard 14-day course of fluconazole 400 mg daily.

**Methods:** Tacrolimus concentrations and doses were assessed within 1–3 days prior to stopping fluconazole (Time 1) and within 5–7 days after stopping fluconazole (Time 2). The primary endpoint was the mean percent change in tacrolimus concentrations from Time 1 to Time 2.

**Results:** A total of 52 patients met inclusion criteria. Among all patients, the mean percent change in tacrolimus concentrations was $-6.77\%$. The mean change in tacrolimus concentrations among patients whose tacrolimus dose was not adjusted, either empirically or based on sub-/supra-therapeutic concentrations, was $-19.47\%$.

**Conclusion:** Discontinuation of fluconazole without dose adjustments decreases tacrolimus trough concentrations by $\sim$20%, necessitating empiric dose adjustments to maintain therapeutic tacrolimus concentrations.

## Women's Health

### Sun-92. Efficacy and safety of mifepristone and misoprostol compared to misoprostol alone for the resolution of miscarriage and intrauterine fetal death: A systematic review and meta-analysis

*Rachael Pirrami, BSPS*[1] and Justin Reinert, Pharm.D., MBA, BCCCP[2]

*(1)Department of Pharmacy, Cleveland Clinic, Cleveland, OH (2)College of Pharmacy and Pharmaceutical Sciences, University of Toledo, Toledo, OH*

**Introduction:** Mifepristone is approved for the termination of intrauterine pregnancy and has an off-label indication for early pregnancy loss. Its efficacy and safety in combination with misoprostol for the resolution of miscarriage and intrauterine fetal death has not been established.
**Research Question or Hypothesis:** Demonstrate the efficacy and safety of mifepristone and misoprostol together (intervention) compared to misoprostol alone (comparator) for the resolution of miscarriage and intrauterine fetal death.
**Study Design:** Systematic review and meta-analysis conducted through July 2024.
**Methods:** A systematic review and meta-analysis was conducted following the PRISMA methodology. It included randomized controlled trials (RCTs) that evaluated the efficacy and safety of mifepristone and misoprostol together compared to misoprostol alone for the resolution of miscarriage and intrauterine fetal death. Primary endpoints were overall delivery success, 24-h delivery success, and incidence of safety outcomes. A p-value of ≤0.05 was considered statistically significant and heterogeneity was reported as the $I^2$ value. Confidence intervals were reported to assess confidence.
**Results:** Twelve RCTs were included. Overall delivery success was higher in the intervention group (0.73 [CI 0.64–0.82], $p < 0.01$). Twenty-four-hour delivery rate was higher (1.54 [CI 1.32–1.77], $p = 0.06$) and a shorter time to delivery interval (9.22–18.78 vs. 15.47–37.1 h) was observed in the intervention group. Safety outcomes including blood transfusion (−0.01 [CI −0.10 to 0.09], $p = 0.88$), infection (−0.02 [CI −0.11 to 0.07], $p = 0.90$), postpartum hemorrhage (0.02 [CI −0.27 to 0.31], $p = 0.90$), neurologic adverse effects (0.07 [CI −0.00 to 0.15], $p < 0.66$), and fever (−0.00 [CI −0.15 to 0.14], $p = 0.82$) did not show a statistically significant difference between groups. Gastrointestinal adverse effects were more frequent in the intervention group (0.04 [CI −0.03 to 0.12], $p < 0.01$).
**Conclusion:** Mifepristone and misoprostol together demonstrated higher delivery success rates and comparable safety outcomes compared to misoprostol alone. The use of mifepristone and misoprostol together for the resolution of miscarriage and intrauterine fetal death is warranted over the use of misoprostol alone.

## MERIT PRIMER PARTICIPANTS—COMPLETED RESEARCH

### Community Pharmacy Practice

### Sun-113. MeRIT Project: Patient Satisfaction with enhanced patient care services within a clinically integrated network (CIN) of community pharmacies

*Sophia Herbert, Pharm.D.*[1], Kayleigh Walker, Pharm.D. Candidate[1], Evan Rabinowitz, Pharm.D. Candidate[1], Laura DeMarse, Pharm.D. Candidate[1], Margie Snyder, Pharm.D., MPH, FCCP, FAPhA[2] and Kim Coley, Pharm.D[1]
*(1)University of Pittsburgh School of Pharmacy, Pittsburgh, PA (2) Department of Pharmacy Practice, Purdue University College of Pharmacy, Indianapolis, IN*

**Introduction:** CPESN USA is a CIN through which pharmacies are reimbursed for services including social determinant of health screenings, disease state management, and medication management. While it is known that these services benefit patients, there are no studies that have quantified 1) patient acceptability of these services, or 2) general patient satisfaction with pharmacies in a CIN. Quantifying acceptability of services and patient satisfaction is important for sustained integration of clinical services into community pharmacy practice.
**Research Question or Hypothesis:**

1. To what extent do patients find receiving services through a CIN acceptable?
2. How satisfied are patients with their overall care experience within a CIN?

**Study Design:** Quantitative, cross-sectional survey.
**Methods:** Subjects were Medicaid beneficiaries who received enhanced pharmacy services from a random sample of CIN pharmacies in Western Pennsylvania. Survey items were informed by the Theoretical Framework of Acceptability and were refined through pilot testing. The survey covered acceptability of nine enhanced services and general satisfaction through multiple-choice, Likert scale, and open-ended questions. The survey was deployed electronically from August to December 2024. Descriptive statistics were used to characterize all data. Median acceptability scores (1 lowest, 5 highest) were calculated for each service. Content analysis of responses to open-ended survey items was performed.
**Results:** Seven pharmacies obtained 37 survey responses to date. Mean age of respondents was 50 years and the majority (81%) were White. Median acceptability scores for each of the nine services were 4.5 or greater. Open-ended item responses focused on the pharmacies' exceptional customer service and timely provision of medications. 89% of respondents were extremely satisfied with their pharmacy and 73% strongly agreed with the statement "I value my pharmacy providing services above and beyond dispensing my prescriptions." Data collection is ongoing.
**Conclusion:** Patients reported high acceptability with enhanced patient care services and the majority were very satisfied with their overall care at CIN pharmacies.

### Pain Management/Analgesia

### Sun-108. MeRIT Project: Sub-dissociative ketamine: Improved pain control in patients receiving continuous low-dose naloxone for spinal cord protection during endovascular thoracoabdominal aortic aneurysm repair

Eric Johnson, Pharm.D., MBA, BCCCP

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**Introduction:** Spinal cord ischemia (SCI) leading to paresis or paraplegia is a known risk associated with thoracoabdominal aortic aneurysm (TAAA) repair. Preventative SCI bundles that include the use of continuous low-dose naloxone (cLDN-bundle) reduce this risk but may result in higher opioid requirements and more pain. Sub-dissociative ketamine (SDK) provides opioid-sparing analgesia and is not antagonized by naloxone. This study examines whether SDK improves pain control for patients receiving a cLDN-bundle as part of a TAAA repair.
**Research Question or Hypothesis:** Does SDK lower pain scores and opioid requirements in patients receiving a cLDN-bundle as part of a TAAA repair?
**Study Design:** Randomized, double-blind, placebo-controlled trial.
**Methods:** Twenty patients undergoing endovascular TAAA repair with a 48-h cLDN-bundle were randomized to an infusion of SDK ($n = 10$) at 0.2 mg/kg/h or placebo (n = 10). The study infusion was started at induction and continued for 48 h postoperatively. The primary and secondary outcomes were mean oral morphine equivalents (OMEs) and pain scores for the first 48 h postoperatively, assessed in 6-h intervals. Overall mean outcomes were compared between the SDK and placebo groups using a repeated measures general linear mixed model with an auto-regressive covariance structure. Statistical significance was set to $p < 0.05$.
**Results:** The 6-hr estimated mean OMEs were lower in the SDK group at 14.7 mg (95% CI 8.6–20.8) compared to 33.0 mg (95% CI 26.9–39.1) in the placebo group, $p = 0.019$. Six-hour estimated mean pain scores were also lower in the SDK group at 1.9 (95% CI 0.4–3.4) versus 4.2 (95% CI 2.6–5.8) with placebo, $p = 0.040$. No adverse events were seen in the SDK group.
**Conclusion:** This study demonstrated that patients undergoing endovascular TAAA repair in conjunction with a cLDN-bundle required fewer OMEs and reported lower pain scores with the use of an SDK infusion, versus placebo.

## Substance Abuse/Toxicology

### Sun-107. MeRIT Project: Impact of intertreatment N-acetylcysteine (NAC) dose delays on hepatotoxicity in acetaminophen toxicity: A multicenter retrospective study

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**Introduction:** Acetaminophen (APAP) toxicity is the leading cause of liver transplantation in the United States. N-acetylcysteine (NAC) restores depleted hepatic glutathione reserves and neutralizes toxic APAP metabolites. Delayed NAC administration can increase the risk of liver failure. However, limited evidence exists on the relationship between intertreatment NAC delays in the 3-bag regimen and patient outcomes.
**Research Question or Hypothesis:** Delays in intertreatment NAC doses are associated with a higher incidence of hepatotoxicity in APAP toxicity.
**Study Design:** Multicenter, retrospective, cross-sectional study.
**Methods:** Adult patients from emergency departments, receiving NAC for APAP toxicity were included from July 1, 2019, to June 30, 2022. Exclusions were incomplete NAC regimen administration and baseline hepatotoxicity (AST/ALT >1000 units/L). Data collected included demographics, NAC administration times, and hepatic function test results. The primary endpoint was incidence of hepatotoxicity. Correlations between intertreatment NAC delay times and hepatotoxicity were analyzed using linear regression.
**Results:** Of 237 patients screened, 127 (53.6%) met inclusion criteria. Median delays between NAC dose 1 and 2 was 28.7 mins (IQR 15.6–82.2), and between NAC dose 2 and 3 was 52.4 mins (IQR 20–97.5). Six patients (4.7%) developed clinically significant hepatotoxicity. Mixed-effects models indicated no associations between NAC dose delays and AST or ALT levels. Estimated effects of the delay between NAC doses 1 and 2 on AST and ALT were $-1.54$ ($p = 0.675$) and $-1.04$ ($p = 0.859$) units/L per minute, and between doses 2 and 3 were 0.50 ($p = 0.272$) and 0.12 ($p = 0.121$) units/L per minute.
**Conclusion:** Delays between NAC doses did not show a significant impact on AST and ALT levels. These findings suggest intertreatment NAC timing may not affect hepatotoxicity development patients with APAP toxicity after initiation of the first dose of a 3-bag regimen. These results may support the exploration of alternative NAC regimens, such as the 1-bag method. Further research may elucidate the impacts on intertreatment NAC delays in APAP toxicity.

## ORIGINAL RESEARCH

## ADR/Drug Interactions

### Tues-2. Evaluation of anticonvulsant-induced leukocytosis: A review of evidence for carbamazepine, lamotrigine, and phenobarbital

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**Introduction:** Drug-induced leukocytosis is a potential adverse effect associated with the use of anticonvulsant medications. It is crucial to differentiate drug-induced leukocytosis from other potential causes, including infections or other underlying medical conditions, in order to promptly manage the underlying reaction. Several anticonvulsant

medications have been associated with drug-induced leukocytosis, although the incidence and severity may vary among individuals.

**Research Question or Hypothesis:** To determine the incidence of leukocytosis associated with carbamazepine, lamotrigine, and phenobarbital.

**Study Design:** A comprehensive literature review was conducted with the assistance of a medical reference librarian on PubMed, MEDLINE, Embase, and Google Scholar through June 2023. Application of inclusion and exclusion criteria identified relevant reports to include in the review.

**Methods:** The following search terminology was applied: "leukocytosis/chemically induced"[MeSH Terms] AND ("Anticonvulsants"[MeSH Terms] OR ("Anticonvulsants"[Pharmacological Action] OR "Anticonvulsants"[MeSH Terms] OR "Anticonvulsants"[All Fields] OR "anticonvulsant"[All Fields] OR "anticonvulsion"[All Fields] OR "anticonvulsive"[All Fields] OR "anticonvulsives"[All Fields]) OR ("Anticonvulsants"[Pharmacological Action] OR "Anticonvulsants"[MeSH Terms] OR "Anticonvulsants"[All Fields] OR "antiepileptic"[All Fields] OR "antiepileptics"[All Fields])).

**Results:** Thirteen reports were included from 64 potential results of our literature review following the application of inclusion and exclusion criteria: seven of the reports involved carbamazepine, four of the reports involved lamotrigine, and two of the reports involved phenobarbital. Five of our studies presented patients with drug-induced hypersensitivity syndrome (DIHS), six of our studies presented patients with drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome, one study presented patients with pseudolymphoma syndrome (PLS), and one study presented a patient from lamotrigine overdose. The most common presenting diagnosis was DIHS and DRESS seen within 5–6 weeks of initiation of the offending agent. The final outcome after treatment included improvement in symptoms and resolution of leukocytosis in each report.

**Conclusion:** Clinicians should be judicious when evaluating leukocytosis in patients on potentially precipitating medications, including carbamazepine, lamotrigine, and phenobarbital.

### Sun-2. Prediction factors of QTc prolongation occurrence among cancer patients treated with oral tyrosine kinase inhibitors

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**Introduction:** Approximately 30% of patients receiving tyrosine kinase inhibitors (TKI) might occur QTc prolongation.

**Research Question or Hypothesis:** What are the best set of factors used to prediction the risk probability of QTc prolongation for cancer patients treated with oral TKIs in clinical practice?

**Study Design:** The retrospective cohort study was conducted using the data retrieved from electronic medical records (EMR) for cancer patients newly treated with oral TKIs in a tertiary medical center in Taiwan.

**Methods:** The occurrence of $QT_C$ prolongation was defined as ≥450 ms for male and ≥470 ms for female using Bazett's formula. Other than performing the statistical (backward logistic regression [LR]) and supervised machine learning (ML) approaches to identify the candidate factors and further to train the best prediction models, the standardized multivariate LR and Receiver Operating Characteristics Curves analysis were performed to explore the impact of the identified factors and the cut-off points of risk probability prediction.

**Results:** The statistical and ML approaches identified the two different sets of 12 factors in the corresponding best models, where the statistically driven model showed excellent model performance and fitting. The cut-off prediction of high-risk probability were around 0.4. Given approximately 0.13 chance occurred QTc prolongation without considering the other factors, the two most important factors were prolongation in the baseline and diagnosed with the other cardiovascular diseases (excluding arrythmia, cardiomyopathy or so) in the two best models. Although the ranking of risk probability predictions due to the other individual factors were various, the factors in the 12-parameter statistically driven model revealed better clinical meaning.

**Conclusion:** The identified statistically driven model with 12 easily-accessible variables from EMR performed better than the other ML-driven models. Those patients with prior experience of QTc prolongation and existing cardiovascular diseases should be monitored intensively to prevent QTc prolongation for cancer survivors newly treated with oral TKIs in the future.

## Adult Medicine

### Tues-6. Kidney function reporting in EMRs—Challenges and opportunities

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**Introduction:** Electronic medical records (EMRs) play a crucial role in clinical decision making. However, optimal reporting of estimated glomerular filtration rate (eGFR) within EMRs remains a challenge.

**Research Question or Hypothesis:** We aimed to describe eGFR reporting in EMRs and any associated challenges.
**Study Design:** We conducted a cross-sectional survey study.
**Methods:** An anonymous survey about eGFR reporting within EMRs was created and shared through listservs used by pharmacists nationally and internationally. Data are reported using descriptive statistics.
**Results:** Of 293 respondents, 76% were from the United States and the remainder represented 18 other countries. Most practiced in inpatient settings across a variety of specialties with a mean of 13.4 ± 9.1 years of experience. Cockcroft Gault (CG) was the primary kidney function estimation equation in 45% of EMRs and 25% reported CKD-EPI, of which 44% reported uncertainty of the specific equation used. Information on eGFR was predominantly found within lab results (51%), with only 22% accessible from the main screen and 14% during order entry/verification. Dissatisfaction with eGFR presentation in the EMR was noted by 29% of respondents. Identified challenges include transparency regarding kidney replacement therapy (35%), unclear/inappropriate patient parameters in estimation equations (36%), and visibility issues (14%). About 55% felt the eGFR calculations in the EMR were reliable for medication-related decision-making, although 82% reported no training on interpretation of eGFR results. Respondents favored institution-specific kidney dosing guidance (about 50% of respondents) more than commercially derived guidance (39%). Areas for opportunity include improved clarity (24%), visibility (31%), integration of patient data (27%), and built-in guidance (17%).
**Conclusion:** Our study sheds light on the current landscape of eGFR reporting within EMRs. Access, accuracy, and education are major concerns. Optimization of eGFR reporting and access and training on interpretation of eGFR results within EMRs are areas for potential intervention to better inform medication-related decisions.

### Tues-8. Decision fatigue in hospital medicine

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**Introduction:** 'Decision fatigue' (DF) is the impaired ability to make decisions following repeated acts of decision-making leading to poorer decision-making efficiency. DF in hospital medicine has broad implications as hospitalists now care for most hospitalized patients and most work for seven consecutive days. Pharmacists work alongside hospitalists to provide care to complex patients, yet little data exists to inform practice models to optimize outcomes.
**Research Question or Hypothesis:** The concurrent use of pharmacologically contradictory medications (e.g., stool softeners and anti-diarrheals) or the incidence of hypoglycemia increases on each successive day on service.
**Study Design:** This was a retrospective evaluation of patients cared for by daytime hospitalists at a large academic center between January 1, 2022 and February 28, 2022.
**Methods:** DF events (i.e., prescription of physiologically contradictory medications and hypoglycemia) were abstracted and attributed to each hospitalist and the day on service. Univariate descriptive statistics were collated to describe event rates and events by day of service.
**Results:** Forty-five hospitalists (36% female) and their 2319 patients were included. Patients had a mean age of 59.5 years (SD 17.3) and median length of stay of 7 days (IQR 4–13). The median maximum consecutive days on service for hospitalists was 8 (IQR 7–11). 319 DF events occurred on 1326 hospitalist days of service (24.1%). When assessed by day of service, the event rate was highest on day one at 25.1%, followed by day two at 23.9%. Day seven, the last day of a typical hospitalist schedule, had an event rate of 17.6%.
**Conclusion:** Contrary to our hypothesis, event rates were highest on the first day of service. These data suggest that pharmacist-hospitalist collaborations should consider the first day on service as the highest risk period for errors. The cognitive burden related to processing large amounts of new data, rather than DF may be a greater threat to patient safety in hospital medicine.

### Mon-90. Assessment of antidiabetic medication use at hospital discharge at an academic medical center

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**Introduction:** Hospitalized patients with diabetes are at a high risk of adverse drug events and readmissions following discharge. Improved medication management during transitions of care represents an opportunity to avoid these undesired outcomes and improve disease control while managing comorbid conditions such as cardiovascular disease.
**Research Question or Hypothesis:** What are the patient factors associated with suboptimal prescribing of antidiabetic medications at hospital discharge?
**Study Design:** Retrospective cohort study.
**Methods:** Patients ≥18 years old with a history of type 2 diabetes admitted to a general medicine unit between January and November of 2023 were eligible for inclusion. The primary endpoint was to determine patient factors associated with guideline discordant

prescribing of antidiabetic medications at hospital discharge. Changes made to patient's home regimens were assessed. Binary logistic regression was used to calculate an odds ratio (OR) with 95% confidence interval (CI) for factors associated with appropriate prescribing at discharge. Changes percentage of patients prescribed each medication class at discharge were assessed with a chi-squared test (SAS version 9.4).

**Results:** Out of 150 patients included, 58 (38.7%) were discharged home on an antihyperglycemic regimen including preferred agents for their specific comorbidities and appropriate therapy escalations. Three factors were associated with suboptimal prescribing of antidiabetic medications including age (OR 1.03 [95%CI 1.001–1.06), $p = 0.04$), hemoglobin A1c (HbA1c) (OR 1.40 [95%CI 1.12–1.74], $p = 0.003$) and history of stroke (OR 2.44 [95%CI 1.06–5.63], $p = 0.04$). Significant differences were found in the proportion of patients prescribed several medication classes between admission and discharge including metformin (60 vs. 54%, $p = 0.007$), Sodium-glucose transport protein 2 inhibitors (23% vs. 34%, $p < 0.001$), sulfonylureas (34% vs. 26%, $p = 0.005$), basal insulin (44% vs. 50%, $p = 0.03$), and sliding scale insulin (13% vs. 19%, $p = 0.02$).

**Conclusion:** This study demonstrated opportunities to improve prescribing of antidiabetic medications at hospital discharge. Future studies are warranted to address the role of pharmacists to improve medication use in this patient population.

## Ambulatory Care

### Mon-7. Evaluation of transplant pharmacist-led post-transplant hyperglycemia service

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**Introduction:** Uncontrolled post-transplant hyperglycemia (PTHG) can result in post-transplant diabetes mellitus (PTDM), therefore strict control of PTHG is warranted. PTDM affects 10–40% of transplant recipients and increases morbidity and mortality.

**Research Question or Hypothesis:** Does pharmacy-led management of PTHG through a collaborative practice agreement (CPA) improve glycemic control?

**Study Design:** Retrospective review of adults ≥18 years who received a kidney or liver-kidney transplant between 1/2014–12/2015 and 4/2021–10/2022 in the pre- and post-CPA groups, respectively.

**Methods:** Inclusion criteria were patients discharged or started on anti-hyperglycemic agents within 30 days of transplant with 1 year of follow-up. Patients with Type 1 Diabetes Mellitus, insulin pump, other organ transplants, or treatment with high-dose corticosteroids for rejection were excluded.

The primary outcome was a composite of hospitalizations and emergency department (ED) visits within 6 months from transplant due to PTHG. Secondary outcomes included hemoglobin A1c (HgbA1c) <7% and discontinuation of insulin at 6- and 12-months post-transplant, and time to first documented ambulatory PTHG assessment. Data were reported with descriptive statistics.

**Results:** Fifty-one and 53 patients in the pre- and post-CPA groups were included, respectively. Transplant pharmacy followed all patients in the post-CPA group. There were no differences in baseline demographics except tacrolimus formulation, inpatient diabetes consults on initial admission, and baseline HgbA1c between groups.

The primary outcome occurred in 3 patients (5.9%) and no patients in the pre- and post-CPA groups, respectively. More patients in the post-CPA group achieved a HgbA1c <7% at 6-months (31.7% vs. 68.1%; $p = 0.007$) and 12-months (22.7% vs. 58.3%; $p = 0.004$) using the last HgbA1c carried forward. More patients in the post-CPA group discontinued insulin at 12-months (7.1% vs. 30%; $p = 0.02$) and all anti-hyperglycemic agents by 6-months (2% vs. 15.1%; $p = 0.02$).

**Conclusion:** The transplant pharmacy-led service numerically reduced hospitalizations and ED visits due to PTHG, and less insulin use at 1-year post-transplant.

### Sun-8. Provider perspectives on continuous glucose monitors

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**Introduction:** Continuous glucose monitors (CGMs) improve hemoglobin A1c and reduce hypoglycemia events. Prior provider surveys, conducted before Medicare coverage expansion, report perceived barriers to CGM uptake that include cost, insurance coverage, and data access. There is limited data identifying provider training and resources needed to address these barriers.

**Research Question or Hypothesis:** What are perceived barriers to CGM uptake identified by healthcare providers? What are the reported education and resource needs concerning CGMs communicated by healthcare providers?

**Study Design:** IRB approved qualitative web-based survey.

**Methods:** After pilot testing and revisions, an investigator developed survey was administered consisting of nominal, Likert-scale, and free-response questions to personnel at endocrinology, family medicine, and internal medicine clinics at one medical center from 2/1/24 to 4/30/24. Results including demographics, identified barriers, and reported educational needs were collected. Data was presented as descriptive statistics using SAS version 9.4 to provide information about variables in the dataset.

**Results:** Twenty-seven survey responses were collected from dietitians, medical assistants, nurses, nurse practitioners, pharmacists, physicians, prior authorization representatives, physician assistants, and resident

physicians. The top perceived barriers to CGM prescribing included insurance ($n = 20$), cost ($n = 15$), and oral-only diabetic regimens ($n = 14$). The identified education and resource needs comprise of on-site training ($n = 6$), decision support materials ($n = 6$), technological support ($n = 2$), advertised webinars ($n = 1$), and required patient follow-up ($n = 1$).

**Conclusion:** CGM use has several perceived barriers to initiation. In addition to expansion of insurance coverage and eligibility for CGMs, providers from different specialties and clinical roles continue to desire additional CGM education and resources. Pharmacists are positioned to play a role in addressing unmet educational needs.

## Tues-15. A retrospective study of obesity and overweight treatment and outcomes in primary care

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**Introduction:** In 2020, U.S. obesity prevalence was 41.9%. Despite more FDA-approved medications for obesity and overweight in the past decade, there are limited studies in select settings evaluating the impact of pharmacist-provided weight management (WM).

**Research Question or Hypothesis:** The study aimed to assess the impact of pharmacist-provided WM via a collaborative drug therapy protocol across Community Physician Network (CPN) primary care.

**Study Design:** Retrospective chart review.

**Methods:** Data was extracted via patient report criteria of having a CPN WM visit, prescribed WM pharmacological therapy, and body mass index (BMI) ≥30 kg/m2 or ≥ 27 kg/m$^2$ with weight-related complication between 5/1/23 and 11/24/23. The primary objective was percentage change in total body weight lost in patients ≥18 years of age seen by their primary care physician (PCP) vs. ambulatory care pharmacist (ACP) vs. CCRN and ACP. Secondary objectives included cardiometabolic parameters changes, weight loss at 3 and 6 months, and weight loss barriers. Descriptive statistics were completed, and student's *T*-test was used as appropriate.

**Results:** Of 58 patients included, baseline BMI was 39.77 kg/m$^2$ in the ACP group and 36.61 kg/m$^2$ in the PCP group. The CCRN and ACP service adoption did not occur during the study period and resulted in no patients meeting this inclusion criteria. There was an average of 6.75% total body weight lost in the ACP group versus 4.5% total body weight lost in the PCP group ($p = 0.02$). The variety of WM medications prescribed during the study period was eight in the ACP group vs. five in the PCP group. The ACP group noted barriers to weight loss including food cravings ($n = 13$), limited mobility for exercise ($n = 13$), lack of time ($n = 9$), and lack of motivation ($n = 5$).

**Conclusion:** Pharmacist-provided WM improved patient outcomes compared to physician alone in CPN primary care, including clinically significant weight loss, a wider range of medications utilized, and weight loss barrier assessment.

## Mon-9. Stresses and successes: Inside the world of ambulatory care pharmacy

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**Introduction:** Ambulatory care pharmacists help manage chronic conditions, optimize medication therapy, and provide patient education. Yet, there is limited research on their day-to-day roles and responsibilities as members of the interprofessional healthcare team. This study generates new knowledge about ambulatory care pharmacists by exploring key stresses and successes.

**Research Question or Hypothesis:** What are the primary stresses and successes experienced by ambulatory care pharmacists across multiple health systems?

**Study Design:** This study employed an exploratory, interview-based qualitative research design.

**Methods:** Twenty-one pharmacists participated in digitally recorded semi-structured interviews of 20–30 min via videoconference software. Interviews were transcribed for later analysis. Analysis proceeded inductively and iteratively through successive reading and discussion to build a codebook of common themes. These themes, represented by codes, were then grouped into larger categories to identify patterns of meaning across all transcripts. Additional steps were taken to maximize validity and minimize bias, including consensus building among interdisciplinary team members, creation of a methodological "audit trail," and presentation of results to a team member who did not participate in the coding process.

**Results:** Our analysis revealed several key stresses and successes. Interviewees faced a high workload that often exceeded 40 h/week, and they had to balance time and resource management. They were also keenly aware of the status differential between themselves and medical doctors and often felt they had to prove their worth. Despite these stresses, interviewees found joy in building trusting patient relations, improving their patients' health, and acting as part of a care team.

**Conclusion:** This exploratory study reveals the nature of ambulatory care pharmacists' stresses and success. Understanding these factors is crucial for optimizing the role of ambulatory care pharmacists in healthcare systems and ultimately improving patient outcomes.

## Tues-14. Retrospective review of pharmacy-driven use of patient assistance programs (PAPs) in an underserved population in a student run free medical clinic

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**Introduction:** High medication costs in the United States can result in medication access challenges for underserved patients. Patient assistance programs (PAPs) are programs provided by pharmaceutical companies that supply free or low-cost medications to underserved, low-income individuals who are uninsured or underinsured. A team of pharmacists and pharmacy students implemented a pharmacy-run PAP service at the CommunityCare Clinic (CCC), one of the largest student-run free clinics in the United States, to enable consistent and affordable access to medications. This research seeks to showcase the unique, pharmacy-driven methodology for utilization of PAP programs for other clinics to replicate as well as showcasing the resulting annual medication savings.

**Research Question or Hypothesis:** To evaluate the annual medication savings from the use of pharmacy-implemented PAP programs.

**Study Design:** A retrospective review of estimated annual medication savings from the confirmed PAP applications with methodology for reproducible implementation.

**Methods:** Estimated annual medication savings utilized the specific national dispensing code (NDC) of the product, the wholesale acquisition cost (WAC) closest to the application date per FirstDataBank, the maximum quantity potentially received throughout the year based upon patient-specific directions, and product-specific pricing algorithms.

**Results:** Between 07/01/2023 and 5/31/2024, the CCC successfully fulfilled 24 PAP applications accounting for $153135.89 in estimated annual medication savings:16 medications were for endocrine disorders accounting for $110431.14, six medications were for pulmonary conditions accounting for $32055.15, one medication was for neuropathic pain accounting for $3412.75, and one medication was for thrombotic prophylaxis accounting for $7236.86. There was a median difference of 7.5 days between the application and WAC dates, with an interquartile range of 14.25 days.

**Conclusion:** The CCC's experience utilizing pharmacy-implemented PAP programs demonstrates pharmacy's ability to advocate for underserved patients by enabling affordable and optimal health management.

## Sat-5. Impact of ambulatory pharmacist interventions on anxiety and depression scores

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**Introduction:** Ambulatory care pharmacists continue to expand their co-management of various disease states across the United States including conditions such as anxiety and depression. There is minimal literature assessing the clinical impact of these practice advances within primary care.

**Research Question or Hypothesis:** What impact do ambulatory care pharmacist interventions have on anxiety and depression objective scores?

**Study Design:** This was a retrospective cohort study of 124 adult patients who had at least one documented visit between February 2020 and August 2023 with an ambulatory care pharmacist to help manage their diagnosis of depression and/or anxiety.

**Methods:** Primary outcome was the achievement of therapeutic response (a reduction of 50% or greater in GAD-7 and/or PHQ-9 scores). Secondary outcomes included the change in PHQ-9 and/or GAD-7 scores, risk factors for therapeutic response, pharmacist interventions subtypes, and percentage pharmacogenomics used.

**Results:** Therapeutic response for PHQ-9 was achieved for 48.4% of patients after utilization of an ambulatory care pharmacist embedded in primary care. While two-thirds of patients also had comorbid anxiety, 57.4% of these patients could not be evaluated as they did not have available GAD-7 scores for analysis. PHQ-9 and GAD-7 scores were significantly reduced by 35.7% and 34.6% at approximately 6 months after pharmacist intervention ($p < 0.000$ and $p < 0.023$). Patients had a median number 4 (2,5) visits with a pharmacist and median number of 2 (1,3) interventions.

**Conclusion:** Ambulatory care pharmacists can help patients achieve therapeutic response for depression and anxiety as well as significantly improve PHQ9 and GAD7 scores, but additional education is warranted on the importance of GAD-7 monitoring given the high prevalence of comorbid anxiety and depression.

## Sun-10. Characterization of hypertension control in marginalized populations at a federally qualified health center

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**Introduction:** Hypertension (HTN) control is lower in marginalized populations, with limited data available in refugee, immigrant and Arab populations.

**Research Question or Hypothesis:** Differences exist in HTN prevalence, management, and control in refugees, immigrants, Black and Arabs.

**Study Design:** A retrospective chart review within five clinics across a federally qualified health center.

**Methods:** Electronic medical records were reviewed from 2020 to 2023 for adult patients with an ICD 10 HTN diagnosis who self-identified as a refugee, immigrant, Black or Arab. Data collection

included: blood pressure (BP) throughout the study period, HTN medications, and comorbidities. Socio-demographic values included: age, sex, race/ethnicity, country of origin, language/interpreter, insurance, and income. Descriptive statistics were used to analyze categorical data and binominal linear regression was used to assess factors influencing BP control.

**Results:** A total of 236 patients were included (mean age of 54 years). The study population included Black (58%), refugee (31%), immigrant (29%), and Arab (5%) patients. Disease states included stage-2 HTN (55%), obesity (45%), type-2 diabetes (38%), and hyperlipidemia (35%). Socio-demographically, the most common income range reported was ≤ $20 000 (28%) and most patients used Medicaid (78%). The patients originated from the US (23%), Burma/Myanmar (6%), Bangladesh (6%), Somalia (4%) and Iraq (4%), and spoke English (63%), Burmese (11%), Nepali (7%), Arabic (6%) and Bengali (6%). Overall, systolic BP was controlled in 36% of patients, with the highest rates of control among Arabs (64%). The systolic BP of Blacks was less likely to be controlled than the study population ($p < 0.05$). Systolic BP was less likely to be at goal if patients were English-speaking (OR 0.31, 95% CI 0.11–0.87), used a calcium channel blocker (OR 0.37, 95% CI 0.18–0.74), or used a diuretic (OR 0.40, 95% CI 0.19–0.85).

**Conclusion:** This study demonstrated that rates of HTN control were different between the populations reviewed. These results highlight important socio-demographic and pharmacotherapeutic considerations in achieving BP control.

## Cardiovascular

### Tues-29. Evaluation of hypertonic saline use for diuretic therapy-resistant acute decompensated heart failure

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**Introduction:** Hypertonic saline solution (HSS) has been proposed as an adjunct therapy to high-dose loop diuretics in patients with refractory acute decompensated heart failure (ADHF). Clinical benefit, safety, and optimal dosing of HSS in ADHF are unclear due to limitations of existing studies.

**Research Question or Hypothesis:** Does HSS administration strategy (1 dose or >1 dose in 24 h) impact safety and efficacy of HSS use in patients admitted with ADHF?

**Study Design:** Retrospective, observational cohort study.

**Methods:** This was a single-center, retrospective chart review that included adult patients admitted with ADHF who received at least one dose of sodium chloride 2% or 3% between December 2015 through November 2023. Patients were excluded if the primary use of HSS was for a neurologic indication. Data extracted included patient demographics, baseline clinical data, concomitant diuretics, and characterization of HSS use, efficacy, and safety. Descriptive statistics were used to characterize use. Mann–Whitney U was used to assess differences in efficacy and safety. A $p$-value <0.05 was considered statistically significant.

**Results:** Overall, 44 patients received HSS for ADHF during the study period. The most common dose used was 150 mL of sodium chloride 3%. 27 patients received 1 dose of HSS within 24 h while 17 patients received >1 dose in 24 h. There was no statistically significant difference in total urine output or net fluid loss at 24 h in patients receiving 1 dose versus >1 dose at 24 h post-HSS administration. Change in serum sodium was similar between groups at 6 and 24 h post-HSS administration. No patients experienced an overcorrection of sodium (increase ≥12 mEq/L) at 24 h.

**Conclusion:** No difference in safety or efficacy was found with a dosing strategy of 1 dose or >1 dose of HSS within 24 h. Further studies are needed to elucidate the optimal dosing strategy of HSS in diuretic-refractory ADHF.

### Sat-8. Evaluating Lipid-lowering intensification in patients post ASCVD revascularization

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**Introduction:** Attainment of LDL-C levels <70 mg/dL with lipid lowering therapy (LLT) is associated with decreased rates of ASCVD events. However, studies show up to 58% of patients have LDL-C > 70 mg/dL 1 year after coronary revascularization and less than half had their LLT intensified.

**Research Question or Hypothesis:** How are lipids being evaluated and managed in patients with various forms of ASCVD following revascularization?

**Study Design:** We report a retrospective cohort study evaluating LLT intensification in patients with ASCVD after coronary, cerebral, or peripheral revascularization between July 2021 and July 2022.

**Methods:** Patients were identified from procedure lists. Exclusion criteria included baseline LDL-C < 70 mg/dL, triglycerides >500 mg/dL, dialysis dependence, and no follow-up care within 6 months of revascularization. Baseline lipids and LLT were compared to follow-up metrics within 15 months post-revascularization. The primary outcome was achievement of LDL-C < 70 mg/dL at 15 months. Secondary outcomes included percentage of patients with follow-up lipid panel, time

to follow-up lipid panel, LLT intensification after revascularization, and achievement of LDL-C < 70 mg/dL at 15 months in patients with early follow-up lipid panel (within 3 months) after revascularization.

**Results:** One-hundred fifty-nine patients were included. Within 15 months, 69 (43%) patients had a follow-up lipid panel for evaluation, 35 (51%) of whom achieved an LDL-C < 70 mg/dL at an average of 162 ± 115 days following revascularization. Only 28 (18%) patients had LLT intensified. LDL-C goal was achieved more frequently in patients with coronary (56%) and peripheral (46%) revascularization compared to cerebral revascularization (17%); only 3% of patients with cerebral revascularization had LLT intensified. Early lipid panel measurement made no significant difference in patients meeting LDL-C goal.

**Conclusion:** High-risk ASCVD patients do not receive appropriate lipid follow-up and have low rates of achieving LDL-C goals within 15 months post ASCVD revascularization.

## Mon-13. Beta-blocker choice and other factors predicting atrial fibrillation following coronary artery bypass grafting: An experience from a quaternary care center in the Middle East

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**Introduction:** Atrial fibrillation (AF) is the most common arrhythmia following coronary artery bypass grafting (CABG).

**Research Question or Hypothesis:** There is no difference between selective beta-blockers in the occurrence of postoperative atrial fibrillation (POAF) after CABG.

**Study Design:** A retrospective observational cohort study.

**Methods:** We performed a single center retrospective study of CABG patients who received metoprolol or bisoprolol within 72-h after surgery between January 1st, 2020 and January 31st, 2023 at a quaternary care center in the Middle-East. The primary endpoint was to identify factors associated with the occurrence of POAF. Multivariate logistic regression was utilized to identify factors predicting occurrence of POAF, and a p-value <0.05 was considered statistically significant.

**Results:** A total of 323 patients were included in the study; median age was 58 (50–65) years and 9.9% were female. Forty-two (13%) patients developed POAF. The median Society of Thoracic Surgeons (STS) score of the group which developed POAF was 7.53 (5.87–7.53) versus 8.54 (5.90–12.98) for those who did not develop POAF ($p = 0.559$). Univariate analysis showed pre-CABG ejection fraction (EF), on versus off-pump surgery, and diagnosis at presentation were significantly different between both groups. The multivariate logistic regression analysis revealed that bisoprolol exhibited an increased risk of POAF compared to metoprolol tartrate (OR: 2.92, 95% CI [1.125,7.576], $p = 0.028$). Other significant predictors of POAF included advanced age (OR: 1.043, 95% CI [1.001,1.087], $p = 0.045$), lower initial magnesium postoperative level (OR: 0.078, 95% CI [0.013,0.481], $p = 0.006$), higher pre-CABG left atrial volume (OR: 1.038, 95% CI [1.003,1.075], $p = 0.034$), and number of grafted vessels (OR: 0.444, 95% CI [0.239,0.825], $p = 0.01$).

**Conclusion:** Our findings suggest that several factors can predict POAF however, beta-blockers might have the most significant effect. Our study emerges from a region of high utilization of bisoprolol post CABG and offers important insights on the best choice of beta-blocker. A larger prospective randomized study is needed to confirm our findings.

## Mon-17. Effectiveness of SGLT2i in veterans with heart failure and type 2 diabetes mellitus recently hospitalized for acute decompensated heart failure

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**Introduction:** Sodium-glucose co-transporter 2 inhibitors (SGLT2i) reduce composite endpoints of cardiovascular death and heart failure hospitalizations (HFH) in patients with heart failure regardless of ejection fraction in randomized controlled trials (RCT). Longer-term outcomes following HFH using real-world data, including patients potentially excluded from RCTs, are needed to verify effectiveness and safety of SGLT2i.

**Research Question or Hypothesis:** In patients with Type 2 Diabetes Mellitus (T2DM) and hospitalized for heart failure, does the initiation of SGLT2i during admission through 30-days post-discharge reduce heart failure readmissions over 1 year in Veterans?

**Study Design:** Retrospective cohort using national VA data comparing patients with T2DM and heart failure, recently discharged due to heart failure exacerbation, who received empagliflozin/dapagliflozin/canagliflozin versus those who were not exposed.

**Methods:** Adult patients (≥18 years) with T2DM and heart failure treated at VA medical centers for a HFH during CY 2015–2022 and at least one outpatient visit within 30 days of discharge were included. The primary outcome was readmission for heart failure within one-year, reported as hazard ratios with 95% confidence intervals for total and adjusted-for baseline characteristics cohorts. Time to first heart failure re-hospitalization assessed by multivariate Cox-regression hazards model. Safety outcomes reported as means with standard deviations.

**Results:** Average age 68 years (exposed, $n = 449$) versus 71 years (unexposed, $n = 32\,057$) with over 97% males in both groups. In the exposed group, 54% were started treatment prior to discharge. One-year HF readmissions occurred in 12% in the exposed group versus 25% in the unexposed, HR 0.43 (95% CI 0.31–0.57) for the total cohort and HR 0.38 (95% CI 0.21–0.66) for adjusted groups. There were no significant differences in safety outcomes, including change in renal function and change in blood pressure.

**Conclusion:** Use of SGLT2i reduced heart failure readmissions when initiated during or early after a HFH.

### Sun-17. Ivabradine associated atrial fibrillation incidence over 1 year

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**Introduction:** Ivabradine (IVBD) is a hyperpolarization-activated cyclic nucleotide-gated channel blocker that inhibits the pacemaker $I_f$ current causing spontaneous depolarization in the sino-atrial node thereby regulating heart rate in patients with heart failure (HF). Previous reports state that IVBD use is associated with an increase in risk of atrial fibrillation (AF).

**Research Question or Hypothesis:** This study aims to determine the incidence of ivabradine-associated AF over 1 year in a real-world database of AF naïve patients with HF.

**Study Design:** Rates of incident AF were determined using Merative Health MarketScan Commercial Claims and Medicare Supplemental Database. Using ICD codes and outpatient medication dispensing records, we extracted HF patients who filled a prescription for IVBD between 01/2015 and 12/2021. Patients with a prior diagnosis of AF before starting IVBD were excluded. The study endpoint was the first diagnosis of AF, defined by ICD 9 and 10 codes, after the index IVBD dispensing.

**Methods:** The time to AF was projected using cumulative incidence calculation. We used Kaplan–Meier product limit estimator to calculate AF outcomes at 30, 90, 180, and 365 days from the index IVBD, where patients were censored at the end of enrollment or end of the one-year follow up.

**Results:** The analytic cohort at first IVB dispensing included 498 patients with mean (SD) age of 52.27(12.47). Analytic cohort was slightly more weighted by male with a proportion of 53.2%. The cumulative incidence of AF at 30, 90, 180 and 365 days after the IVB use was 4.91%, 12.16%, 19.24%, and 28.11%, respectively.

**Conclusion:** Cumulative incidence of AF after IVBD was higher than the published AF incidence among commercially insured HF patients. A comparative safety assessment is warranted to quantify the measure of association for the AF incidence and exposure to IVBD.

### Tues-25. Patients' beliefs about their heart failure medications

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**Introduction:** Beliefs about Medicines Questionnaire (BMQ) is a validated tool that has been correlated with medication adherence. Social determinants of health, including education, income, and race/ethnicity, can significantly impact adherence, yet their influence on patients' beliefs about heart failure (HF) medications is unclear.

**Research Question or Hypothesis:** In patients with HF, what are their beliefs about their medications, and what factors are associated with more or less favorable beliefs?

**Study Design:** Prospective, quantitative cross-sectional survey of community-dwelling adult patients with HF. Beliefs and self-reported adherence were assessed using the BMQ and Medication Adherence Report Scale-5 (MARS-5), respectively.

**Methods:** The survey was distributed to patients at specialized HF outpatient clinics in British Columbia and Alberta, Canada, as well as on social media. Data were collected between January and May 2024. The primary outcome was BMQ necessity-concerns differential (BMQ-NCD). Linear regression was used to evaluate associations between patient characteristics and BMQ-NCD.

**Results:** Sixty patients initiated the survey and 35 completed it in full. Mean age was 64 years, 63% were female, 83% were White, 37% had a college/university degree, and 46% were retired. Thirty-seven percent self-reported having HF with reduced ejection fraction and 57% self-reported New York Heart Association class II symptoms. Self-reported medication use included: 83% beta-blocker, 63% RAAS inhibitor, 57% MRA, and 46% SGLT2 inhibitor. Mean BMQ-NCD was 7.8 (range −20 to 20). Mean BMQ subscale scores were: general-harm 8.8/25, general-overuse 8.1/15, specific-necessity 20.7/25, and specific-concerns 12.9/25. East Asian race was associated with a lower mean BMQ-NCD versus White patients, as well as post-graduate education versus high school. Patients who were retired (vs. full-time employment) and longer HF duration were associated with a higher mean BMQ-NCD. Mean MARS-5 score was 22/25.

**Conclusion:** Respondents held generally favorable beliefs about their HF medications with high self-reported adherence. The mean positive BMQ-NCD indicated patients' beliefs about the necessity of their HF medications exceeded their concerns.

### Sun-26. Evaluation of a modified enoxaparin treatment dosing scheme of 0.75 mg/kg in hospitalized obese patients

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**Introduction:** Standard enoxaparin venous thromboembolism (VTE) treatment dosing is 1 mg/kg twice daily; however, recent literature suggests a modified dose in obese patients. In 2020, modified enoxaparin VTE treatment dosing strategy of 0.75 mg/kg was implemented in hospitalized obese patients based on an internal review of a small outpatient cohort.

**Research Question or Hypothesis:** To evaluate the safety and efficacy of a modified enoxaparin dosing protocol in hospitalized patients with a BMI ≥40 kg/m$^2$.

**Study Design:** A retrospective, multicenter cohort study utilized the electronic health record to identify adult patients with BMI ≥40 kg/m$^2$ admitted to a 10-hospital health system from May 2020 through September 2023 receiving VTE treatment with enoxaparin and obtained a low molecular weight heparin (LMWH)-calibrated anti-Xa peak level at steady state.

**Methods:** The primary endpoint was percentage of LMWH anti-Xa peak levels within therapeutic range. Secondary endpoints include recurrence in thrombosis within 90 days of enoxaparin initiation and bleeding prevalence, including minor bleeding and major bleeding while on enoxaparin.

**Results:** Seventy-six patients met inclusion criteria. Thirty-eight followed the modified dosing protocol (0.65–0.85 mg/kg) and 38 received traditional dosing >0.85 mg/kg. In the modified group, 21 (55%) LMWH-anti-Xa levels were therapeutic versus 15 (39%) in the traditional dose ($p < 0.001$). The average LMWH-anti-Xa level in the modified group was 0.90 IU/mL, versus 1.16 IU/mL in the traditional group ($p = 0.022$). Minor bleeding occurred in 14 (34%) patients receiving modified doses and 15 patients (38%) receiving traditional doses (OR 0.97, 95% CI 0.39–2.46). Major bleeding occurred in four patients (11%) in the traditional group ($p > 0.05$). Recurrent thrombosis occurred in two (5%) traditional group patients (>0.05).

**Conclusion:** A modified enoxaparin dosing scheme resulted in a higher proportion of patients obtaining therapeutic levels; however, no major differences were noted in thrombosis and bleeding endpoints. Adherence to the modified dosing protocol is poor. Future prospective studies are needed to validate results.

### Sun-25. Global distribution of clinical sites in guideline-influencing trials for cholesterol management

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**Introduction:** Guideline-changing trials support clinical decision-making worldwide. Focus on high disease prevalence regions for recruitment of clinical trial participants is common in an attempt to enroll an adequate number of individuals. With regards to clinical trials for cholesterol management, the relationship between geographic distribution of clinical trial sites and cardiovascular (CV) mortality rate is unknown.

**Research Question or Hypothesis:** Is there a correlation between the global geographic distribution of clinical trials and CV mortality rate?

**Study Design:** This is an observational, cross-sectional study that involves analyzing data from published clinical trials and their geographic location.

**Methods:** Guideline-Influencing CV clinical trials were identified using The American College of Cardiology/American Heart Association Guideline on the Management of Blood Cholesterol. The locations of registered randomized controlled trials from ClinicalTrials.gov were matched with regional data from Global Burden of Cardiovascular Disease and Risks 1990–2022. The correlation between the number of sites and CV mortality reduction rates were tested utilizing the Spearman's test.

**Results:** A total of 659 trial sites from 71 clinical trials were identified and categorized into 21 geographic regions worldwide. Regions with 10 or more sites had a median CV mortality reduction of 47% from 1990 to 2022, while those with fewer than 10 sites had a median CV mortality reduction of 18.4%. High-Income North America and Western Europe had the highest number of trial sites ($n = 291$, 123, respectively) and CV mortality rate reduction of 60% and 46%, respectively. A positive correlation (rs: 0.56332) was identified between CV mortality reduction from 1990 to 2022 and the number of regional trial sites.

**Conclusion:** Regions with higher numbers of clinical trial sites had greater reductions in CV mortality from 1990 and 2022. Current research must prioritize and enhance patient representation from geographic areas where CV mortality rates remain high in order to overcome health disparities and improve health outcomes worldwide.

### Mon-92. Extended infusion alteplase for refractory left ventricular assist device pump thrombosis

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**Introduction:** There is no recognized standard of care for medical treatment of durable left ventricular assist device (LVAD) pump thrombosis.

**Research Question or Hypothesis:** Describe outcomes of alteplase administration (using a modified, extended Webber approach) for LVAD pump thrombosis at a non-transplant US center.

**Study Design:** Single-center, retrospective, observational cohort study.

**Methods:** Adult patients with a durable LVAD admitted between January 2012 and December 2021 who received intravenous alteplase for suspected pump thrombosis were included. Our standard dosing regimen included a 10 mg bolus over 1 min, followed by a 20 mg bolus over 20 min, then a continuous infusion at 1 mg per hour. Providers trended LDH and pump function to determine when to discontinue alteplase rather than a prespecified duration. Treatment and outcome data are described.

**Results:** Twenty-nine individual patients (of 227 total implanted during study period) experienced a suspected pump thrombosis. Twelve of the 29 patients received alteplase for treatment of pump thrombosis; of these, two had multiple occurrences resulting in 16 total events. All patients were supported with HeartMate II ($n = 6$) or HeartWare HVAD ($n = 6$) devices. The average alteplase duration per event was 49 h (range 19.7–713 h). The median LDH prior to discontinuation of alteplase infusion was 1276.5 IU/L (range 490–3585 IU/L) with continued downtrend to a median of 526 IU/L (range 256–2549 IU/L) at time of discharge. Three negative outcomes were noted during alteplase administration. Two bleeding events, hemorrhagic conversion of an ischemic stroke and multifocal intracranial hemorrhage, resulted in immediate discontinuation of alteplase. One episode of suspected gastrointestinal bleeding occurred prior to discharge without a change in antithrombotic regimen.

**Conclusion:** Patients supported by HeartMate II and HeartWare HVAD devices who may not want or be eligible for surgical intervention in the setting of pump thrombosis require medical management options. This is the largest study describing alteplase administration in this setting to date.

## Sun-18. Characterization of warfarin initiation after mechanical valve replacement

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**Introduction:** Warfarin is the only guideline recommended anticoagulant indicated for mechanical valve replacement. There is an exaggerated response to warfarin in the early post-operative setting which leads to difficulty managing warfarin dosing.

**Research Question or Hypothesis:** The purpose of this study is to assess the relationship between warfarin initiation dose and warfarin interruption after mechanical valve replacement at Virginia Commonwealth University Health System (VCUHS).

**Study Design:** Single-center, retrospective chart review for quality improvement of VCUHS current guidance on warfarin initiation.

**Methods:** This study included adult patients started on warfarin after mechanical heart valve at VCUHS from January 1, 2015 to June 30, 2023. Patients were divided into two groups; conservative initial warfarin dose ≤2.5 mg ($n = 92$) and standard initial dose >2.5 mg ($n = 91$). The primary composite outcome was the incidence of warfarin interruption attributed to supratherapeutic INR, rapid-rise INR, or bleeding. Other assessments included time to therapeutic range, hospital length of stay, and discharge warfarin dose. An independent t-test was used for analysis of continuous data and chi-squared or Fisher's Exact for categorical data.

**Results:** There was no statistical difference in the composite outcome between groups. Warfarin interruption secondary to a rapid-rise INR occurred significantly more in the standard group ($n = 17$) versus conservative group ($n = 28$), $p = 0.05$. Overall, more patients in the standard group experienced supratherapeutic and rapid-rise INRs. Patients who received a conservative dose were more likely to have a longer time to therapeutic range but no difference in hospital length of stay. The average dose at discharge was 4 mg in both groups. In a subgroup analysis of the standard group, patients with cardiopulmonary bypass (CPB) ≥150 min were more like to meet the primary endpoint compared to those with CPB <150 min.

**Conclusion:** We recommend a standard initial warfarin dose of 4 mg and a conservative initial dose in patients with prolonged CPB (≥150 min) at VCUHS.

## Tues-27. Effect of P2Y12 inhibitors on major adverse cardiovascular events in patients after coronary artery bypass graft surgery: A population-based cohort study

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**Introduction:** Patients who undergo coronary artery bypass graft (CABG) surgery remain at high risk for major adverse cardiovascular events (MACE). The effect of P2Y12 inhibitors in this patient population is equivocal.

**Research Question or Hypothesis:** In patients who undergo CABG surgery, does exposure to a P2Y12 inhibitor, as compared to no exposure, reduce MACE?

**Study Design:** Population-based, propensity-weighted, retrospective cohort study using data from linked administrative databases in the province of British Columbia (BC), Canada. These databases include all cardiac revascularization procedures, hospital admissions, and prescription data for the entire population of BC (~5 million people).

**Methods:** Included were all adults who underwent CABG surgery in BC between 2002 and 2020. Patients who underwent CABG surgery <10 years or filled a prescription for a P2Y12 inhibitor <12 months

before surgery were excluded. Primary exposure was prescription for a P2Y12 inhibitor <30 days post-surgery. Primary outcome was time to MACE (composite of all-cause death, nonfatal myocardial infarction, and nonfatal ischemic stroke). Adherence was assessed using proportion of days covered (PDC). Data were analyzed using Cox proportional hazards models with propensity weighting.

**Results:** In total, 15 439 patients were included. Mean age was 66 years, 83% were male, and 57% had a previous myocardial infarction. Sixteen percent were prescribed a P2Y12 inhibitor (83% clopidogrel) with median exposure time of 23 months. Ninety-seven percent were on a statin and 95% were on a beta-blocker. After propensity weighting and adjustment for relevant covariates, exposure to a P2Y12 inhibitor significantly lowered MACE at 1 year (hazard ratio 0.39, 95% confidence interval 0.27–0.55) and 5 years of follow-up (hazard ratio 0.65, 95% confidence interval 0.54–0.79). A PDC of ≥80% versus <80% did not impact these results.

**Conclusion:** Exposure to a P2Y12 inhibitor (primarily clopidogrel) reduced the hazard of MACE in patients after CABG surgery. These results support use of P2Y12 inhibitors as routine preventive therapy in post-CABG surgery patients.

### Tues-26. Use of sodium-glucose cotransporter-2 inhibitors in patients with heart failure with reduced ejection fraction on discharge from hospital

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**Introduction:** Sodium-glucose cotransporter-2 inhibitors (SGLT2i) are now part of guideline-directed medical therapy for patients with heart failure (HF) with reduced ejection fraction (HFrEF). However, use of SGLT2i in practice, particularly among hospitalized patients, is unknown.

**Research Question or Hypothesis:** How many patients with HFrEF were discharged from hospital on an SGLT2i, and has it increased over time?

**Study Design:** Retrospective, quantitative electronic medical record review of patients with HFrEF admitted to Abbotsford Regional Hospital in Abbotsford, Canada between 2021 and 2023.

**Methods:** Included were adult patients with HFrEF (left ventricular ejection fraction ≤40%) admitted with HF. Data were collected on a randomly selected cohort of 50 patients each year from 2021 to 2023. Patients with an estimated glomerular filtration rate <30 mL/min/1.73 $m^2$ were excluded. The primary outcome was proportion of patients discharged on a SGLT2i. Secondary outcomes included the trend in prescribing of SGLT2i from 2021 and 2023, use of SGLT2i in patients with or without diabetes, and specialization of the prescriber.

**Results:** In total, 150 patients were included. Mean age was 71 years, 69% were male, 61% had hypertension, 40% had diabetes, and 35% had chronic kidney disease. Forty-three percent had newly diagnosed HF. Use of beta-blockers was 96%, RAAS inhibitors was 85%, and MRAs was 61%. Overall proportion of patients discharged on an SGLT2i was 44%. There was a statistically significant increase in SGLT2i use from 2021 to 2022 (10% vs. 38%, odd ratio 5.52, 95% confidence interval 1.86–16.34), and from 2022 to 2023 (38% vs. 84%, odds ratio 8.57, 95% confidence interval 3.32–22.09). In 2021, 100% of patients prescribed an SGLT2i had diabetes, which decreased to 47% in 2022 and 45% in 2023. Overall, 97% of SGLT2i were prescribed by a cardiologist.

**Conclusion:** There was a significant increase in SGLT2i discharge prescriptions between 2021 and 2023 among hospitalized patients with HFrEF. Utilization in patients with HFrEF but without diabetes also increased over that time period.

### Sat-29. Icosapent ethyl-associated new atrial fibrillation incidence compared to omega-3 fatty acids: An observational cohort study

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**Introduction:** Icosapent ethyl (IE), a lipid-regulating agent containing an ethyl ester of eicosapentaenoic acid (EPA) is indicated as adjunct to maximally tolerated statin therapy to reduce MACE outcomes in patients with established cardiovascular (CV) disease with elevated triglyceride levels. Previous RCTs have shown an association of IE to atrial fibrillation (AF), requiring hospitalization, higher in patients with prior AF.

**Research Question or Hypothesis:** IE will increase AF incidence in AF-naïve patients compared to omega-3-acid ethyl esters (DHA/EPA) in patients taking baseline-statin therapy.

**Study Design:** Observational cohort study.

**Methods:** In this retrospective cohort study, the population consisted of individuals enrolled in the Merative MarketScan Commercial Claims and Medicare Supplemental Databases (2013–2021). Adult patients on statins who initiated IE or DHA/EPA were identified using outpatient-dispensing records. Patients with an AF diagnosis during

the one-year baseline period were excluded. Patients were followed for 2 years to assess the incidence of AF. Censoring occurred if there was treatment discontinuation, switching between treatments, end of enrollment, or end of the study (prior to event). Patients experiencing events or being censored within the first 30 days were excluded. Propensity score matching was used to create comparable groups, with exact matching on periods (2013–2015, 2016–2018, and 2019–2021). Using Cox proportional hazard regression model, we calculated hazards ratio of the onset of AF for IE versus DHA/EPA.

**Results:** The analytic cohort consisted of 17 638 matched pairs. Patients in both groups had a median age of 56 years. Male patients accounted for a 65.7% of the IE group and 64.5% of the DHA/EPA group. Baseline cardiovascular risk factors were well-matched between groups. The 2-year cumulative incidence of AF for IE and DHA/EPA groups were 5.322% and 3.994%, respectively, calculating a HR of 1.257 [95% CI,1.159–1.364], $p = 0.0032$.

**Conclusion:** IE is associated with a higher risk of AF compared to DHA/EPA.

## Mon-14. Assessment of time in therapeutic range for international normalized ratio post-implementation of pharmacist-driven warfarin dosing in a left ventricular assist device clinic

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**Introduction:** Patients with LVADs face an increased risk of thrombotic and bleeding events, so anticoagulation therapy with warfarin must be managed carefully. Studies have showcased higher proportion of time within therapeutic INR range with the incorporation of pharmacists in an LVAD clinic over shorter study durations. Our study focused on patients who received HeartMate 3 (HM3) devices, evaluating outcomes over 6 months prior to and after the implementation of independent pharmacist dosing.

**Research Question or Hypothesis:** Did pharmacist-led warfarin dosing achieve similar time in therapeutic range (TTR) compared to dosing approved by physicians in outpatient HM3 LVAD patients?

**Study Design:** A retrospective chart review of HM3 LVAD patients were examined for INR levels and occurrences of gastrointestinal bleeding that resulted in hospital admissions.

**Methods:** A retrospective chart review of 127 patients was conducted to assess time in therapeutic INR range for patients pre- and post- initiation of pharmacist-managed warfarin dosing in an outpatient LVAD Clinic. HM3 LVAD patients implanted before September 2022 with no bleeding or thrombosis in the past 6 months were included in the analysis. The primary outcome was time in therapeutic INR range 6 months pre- and 6 months post- pharmacist warfarin dosing implementation. Secondary outcomes include occurrence of INRs <1.5 and >4, number of INRs drawn per patient, and number of bleeding episodes.

**Results:** Pharmacist managed warfarin dosing led to an overall improvement in TTR for HM3 patients, though the increase was not statistically significant. TTR was 57% with physician-approved warfarin dosing and 62% with pharmacist independent dosing ($p = 0.23$). The occurrence of INR < 1.5 or >4 was similar in both groups, as were average number of INRs drawn per patient and number of bleeding episodes.

**Conclusion:** Pharmacist-led warfarin dosing achieved similar TTR to dosing approved by physicians in outpatient HM3 LVAD patients.

## Sat-7. Association of atrial fibrillation with lamotrigine in bipolar I disorder: An observational cohort study

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**Introduction:** Atrial Fibrillation (AF) is the most common sustained arrhythmia whose prevalence and incidence are increasing worldwide. Lamotrigine (L) is widely prescribed for Bipolar I (BPI) disorder. L reduces intracellular sodium through inhibition of voltage-gated sodium channels, which thereby slows cardiac conduction velocity, introducing a potential substrate for AF.

**Research Question or Hypothesis:** This study aimed to examine the incidence of atrial fibrillation in L patients with and without a history of cardiac arrhythmias or structural heart disease (SHD) vs. controls prescribed common medications for Bipolar I disorder.

**Study Design**: Adult patients with BPI who filled a prescription for lamotrigine were taken from Merative MarketScan® Commercial Claims and Medicare Supplemental Database. Eligible subjects should be free from AF, arrhythmia, or structural heart disease. Controls (C) were on lithium, quetiapine, valproate, or risperidone for managing BPI. Onset of AF was determined using ICD codes. Calculating the cumulative incidence of AF, patients were censored from follow up at switching between L and C, discontinuation of L or C, or end of follow-up, whichever incurred first.

**Methods:** The measure of association was hazard ratio (HR) of AF for L versus C calculated from a multi-variable Cox-proportional hazard regression model. As a sensitivity analysis, we analyzed a propensity score matched (PSM) cohort.

**Results:** The analysis included 150 470 L patients and 204 704 C patients. The 1-year cumulative incidence of AF from L and C was

0.76% and 0.64%, respectively, calculating a HR of 1.257 [95% CI: 1.0878–1.4534], $p = 0.0118$. PSM resulted in a similar HR estimate of 1.177 [1.007–1.378]. The number needed to treat for one additional AF was 833.

**Conclusion:** In adult naïve AF patients, L compared to C taking commonly prescribed BPI medications was associated with a higher risk of AF.

## Community Pharmacy Practice

### Sun-31. Characterizing routine patient information requests made by chain community pharmacists

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**Introduction:** Limited access to patient health information (e.g., laboratory values) hinders community pharmacists' ability to deliver a wide range of services. Contacting prescriber offices for patient health information can cause workflow disruptions. While recent survey research identified information needs for independent pharmacists and the potential for health information exchange to improve current practices, real-world data about information requests is unknown.

**Research Question or Hypothesis:** How often are patient information requests made by chain community pharmacists during routine practice and what are the characteristics (e.g., reason for request and time required) of these requests?

**Study Design:** This electronic card study captured cross-sectional observational data on patient information requests made by pharmacists during routine practice. Information requests were documented in real time by one pharmacist meeting eligibility criteria at each participating pharmacy.

**Methods:** Pharmacists from one district of a national chain were randomized to a two-week data collection period. Pharmacists recorded the type of information requested, reason for request, information source, whether initial or follow up request, modality of communication, and the time required to make the request. Data were summarized using descriptive statistics. The Indiana University Institutional Review Board approved all study procedures.

**Results:** Nineteen of 33 eligible pharmacists consented to participate, providing an enrollment rate of 57.58%. Most participants held a Pharm.D. degree (78.9%) and were the pharmacy manager (89.5%). Pharmacists requested information mostly from patient/caregivers (39.80%) and the prescriber office (53.60%). The most common information requests from pharmacists included updated medication orders/lists (41.30%) and insurance (33.30%). These were primarily used for prescription clarification/filling (93.40%). Requests required an average of 6.0 (SD: 4.8) min. Over half (61.2%) of requests were made by telephone.

**Conclusion:** Community pharmacists often need current medication lists and insurance information during routine prescription processing. This emphasizes the potential value of HIE for all pharmacies, regardless of the extent of clinical service implementation.

## Critical Care

### Mon-25. Hydrocortisone and fludrocortisone versus hydrocortisone to reverse septic shock

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**Introduction:** Sepsis is a life-threatening condition characterized by a dysregulated host immune response to an infection. The 2021 Guidelines for Management of Septic Shock provide a weak recommendation to suggest the use of intravenous corticosteroids in the setting of ongoing septic shock requiring vasopressor therapy. In the APROCCHSS trial, Annane et al. assessed the clinical outcomes of patients in septic shock receiving hydrocortisone plus fludrocortisone compared to placebo. Study investigators found that the time to weaning off vasopressor support was lower among those who received combination therapy than those who received placebo.

**Research Question or Hypothesis:** Does the addition of fludrocortisone to hydrocortisone result in increased resolution of septic shock compared to hydrocortisone alone?

**Study Design:** This single-center, retrospective cohort study identified patients admitted to the surgical or trauma ICU over a 2-year period who received either hydrocortisone plus fludrocortisone or hydrocortisone alone for the treatment of septic shock.

**Methods:** Patient demographics and clinical data were manually extracted through chart review. Appropriate statistical analyses were performed to determine differences between the treatment approaches.

**Results:** A total of 60 patients were included in the analysis, 30 patients in each group. Baseline demographics did not differ between those who received hydrocortisone + fludrocortisone and those who received hydrocortisone alone. Illness severity scores, as evidenced by a median APACHE II Score, were similar (24.5 vs. 25, $p = 0.9$). Intra-abdominal infections were the primary source of sepsis in both groups (46.7% vs. 43%, $p = 0.7$). The primary outcome of time to vasopressor cessation in the hydrocortisone + fludrocortisone group was 3.70 days [2.62–4.95] compared to 3.00 days [2.20–3.85] in the hydrocortisone alone group ($p = 0.040$). Secondary outcomes such as hospital length of stay, ICU length of stay, and disposition were similar.

**Conclusion:** The combination of hydrocortisone and fludrocortisone did not result in a faster resolution of septic shock compared to the use of hydrocortisone.

### Sat-36. A retrospective cohort study on time at target sedation in mechanically ventilated patients with malignancies

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**Introduction:** There is limited literature exploring the efficacy and safety of dexmedetomidine and propofol in the critically ill mechanically ventilated oncology population. Patients with an underlying malignancy may benefit from the analgesic properties of dexmedetomidine, optimizing analgesia and sedation.

**Research Question or Hypothesis:** Does dexmedetomidine (D group) for mechanically ventilated (≥24 h) adult patients with malignancies improve time at target sedation (TTS) when compared to propofol (P group) or the combination of propofol and dexmedetomidine (P&D group)?

**Study Design:** Retrospective, single center, cohort study.

**Methods:** The primary outcome was the percentage of time RASS scores was within goal (TTS). Continuous outcomes were examined using Kruskal-Wallis and Wilcoxon rank-sum tests. Fisher's exact test and logistic regression were used to compare categorical outcomes. A post-hoc secondary analysis of two groups was conducted by reassigning the P&D patients to either the P or D group based on longer infusion time.

**Results:** A total of 113 patients were included (P group: $n = 94$, D group: $n = 12$, P&D group: $n = 7$). The median TTS was 29.7% in the P group, 24.2% in the D group, and 32.3% in the P&D group ($p = 0.7492$). More patients in the P&D group (71.5%) and the P group (55.3%) required the use of as needed propofol, compared to the D group (16.7%). The MDD of as needed fentanyl was significantly higher in the P&D group (125mcg/day, IQR 92.5–165) compared to the P (75mcg/day, IQR 50–100) and D group (50mcg/day, IQR 50–61.9) ($p = 0.0136$). There was no statistically significant difference in all other secondary outcomes. The secondary analysis (P group: $n = 99$; D group: $n = 14$) found more hypotension (92.9% vs. 63.6%; $p = 0.0334$) and vasopressor use (100% vs. 73.7%; $p = 0.0372$) in the D group.

**Conclusion:** Dexmedetomidine for mechanically ventilated patients with malignancies did not result in a difference in TTS compared to propofol or the combination.

### Sat-37. Evaluating the clinical characteristics of patients with thrombocytopenia in the ICU setting

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**Introduction:** Thrombocytopenia has been associated with poorer clinical outcomes in the intensive care unit (ICU) including increased risk of bleeding, prolonged length of stay, and mortality.

**Research Question or Hypothesis:** Which patient-specific characteristics are associated with thrombocytopenia in critically ill patients?

**Study Design:** A retrospective analysis was performed using the electronic health records of 318 critically ill adult patients from February 1 to August 30, 2020.

**Methods:** Thrombocytopenia was defined as a serum platelet count $<150 \times 10^3$/mcL. Thrombocytopenia outcomes were custom-coded using R-programming language. The primary outcome was the incidence of thrombocytopenia, and secondary outcomes were the risk factors associated with the disease and all-cause mortality during hospitalization. Descriptive statistics were conducted using an independent t-test and chi-square tests. Multivariable logistic regression models were utilized to examine the risk factors associated with the condition.

**Results:** Among 318 patients, 140 (44.02%) met thrombocytopenia criteria. The thrombocytopenic cohort had significantly lower ($p < 0.05$) IQR values for eGFR 57.4 (24.2–94.3), hemoglobin 9.03 (8.04–10.6), hematocrit 28.3 (25.1–33.1), SBP 118 (88.2–146.2), MAP 85 (67.5–108), and RR 21.4 (14.3–32.7). Further, the thrombocytopenic cohort had higher IQR values for BUN 28.6 (15.1–53) and SCr 1.1 (0.7–2.5). The thrombocytopenic cohort used less analgesics and sedatives 62 (44.3%, $p = 0.03$) but more vasopressor agents 34 (10.7, $p = 0.001$) and experienced longer lengths of stay 70.5 (7.3–890, $p = 0.001$). The most prescribed medications classes within the thrombocytopenic cohort were IV fluids, anti-infective, and analgesic agents. Medication classes associated with highest thrombocytopenia incidence were vitamins/iron supplements OR 2.12 [1.05–4.32] (0.03), vasopressors 2.95 [1.51–5.92] (0.001), and anti-infectives 1.80 [1.01–3.28] (0.04).

**Conclusion:** The inclusion of clinical phenotypic and medication use data can improve the identification and risk stratification for the development of thrombocytopenia for adults within the critical care setting.

### Tues-33. Gender influence on practices and opinions on weight-based dosing of fluids in septic shock

*Emma Covington, BS, Pharm.D. Candidate*[1], Alexander Ruehman, Pharm.D. Candidate[2], Trisha N. Branan, Pharm.D., BCCCP, FCCM[3] and Susan E. Smith, Pharm.D., BCCCP, FCCM[3]

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**Introduction:** Previous research has indicated differences based on provider gender, including the likelihood to follow clinical practice

guideline recommendations. The 2021 Surviving Sepsis Campaign (SSC) Guidelines updated the supplemental text to recommend ideal body weight (IBW) to dose resuscitation fluids. This study's purpose was to understand current practices and opinions regarding this recommendation with respect to gender.

**Research Question or Hypothesis:** Does gender impact practices and perceptions of SSC guideline recommendations?

**Study Design:** Cross-sectional survey electronically distributed to Society of Critical Care Medicine members.

**Methods:** Demographics, practices, and opinions related to sepsis management were queried. Outcomes included assessment of practitioner use of guideline recommendation to use IBW for dosing resuscitation fluids (i.e., 30 mL/kg) and opinion on their level of agreement with this recommendation and were compared between gender groups using the Chi-squared test. Logistic regression was applied to account for confounding variables. Analyses were conducted using SPSS Version 29 with alpha <0.05 considered significant.

**Results:** There were 485 responses, including 62.7% physicians, 15.5% pharmacists, 17.3% advanced practice providers, and 4.5% nurses/other, representing 42.5% female and 54.6% male. Male practitioners were more likely to use IBW in practice for dosing fluid resuscitation than females in non-obese (20% vs. 13%, $p = 0.011$) and obese (43% vs. 38%, $p = 0.022$) patients. Practitioner gender was similar with respect to opinion on the use of IBW for non-obese (37.7% vs. 36.4%, $p = 0.056$) and obese (62.6% vs. 61.2%, $p = 0.425$) patients. These findings lost significance in multiple logistic regression controlling for clinician type, institution type, and years in practice.

**Conclusion:** While gender differences in clinical practice have been reported previously, the observation of male clinicians being more likely to follow guideline recommendations differs from these previous reports, although was not maintained in regression analysis. Potential reasons for this finding may include differences in knowledge or trust in recommendations. Interpretation is limited by the reliance on accurate self-reporting.

## Sat-35. Use of ideal body weight to dose initial fluid resuscitation in adults with septic shock

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**Introduction:** The 2021 Surviving Sepsis Campaign guidelines recommend initial fluid resuscitation of 30 mL/kg using ideal body weight (IBW). The impact of weight-based fluid dosing using IBW compared to actual body weight on patient outcomes is unknown.

**Research Question or Hypothesis:** Does resuscitation fluid dosing based on IBW affect the need for mechanical ventilation (MV) in septic shock?

**Study Design:** Single-center, retrospective, observational cohort study.

**Methods:** A convenience sample of 200 adult patients admitted to the intensive care unit between 11/01/2020 and 01/31/2023 with a diagnosis of septic shock were identified. Patients were divided into tertiles based on the volume per kilogram of IBW of resuscitation fluids received within 3 h of presentation. Primary and secondary endpoints included the need for and duration of MV and were compared between groups with the Chi-squared and Kruskal–Wallis test, respectively. Binary logistic regression and multiple linear regression were applied to control for confounding variables.

**Results:** Patients were a median age of 67 years, predominantly Caucasian, had a median BMI of 26.9, and 33% had preexisting heart failure. Each tertile received a median volume of resuscitation fluid of 24.3, 33.4, and 49.5 mL/kg IBW ($p < 0.001$). Initiation and duration of MV were similar regardless of receiving more or less than guideline-recommended volume of resuscitation fluid (MV: 43% vs. 46% vs. 37%, $p = 0.308$; duration: 51 vs. 41 vs. 97 h, $p = 0.174$). When controlling for confounding variables, weight-based dosing of resuscitation fluid was not associated with need for MV and there was trend towards an association with duration of MV (beta coefficient $-1.065$, $p = 0.077$).

**Conclusion:** The need for and duration of MV was not affected by the volume of resuscitation fluids administered by IBW in the first 3 h of septic shock. Dosing weight used for resuscitation fluids should be further evaluated to determine any impact on patient outcomes.

## Sat-34. Antimicrobial prescribing practices in the treatment of intraabdominal infections

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**Introduction:** Intraabdominal infections (IAI) remain a significant cause of sepsis in the critically ill. Optimal antimicrobial regimens for IAI are controversial. Although guidelines recommend limiting empiric antibiotics to 4–7 days after source control, antibiotic duration is variable in practice.

**Research Question or Hypothesis:** This study's aim was to describe antimicrobial prescribing practices for treatment of IAI and assess the need for empiric MRSA coverage in critically ill surgical patients.

**Study Design:** This single-center, retrospective, cohort study at Vanderbilt University Medical Center included all adults admitted to the Surgical Intensive Care Unit that received antibiotics for an IAI from 6/1/2021 to 4/30/2023.

**Methods:** Manual chart review was conducted to confirm an IAI. The primary outcome was antibiotic duration for IAI. Other outcomes

included were infections from multi-drug resistant organisms (MDRO) and mortality. Statistical analyses were performed using SPSS. Categorical and continuous data were analyzed using x2 and Mann–Whitney U. Logistic and linear regression were performed to determine risk factors for vancomycin use, mortality, and prolonged antibiotic use.

**Results:** Of 722 encounters, 334 met inclusion criteria. The median age was 59 years, with 39.5% having septic shock. Most patients received piperacillin-tazobactam (68%), followed by cefepime (36.5%), meropenem (21.9%), and levofloxacin (18.3%). The median antibiotic duration was 8 days (IQR 5–12.25). Vancomycin was used in 71.3% of patients for a median of 4 days (IQR 3–7). Among 130 positive cultures, 8 isolated MRSA, and 67 had MDRO. Those with an infectious disease consult had an average of 5.6 (95% CI 3.2–8.1) more days of antibiotic coverage. Vancomycin was used less frequently with piperacillin-tazobactam (OR 0.34, 95% CI 0.1–0.8). Age (OR 1.05, 95% CI 1.00–1.08) and septic shock (OR 2.8, 95% CI 1.3–6.1) were associated with mortality.

**Conclusion:** This study provides evidence that broad-spectrum antibiotics for IAI are used for prolonged durations and vancomycin may be over utilized based on the low incidence of MRSA infections.

### Sun-33. Comparison of septic shock management strategies reported by pharmacists versus other professions

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**Introduction:** Sepsis is a life-threatening condition with well-established practice standards. The 2021 Surviving Sepsis Campaign Guidelines include nine updates pertaining to medication recommendations. This study's purpose was to understand current practices and opinions regarding the use of the new recommendations.

**Research Question or Hypothesis:** Does profession impact practices and opinions regarding addition of second-line vasopressor and corticosteroids in septic shock?

**Study Design:** Cross-sectional survey distributed electronically to Society of Critical Care Medicine members.

**Methods:** Demographics, practices, and opinions related to sepsis management were assessed. Respondents were grouped by profession (physician, pharmacist, advanced practice providers [APP], nurses). Outcomes included knowledge and use of guideline recommendations to initiate second-line vasopressor based on norepinephrine rate and to initiate adjunctive corticosteroids based on norepinephrine rate and duration. Outcomes were compared using the Chi-squared test. Logistic regression was applied. SPSS Version 29 was used with alpha <0.05 considered significant.

**Results:** Four-hundred eighty-five clinicians participated in the survey, including 62.7% physicians, 15.5% pharmacists, 17.3% advanced practice providers, and 4.5% nurses/other. Pharmacists (82%) were more aware of the guideline recommendation statement on adding second-line vasopressors compared to physicians (62%), APPs (50%) and nurses (32%) ($p < 0.001$); however, the use of this recommendation in practice was lower (41.5%) and was similar across clinician types. Similarly, pharmacists (78%) were more aware of the guideline recommendation statement on adding corticosteroids when compared to physicians (54%), APP (35%), and nurses (37%) ($p < 0.001$). This recommendation was infrequently applied in practice (4.9%) and was similar across professions. In multiple regression accounting for confounding variables, pharmacists remained more likely to be aware of guideline recommendations for adding a second-line vasopressor (OR 4.402, 95% CI 2.122–9.131) and corticosteroids (OR 6.510, 95% CI 3.170–13.368).

**Conclusion:** Although pharmacists reported higher awareness of guideline recommendations relating to addition of a second vasopressor to norepinephrine and addition of corticosteroid, the majority of all providers do not follow these SSC recommendations.

## Education/Training

### Mon-35. Qualitative analysis of competency-based structured reflections on short term experiences in global health

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**Introduction:** Competency based global health experiences can assist with fulfilling curricular outcomes. There is limited data available to characterize student learning on short-term (≤ 14 day) experiences in global health (STEGH).

**Research Question or Hypothesis:** Characterization of thematic learning experiences during STEGHS can assist schools of pharmacy in fulfilling curricular objectives.

**Study Design:** Thematic Document Analysis.

**Methods:** P1-P4 students participating in a STEGH are required to submit post-experience structured reflections. These reflections include seven required and three optional questions which were linked to the Consortium of Universities for Global Health competencies and the AACP Curricular Outcomes and Entrustable Professional Activities (COEPA). Student experiences were in five different low- and middle-income countries. Qualitative analysis followed an inductive and deductive content analysis approach. Two investigators reviewed all de-identified reflections with a codebook that was developed by two investigators with global health and/or qualitative research experience. Axial coding was then used to identify larger

themes. Four investigators met, developed the overall themes based on initial coding, and resolved discrepancies.

**Results:** From 2019 to 2024, 45 student reflections were analyzed. Eight key themes were identified: (1) Distance is a challenge for patient access to medical care, (2) Education is important for patients to engage in their healthcare, (3) Healthcare infrastructure is under-resourced to meet patient needs, (4) Lack of clean water and air were associated with the development of preventable disease, (5) Poverty may limit healthcare access, (6) Cultural practices influence origin and treatment of disease, (7) Interprofessional collaboration with the pharmacy team was valuable for patient care, and (8) Recognizing cultural differences is necessary to provide appropriate communication. These themes aligned with COEPA outcomes: 2.2 Communication, 2.3 Cultural and Structural Humility, 2.7 Interprofessional Collaboration, and 2.8 Population Health and Wellness Promoter.

**Conclusion:** Reflection themes provide insight into student knowledge and skills acquired on STEGHs. These experiences can contribute to fulfilling curricular objectives when structured appropriately.

### Sat-40. Applying cognitive science to develop a study guide for improving student learning in a required anti-infectives course

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**Introduction:** Study guides are commonly used by pharmacy educators; however, their optimal development, content and application is not defined. Cognitive science of learning suggests that learning is enhanced through active behaviors that involve information processing and reflection. This study sought to apply cognitive science principles to develop a study guide that supports pharmacy students' learning of antifungal pharmacotherapy in a required anti-infectives course.

**Research Question or Hypothesis:** What are pharmacy students' perceptions of a study guide developed based on cognitive science principles, and how does the study guide impact learning?

**Study Design:** IRB-approved, single-center, cross-sectional study.

**Methods:** In Spring 2024, a post-lecture study guide was developed prompting students to compare across different antifungal classes and incorporating reflection questions that emphasized key learning points. Students' perceptions (primary objective) were evaluated using an anonymous voluntary survey administered post-examination via Qualtrics. Quantitative responses were summarized using descriptive statistics, and open-ended responses were analyzed through thematic analysis. Impact on learning (secondary objective) was assessed by comparing scores on 4 relevant examination questions between students who used versus did not use the study guide using t-test, in Stata v14 with alpha of 0.05.

**Results:** Fifty-seven students (38%) responded to the survey. Among students who used the study guide, most felt it was of moderate to high value to learning (82%). Major themes describing how the study guide was useful: (1) helped to organize information, (2) helped to focus on important concepts, and (3) facilitated comparison of drug properties. Students also suggested incorporating practice questions and further aligning content for examination purposes. Students who used the study guide scored statistically significantly higher on the 4 relevant examination questions compared to those who did not ($2.3 \pm 0.1$ vs. $1.3 \pm 0.4$, $p = 0.005$).

**Conclusion:** A study guide developed based on cognitive science principles was well-received by pharmacy students and appeared to positively impact their learning.

### Sun-35. Impact of COVID-19 on advanced pharmacy practice experience students' clinical interventions

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**Introduction:** The COVID-19 pandemic brought unprecedented challenges in pharmacy education, particularly in experiential learning. As a result, preceptors were forced to make significant changes in how pharmacy students engaged with the healthcare team. While there is limited data published on the specific changes implemented, there is documentation of student perceptions of the changes. There is a notable lack of information, however, on the impact these changes had on documented interventions.

**Research Question or Hypothesis:** What impact did COVID-19 have on the number/type of clinical interventions and acceptance rate compared to pre- and post-COVID-19?

**Study Design:** Retrospective quality improvement project.

**Methods:** Fourth year pharmacy students for three faculty preceptors on a mandatory inpatient general medicine advanced pharmacy practice experiential (APPE) at a large community medical center documented clinical interventions in an online database from May 2018 through April 2024. The database captured information pertaining to APPE block, preceptor, intervention category, description of intervention, potential benefits, outcomes, and references. Data was extracted from the database for each rotation block and combined into the following groupings: pre-COVID-19 (May 2018–March 2020), COVID-19 (May 2020–April 2022), and post-COVID-19 (May 2022–April 2024).

**Results:** Pre-COVID-19, 59 students documented 1752 interventions (median 28; range 13–60). During COVID-19, 62 students documented 1402 interventions (22; 0–52). Post-COVID-19, 60 students documented 1266 interventions (20; 8–40). Most intervention categories were similar except for patient education: 17.8% pre-COVID-19, 10.4% during COVID-19, and 8.5% post-COVID-19. Recommendations were typically accepted: 53.5% pre-COVID-19, 63.6% during COVID-19, and 62.6% post-COVID-19.

**Conclusion:** During COVID-19, there was an observed reduction in the number of interventions per student, especially for patient

education. This was expected based on conditions such as virtual rotations, absences due to illness, lack of bedside rounding, and inability to enter some patient rooms. Interestingly, post-COVID-19 intervention numbers have not returned to pre-COVID-19 levels. Further analysis is needed to explain this continued downtrend in student interventions.

### Tues-41. Uncertainty tolerance in student pharmacists following an inpatient rounding simulation

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**Introduction:** Uncertainty tolerance (UT) includes the emotional, cognitive, and behavioral response to minimize negative and maximize positive effects of uncertainty. With increasing involvement of pharmacists in clinical situations, including decision-making roles and expanding prescriptive authority, management of uncertainty is a desirable component of pharmacy education leading to improved UT as pharmacists. The tolerance of ambiguity scale (TAS) is a validated instrument in which higher scores represent lower UT (average score 44–48).

**Research Question or Hypothesis:** An inpatient rounding simulation (IRS) exposing student-pharmacists to a level of uncertainty will lead to change in TAS scores and self-reflection comment themes.

**Study Design:** IRB-approved, pre-post observational, pilot survey.

**Methods:** Student-pharmacists in their second professional year enrolled in a skills-based course were included. Student-pharmacist groups of 4–5 completed an IRS and responded to clinical questions in a timed environment and completed pre-/post-IRS TAS and self-reflection on uncertainty/UT. Pre-/post-IRS TAS scores were analyzed with paired t-tests. Thematic analysis and Fisher's exact test were used to evaluate qualitative self-reflection.

**Results:** 59 students responded (48% response rate). TAS was high, but not different pre/post-IRS (63.2 vs. 62.6, $p = 0.63$). The most common theme regarding source of uncertainty pre-IRS was the clinical question posed to the group ($n = 17$, 26%). The most common way of overcoming uncertainty pre-IRS was working with groups or availability of resources ($n = 20$, 30%; for each). Relief that the IRS was over was most frequent positive theme pre-IRS ($n = 11$, 28%). The most common source of uncertainty post-IRS was discerning the best answer ($n = 25$, 38%). The most common way of overcoming uncertainty post-IRS was working with groups ($n = 27$, 44%). Working with groups was the most frequent positive theme post-IRS ($n = 10$, 24%). Working with groups was thematically more common post/pre-IRS (10 vs. 0, $p = 0.001$).

**Conclusion:** Student-pharmacists had low UT pre- and post-IRS. Group utilization was cited as a positive in an uncertain environment that occurred more frequently post-IRS.

### Mon-27. Effects of practice questions on pharmacy calculations final examination performance

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**Introduction:** Pharmacists are often the last line of defense from medical errors caused by inaccurate calculations. Effective teaching and assessment of pharmaceutical calculations is essential in preparing students for successful pharmacy careers.

**Research Question or Hypothesis:** This study aimed to elucidate the potential benefit of self-testing practice questions on final examination performance in a first-year pharmaceutical calculations course.

**Study Design:** Students were given access to 110 online practice calculation questions, in the form of four quizzes, 8 days prior to the final examination. The date of first access, number of attempts, and best quiz percentage, as well as final examination score, for each student was recorded.

**Methods:** Retrospective analysis using Spearman's Rho calculation and an Unpaired T-test was used to assess the effect of self-study practice questions on exam performance.

**Results:** A greater number of attempts on practice questions correlated with a higher score on the final examination for the class of 2026, but not the class of 2027. Furthermore, superior performance on practice questions was linked to enhanced final examination scores for both the class of 2026 and 2027. Also, an earlier first access date was associated with higher final examination scores specifically for the class of 2026.

**Conclusion:** This retrospective study was conducted to evaluate the use of practice calculation questions on final examination performance, and results reveal that the utilization of practice calculation questions positively correlates with improved final examination performance, notably observed in the class of 2026 but not in 2027. These findings suggest the potential efficacy of this preparatory method across various pharmaceutical courses and other calculation-based disciplines internationally.

### Sun-41. PGY1 and P4 Student perceptions of residency pathway program

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**Introduction:** Schools of pharmacy have implemented numerous strategies to improve student readiness for postgraduate training and increase match success rates. The residency pathway at Concordia University Wisconsin School of Pharmacy (CUWSOP) focuses on

developing project management skills and requires professional development activities.

**Research Question or Hypothesis:** What experiences/activities are perceived as most helpful for PGY1 preparation by P4 students compared to post-PGY1 residents?

**Study Design:** Retrospective cohort study.

**Methods:** All CUWSOP P4 students who participated in the 2024 residency match and all former CUWSOP students completing a PGY1 residency in 2023–2024 were sent an electronic survey regarding their perceptions of the value of certain activities and experiences in their ability to successfully obtain and complete a PGY1 residency, respectively.

**Results:** The P4 student survey was completed by 46 (88.5%) and the post-PGY1 survey was completed by 20 (87.0%) students. Five P4 and 9 PGY1 respondents completed the residency pathway. Both P4 and PGY1 residents identified working as a pharmacy intern (P4 & PGY1 = 100%), APPEs (P4 & PGY1 = 100%), and completing/presenting a project as a student (P4 = 100%, PGY1 = 83.3%) as the experiences/activities being the most helpful in obtaining and being successful as a PGY1 resident. 100% of P4 students also identified leadership in student organizations as very helpful compared with only 50% of PGY1 graduates. The residency pathway components viewed most valuable by P4 students included CV review by pathway faculty ($n = 5$, 100%), letter of intent review ($n = 5$, 100%) and mock interviews ($n = 5$, 100%). PGY1 graduates identified mock interviews ($n = 5$, 83.3%) as the most valuable component followed by the residency prep information session ($n = 4$, 66.7%), professional organization participation ($n = 4$, 66.7%), pathway faculty advising ($n = 4$, 66.7%), elective IPPEs ($n = 4$, 66.7%), and the longitudinal project ($n = 4$, 66.7%).

**Conclusion:** P4 students and PGY1 residents find similar experiences and activities valuable in helping them to obtain and be successful in residency.

## Sun-44. Changes in course delivery and didactic methods on P1 student exam performance

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**Introduction:** Significant changes within the first professional year (P1) Disease Prevention & Self-Care therapeutics course at the Philadelphia College of Pharmacy have occurred since course redesign due to the COVID-19 pandemic as well as intentional pedagogical updates by course faculty. Incorporation of active learning activities allow students to practice applying effective learning strategies but may not consistently improve course exam scores.

**Research Question or Hypothesis:** Do the delivery methods of didactic course content (on-campus vs. largely asynchronous) or updates to active-learning strategies affect exam performance?

**Study Design:** Retrospective cohort-based quantitative study, IRB exempt.

**Methods:** This study assessed course exam performance for students that took course exams from 2018 to 2023. Three exams were administered each course year (except 2018, where two exams were administered). Exam scores were compared for years that didactic content was delivered on-campus (2018, 2019, and 2023, $n = 690$) versus years that delivery was largely asynchronous and virtual (2020–2022, $n = 1100$). Exam performance was also compared between years that one active learning activity was repeated before each exam (2019–2022, $n = 1457$) versus utilizing different active learning strategies before each exam in addition to extra content application time following the first few lecture topics (2023, $n = 171$). The Mann–Whitney U test was utilized for comparisons of the primary outcomes (PSPP v1.5.3; $p \leq 0.05$ significant).

**Results:** Exam performance was similar between years utilizing on-campus versus asynchronous delivery methods (73.3% vs. 73.4%, $p = 0.988$). Exam scores were modestly higher during 2023 where additional post-lecture application and varied pre-exam active learning strategies were utilized compared to 2019–2022 (76.1% vs. 72.7%, $p < 0.001$).

**Conclusion:** Use of multiple types of active learning strategies within P1 therapeutics courses may benefit exam performance. The method of didactic content delivery, on-campus versus asynchronous, may not significantly impact exam scores. Additional studies should examine the impact of active learning strategies on first-year therapeutics course performance.

## Mon-34. Is pharmacy education working? A qualitative exploration of stakeholders perception of pharmacy education and the current and future needs for pharmacists

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**Introduction:** Recent calls for changes in health professions education have prompted pharmacy education to engage in curricular transformation efforts. However, are the educational efforts working? To address this gap, it is crucial to ask stakeholders their perceptions of pharmacy education and current and future needs of practice to drive future educational transformation.

**Research Question or Hypothesis:** What are stakeholders' perceptions of the current state of pharmacy education and the current and future needs for pharmacists?

**Study Design:** Qualitative design using semi-structured focus-groups.

**Methods:** Guiding interview questions were created a priori and iterated through researcher consensus-building. Stakeholders were recruited from: professional organization leadership (national and state), practice transformation leaders, practicing pharmacists (ex: clinical, hospital, community, Veteran's Administration), pharmacy payors, and other healthcare professionals. Following IRB-approved consent, 1-h focus groups were conducted by a trained researcher, audio-recorded, and transcribed verbatim until content saturation was achieved. As part of Grounded Theory and to ensure accuracy in coding, the constant comparison method was utilized. Two team members independently compared the data and themes for each focus group, followed by a consensus among all coders to finalize themes, ensuring data accuracy.

**Results:** Multiple themes were identified, with clearly identified strengths and weaknesses of recent pharmacy graduates and clear identification of societal and patient needs. Strengths of graduates included patient advocacy and patient communication and care skills along with clinical skills. There was significant disagreement on whether graduates possess critical thinking skills, with workforce-based stakeholders seeing it as a weakness. Key societal needs included drug knowledge, business and management-related skills, and enhancing patient access to care, and stakeholders generally agreed these elements were often weaknesses of recent graduates.

**Conclusion:** Focus groups provided valuable insights into the strengths and weaknesses of pharmacy graduates along with rising needs for pharmacists, which can be used when evaluating future educational changes.

## Tues-39. Assessing the reliability of artificial intelligence tools in pharmacy education with a focus on pharmaceutical calculations

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**Introduction:** Pharmaceutical calculations are required elements of the didactic Doctor of Pharmacy curriculum according to "Standards 2025" and COEPA 2022. As the use of artificial intelligence (AI) grows and the number of AI tools increases, pharmacists and educators explore how and when to apply AI to practice settings and the classroom. The accuracy of AI in performing pharmaceutical calculations remains unknown.

**Research Question or Hypothesis:** How accurate and reliable are AI tools for solving pharmaceutical calculations?

**Study Design:** A descriptive study analyzing the accuracy and teachability of AI tools for solving pharmaceutical calculations commonly encountered in the pharmacy curriculum.

**Methods:** Eleven free-access AI tools with the potential to perform mathematical calculations were gathered through an internet search with the assistance of a librarian. Seven faculty-generated questions were tested with each AI tool: one control, two creatinine clearance, one oral to intravenous dose conversion, one vancomycin pharmacokinetic dosing, one gentamicin dose, and one number needed to harm (NNH). The primary outcome was the AI tools' ability to perform the calculation correctly by reporting a correct response. Secondary outcomes included types of mistakes made and teachability for each tool.

**Results:** The control question was answered correctly by 10 (90.9%) AI tools, and all AI tools correctly answered the dose conversion problem. Eight (72.7%) tools were able to calculate NNH. Only one (9.1%) calculated the correct gentamicin dose and interval. None of the tools correctly calculated creatinine clearance or vancomycin dose and interval. The most frequently encountered mistakes were incorrect weight selection for creatinine clearance and use of incorrect formulas. Nine (81.8%) of the tools were able to be taught on at least one question within a session.

**Conclusion:** AI tools proved to be unreliable for solving complex pharmaceutical calculations that require multiple steps and critical thinking. Certain tools may be more reliable for straightforward calculations such as proportional reasoning or NNH.

## Mon-29. Assessing pharmacy students' knowledge and attitudes towards off-label drug uses: Implications for clinical pharmacy education

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**Introduction:** This study examines off-label prescription practices in the U.S. and evaluates pharmacy students' understanding of such uses, which are often under-discussed in therapeutic courses. The study identifies gaps in literature and education related to off-label drug applications, highlighting the relevance to clinical pharmacy.

**Research Question or Hypothesis:** The research investigates two key questions: "What is the level or availability of literature on off-label drug uses?" and "What is the understanding among pharmacy students regarding these uses?"

**Study Design:** A survey was administered along with a literature search to 40 pharmacy students to assess their knowledge and opinions on the off-label uses of albuterol, gabapentin, and tamsulosin.

**Methods:** Using a standardized questionnaire (a total of 45 knowledge and 45 opinion questions), we evaluated students' knowledge on drug side effects, interactions, indications, and formulations, with a primary focus on off-label uses. Responses were analyzed using descriptive statistics, chi-square tests, and multi-regression analysis in SPSS, targeting a 0.05 significance level.

**Results:** Students achieved an average correctness rate of 52.21% across 30 knowledge questions. Detailed results indicated strong knowledge in identifying side effects, such as 86.5% recognizing tachycardia from albuterol. However, significant knowledge gaps were evident in off-label uses; only 59.5% understood that albuterol is not approved for bacterial infections and correctly identified its tablet form. Most of them also do not believe in promoting the off-label use of medications. These gaps underscore the need for enhanced educational focus on off-label drug uses to improve safe prescribing practices.

**Conclusion:** Although pharmacy students are generally knowledgeable about medication safety, there are substantial gaps in their understanding of off-label uses. There is a lack of literature in guiding practitioners in the off-label uses of medications. This study underscores the importance of integrating comprehensive education on off-label prescribing into pharmacy training programs.

## Emergency Medicine

### Sat-43. Impact of one-time vancomycin dosing in patients with skin and soft tissue infection discharged from the emergency department (The OVED study)

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**Introduction:** One-time vancomycin doses in the emergency department (ED) are a common practice in the management of skin and soft tissue infections (SSTI), accounting for 70% of vancomycin use in discharged patients in a previous study. The impact of this practice on clinical outcomes is unknown and it may lead to increased length of stay due to long vancomycin infusion times.

**Research Question or Hypothesis:** Investigate whether one-time vancomycin doses in a community teaching hospital impact SSTI treatment failure rates in discharged ED patients.

**Study Design:** This study was a retrospective, single-center, cohort study comparing adult ED patients with SSTI who received a one-time vancomycin dose (VAN) to those who did not receive any vancomycin (NOVAN). Patients were excluded if they were admitted, received more than one vancomycin dose, or were not discharged on oral antibiotics.

**Methods:** The primary outcome was 30-day treatment failure defined as re-presentation to the ED for SSTI at the same site as the index encounter with an empiric therapy change, repeat incision and drainage procedure, or hospital admission. Secondary outcomes included 90-day treatment failure and ED length of stay. Chi-square tests were used for categorical data. *T*-tests were used for continuous variables. A priori alpha levels were set to 0.05 and analyses were conducted in R 4.3.3.

**Results:** Thirty-day treatment failure occurred in 16 patients (8.8%, $n = 181$) in the NOVAN group and 14 (14.7%, $n = 95$) in VAN group ($p = 0.127$). Ninety-day treatment failure occurred in 19 patients (10.5%) in NOVAN and 18 (18.9%) in VAN group ($p = 0.046$). Mean length of stay was 158.5 min in NOVAN and 306.2 min in VAN group ($\Delta = 147.7$, $p < 0.001$).

**Conclusion:** This study does not support the use of one-time vancomycin doses to decrease SSTI treatment failure rates in ED patients managed as outpatients and this practice may increase length of stay.

### Mon-39. Impact of antihypertensive administration strategy on time to thrombolytic administration in acute ischemic stroke

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**Introduction:** Patients with acute ischemic stroke (AIS) often present with elevated blood pressure (greater than 185/110 mmHg) which must be lowered prior to administering thrombolytics. The current AHA/ASA guideline for AIS does not recommend a preferential antihypertensive agent in this setting.

**Research Question or Hypothesis:** Does the choice of initial antihypertensive agent affect time from antihypertensive to thrombolytic administration in patients presenting with BP > 185/110?

**Study Design:** Single-center retrospective chart review of adults admitted to Methodist LeBonheur Healthcare in Memphis, TN between March 2022 and November 2023 who required antihypertensive medications prior to administration of thrombolytics.

**Methods:** Cohorts were divided by initial type of antihypertensive used: intravenous push (IVP) or continuous infusion (CI). IVP agents included labetalol and hydralazine while nicardipine was the CI agent. Patients were excluded if they received both IVP and CI agents within 5 min of the initial agent.

**Results:** One hundred patients were included: 44 in the IVP group and 56 in the CI group. The median baseline NIH stroke scale score was 6. The highest systolic blood pressure was higher in the CI group (193 mmHg vs. 207 mmHg, $p < 0.001$). The median antihypertensive-to-thrombolytic time was significantly shorter in the IVP group compared to the CI group (9.5 min vs. 15 min, $p = 0.005$). Door-to-thrombolytic time was shorter in the IVP group also (57.5 min vs. 67 min, $p = 0.038$). There were no statistically significant differences in use of rescue antihypertensives, bradycardia,

hypotension, hypertension, functional outcomes at discharge, hemorrhagic transformation, or angioedema between the two groups.

**Conclusion:** IVP antihypertensives may decrease the time from antihypertensive agent to thrombolytic administration in AIS patients who require blood pressure lowering to meet criteria for thrombolytics. Ease of administration and quick onset of action of IVP agents may allow for faster antihypertensive-to-thrombolytic times without increasing rates of adverse effects. Functional outcomes were not impacted with this intervention.

## Endocrinology

### Sat-44. Patterns of dietary supplement use for weight loss among adults with obesity: insights from the National Health and Nutrition Examination Survey (NHANES) database 2011–2018

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**Introduction:** Dietary supplements continue to be used for a variety of health conditions. However, limited data are available about the patterns of their use for weight loss among adults with obesity.

**Research Question or Hypothesis:** What are the patterns of dietary supplement use for weight loss among individuals with obesity?

**Study Design:** A cross-sectional study was conducted using data from the National Health and Nutrition Examination Survey (NHANES).

**Methods:** NHANES included initial home interviews followed by physical and laboratory tests in a mobile examination center. We extracted demographic and dietary data from NHANES collected during 2011 to 2018. Inclusion criteria were adults (age ≥ 20) with a body mass index (BMI) ≥ 30 kg/m$^2$ who reported using supplements for weight loss. The Mann–Whitney *U* test was applied to identify statistically significant differences between groups, using a 2-sided *p*-value <0.05 to establish significance. Weighting was applied to participant data to account for unequal sampling probabilities and non-response.

**Results:** Of the 37 775 participants, 13 695 had the diagnosis of obesity. A total of 493 (3.6%) individuals reported using dietary supplements for weight loss. The most popular supplements were herbal products, vitamins/minerals, fish oil, amino acids, and probiotics/prebiotics/fiber. Among the herbal products, garcinia, green coffee, and green tea were the most frequently used. Notably, 86.4% of supplement users took the supplements without medical advice, while only 13.6% followed the doctor's recommendation. Women, white individuals, and younger adults were more likely to use supplements for weight loss compared to men, other races, and older age group.

**Conclusion:** The study demonstrated that over 86% of individuals used dietary supplements without medical guidance and identified most commonly used products and the groups of individuals frequently using them. These findings highlight the need for enhanced education and oversight to ensure that consumers are well-informed about the potential benefits and risks of using dietary supplements for weight loss.

### Sun-49. Evaluating the consistency of AI-generated clinical recommendations for type 1 diabetes management: A comparative analysis of ChatGPT-4 and Google bard

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**Introduction:** Generative AI (artificial intelligence) has the potential to transform clinical pharmacy practice by analyzing complex medical data and providing personalized treatment recommendations. This study compares clinical recommendations for type 1 diabetes management, based on the American Diabetes Association's Standards of Medical Care—2022, generated by two AI platforms: ChatGPT-4 and Google Bard.

**Research Question or Hypothesis:** Both platforms can achieve internal consistency within each platform and external consensus between platforms and with a clinical pharmacist's decisions.

**Study Design**: AI-generated responses were reviewed and compared to the clinical pharmacist's assessment and plan using a qualitative approach.

**Methods:** A complex clinical case involving type 1 diabetes with a history of severe hypoglycemia and diabetic ketoacidosis (DKA) was selected. The clinical note, including the chief complaint and subjective and objective information, was edited for clarity and ensuring HIPAA compliance. The case was analyzed by both platforms three times. We then compared the AI-generated recommendations with the assessment and plan written by the clinical pharmacist.

**Results:** Comparison of ChatGPT-4 and Google Bard revealed key similarities and differences in safety and effectiveness recommendations. ChatGPT-4 recommended ketone strips, consistently mentioned glucagon for hypoglycemia management, and emphasized insulin injections, patient education, and CGM (continuous glucose monitoring) troubleshooting. Bard focused on re-educating DKA prevention techniques and updating emergency plans for hypoglycemia. Both platforms recommended consulting dietitians and adjusting insulin doses. The clinical pharmacist's note highlighted gaps in patient adherence and data reporting, emphasizing the importance of patient adherence for effective management.

**Conclusion:** This pilot study demonstrates both platforms can generate clinical recommendations with internal consistency, particularly in effectiveness measures. ChatGPT-4 provided safety recommendations more closely aligned with the Standards of Medical Care. Further analyses with more cases are warranted to explore the potential of AI to augment clinical practice in managing type 1 diabetes.

### Mon-50. Comparing the efficacy of liraglutide versus semaglutide on weight loss

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**Introduction:** Limited data exists comparing the efficacy of liraglutide and semaglutide in managing weight loss.

**Research Question or Hypothesis:** Which drug is more effective in managing weight loss?

**Study Design:** A retrospective observational cohort study.

**Methods:** This study was conducted at a quaternary care hospital from June 2018 to July 2022, including adults who received either liraglutide or semaglutide. The primary outcome was weight loss, while secondary outcomes included effects on HbA1C and lipid profile.

**Results:** A total of 366 patients were analyzed: 122 received liraglutide and 244 received semaglutide. The mean age was 51.00 ± 11.55 years in the liraglutide group and 51.16 ± 12.35 years in the semaglutide group ($p = 0.521$). The baseline mean weight was 94.7 ± 19.5 kg in the liraglutide group and 94.6 ± 19.9 kg in the semaglutide group ($p = 0.989$). After a median follow-up of 10 (6–17) months for the liraglutide group and 7.5 (6–11) months for the semaglutide group ($p < 0.001$), the resultant weights were 90.8 ± 19.6 kg for the liraglutide group and 91.1 ± 19.8 kg for the semaglutide group ($p < 0.001$) when comparing each group to its baseline separately. When comparing the weight loss achieved in each group, liraglutide achieved a median weight loss of −4 (−7 to 0) kg versus −3 (−6 to 0) kg for semaglutide ($p = 0.867$). The reduction in HbA1C with liraglutide was significantly less than with semaglutide: −0.2 (−0.5 to 0.3) versus −0.5 (−1.1 to 0.1) ($p = 0.003$). Both drugs significantly lowered LDL and triglycerides. Multivariate linear regression analysis confirmed no significant difference between the drugs [B -0.577, 95% CI −1.87 to 0.7; $p = 0.38$], while baseline weight, diabetes, and SGLT2I were significant factors affecting weight.

**Conclusion:** Both liraglutide and semaglutide were effective in reducing weight, with no significant difference between the two drugs. Further large-scale prospective studies are necessary to confirm these findings.

### Mon-45. Evaluating AI-generated clinical recommendations for type 2 diabetes management: implications for future clinical pharmacy practice

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**Introduction**: Generative AI (artificial intelligence) holds the promise of transforming clinical care. Utilizing algorithms and datasets, AI can analyze intricate medical information to enhance individualized clinical management for chronic conditions, such as type 2 diabetes. This study aims to compare clinical recommendations for type 2 diabetes management generated by two AI platforms—OpenAI's ChatGPT-4 and Google Bard—based on the American Diabetes Association's Standards of Medical Care—2021.

**Research Question or Hypothesis**: We hypothesized both platforms can achieve internal consistency within each platform and external consensus between platforms and with a clinical pharmacist's decisions.

**Study Design**: AI-generated responses were reviewed and compared to the clinical pharmacist's assessment and plan using a qualitative approach.

**Methods**: A complex clinical case was chosen, involving a patient with co-morbid conditions and complications related to type 2 diabetes. The note was edited before being analyzed by each AI platform to ensure clarity and HIPAA compliance. The case was analyzed by both AI platforms three times. We then compared the AI-generated recommendations with the assessment and plan written by the clinical pharmacist.

**Results**: The comparison of ChatGPT-4 and Bard revealed both AI platforms consistently emphasized pharmacotherapy and hypoglycemia prevention. ChatGPT-4 focused on insulin therapy reevaluation and glucagon education, while Bard recommended medication reviews and hypoglycemia monitoring. ChatGPT-4 suggested continuous glucose monitoring (CGM), whereas Bard incorporated HbA1c levels and a GLP-1 receptor agonist for better glycemic management. Both platforms agreed on blood pressure and statin therapy for reducing complication risks. The clinical pharmacist's note aligned with these recommendations.

**Conclusion**: Both AI platforms demonstrated different degrees of internal consistency in recommendations. Regarding external consensus, both platforms focused on secondary cardiovascular prevention. The alignment of AI-generated recommendations with a clinical pharmacist's note suggests that AI can potentially augment clinical pharmacy practice in managing type 2 diabetes and complication reduction.

### Mon-42. Insulin glargine utilization in dexamethasone-induced hyperglycemia

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**Introduction:** Insulin is commonly used for managing steroid induced hyperglycemia (SIH), but the optimal dosing strategies are not established. The majority of the literature on SIH management focuses on intermediate-acting steroids with limited reported experience on SIH management caused by long-acting steroids such as dexamethasone. This study aimed to evaluate insulin glargine use in managing dexamethasone-induced hyperglycemia.

**Research Question or Hypothesis:** What percentage of patients who received once-daily insulin glargine and dexamethasone combination therapy achieved euglycemia by day three?

**Study Design:** Single-center, retrospective, cohort study.

**Methods:** Adult patients admitted during July 1, 2021 and July 31, 2023 who received insulin glargine and dexamethasone for at least three consecutive days were screened. Exclusions were applied for patients with Type I diabetes mellitus, not receiving once-daily administration of either, or initiation of continuous insulin infusion within the first 3 days. The primary outcome was the percentage of patients achieving euglycemia (mean blood glucose 70–180 mg/dL) on day three of combination therapy.

**Results:** Among 733 screened patients, 118 were included in the analysis. The most common indication for dexamethasone use was COVID-19 (55.1%) followed by hematologic malignancies (16.1%). Euglycemia was achieved by 28 patients (24%) on day three. The mean body mass index (BMI) and presence of Type II diabetes mellitus diagnosis were found to be significantly lower in the euglycemia cohort than non-euglycemia cohort (29.1 vs. 33.7 kg/m$^2$, $p = 0.019$; 85.7% vs. 97.8%, $p = 0.028$, respectively). The standardized mean insulin glargine dose was 0.04 vs. 0.03 units/mg dexamethasone/kg in the euglycemia cohort compared to the non-euglycemia cohort ($p = 0.14$), with a median correctional insulin dose of 6 [IQR 4–15] vs. 24 [IQR 15–45] units, respectively. One patient in the euglycemia cohort developed hypoglycemia.

**Conclusion:** Achieving early euglycemia with insulin glargine for dexamethasone-induced hyperglycemia remains challenging. Lower BMI and absence of pre-existing Type II diabetes mellitus were associated with success.

### Tues-50. Comparison of subcutaneous versus intramuscular route of therapeutic estradiol levels for feminizing gender-affirming hormone therapy

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**Introduction:** While recommendations are available for subcutaneous (SC) testosterone administration for masculinizing gender-affirming hormone therapy (GAHT) in transgender and non-binary patients, there is limited literature regarding the efficacy differences between SC and intramuscular (IM) estradiol (E2) administration for feminizing GAHT. In many practices including at the study institution, the SC route is frequently used off-label for feminizing GAHT for improved injection comfort and ease.

**Research Question or Hypothesis:** The purpose of this study was to compare SC versus IM E2 administration to determine if there are differences in time to therapeutic levels.

**Study Design:** This single health-system, retrospective cohort study included all patients ≥18 years prescribed SC or IM E2 valerate with 2 or more serum E2 levels at least 3 months apart and a documented diagnosis of gender incongruence who were seen at University Health between January 1, 2013 to December 31, 2023.

**Methods:** The primary endpoint was percentage of patients reaching therapeutic E2 levels at month 6. Secondary endpoints included occurrence of sub- and supra-therapeutic E2 levels; SC and IM E2 levels at 3, 6, 9, and 12 months; and percentage of patients who received pharmacist-led injection education. Continuous data were analyzed via a Wilcoxon test and categorical data were analyzed via chi-squared and Fisher's exact tests.

**Results:** Forty-five patients met inclusion criteria. Results of the primary endpoint showed no statistical difference ($p = 0.59$) in time to therapeutic levels between SC (25.9%) and IM (33.3%) E2 administration. There was also no statistical difference in secondary endpoints of therapeutic levels at any time frame between routes.

**Conclusion:** Although study results support the use of SC E2 administration, larger studies comparing E2 administration routes are needed to align GAHT guidelines with current practice.

## Geriatrics

### Mon-60. Evaluation and outcomes of antipsychotic use in hospitalized older adults

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**Introduction:** Antipsychotics are commonly used in older, inpatient adults to treat agitation, despite a lack of evidence for this indication, and are often ordered at higher than recommended doses. In addition to questionable efficacy, concerns regarding safety exist.

**Research Question or Hypothesis:** What is the efficacy and safety of low dose antipsychotics compared to high dose antipsychotics in hospitalized, agitated, older adults?

**Study Design:** IRB approved, retrospective cohort study.

**Methods:** Inpatients ≥65 years, administered an antipsychotic between August 2021 and August 2023 were screened. Exclusion criteria included: home use of antipsychotic or benzodiazepine, mood disorder except major depressive disorder, admission to the intensive care unit for ≥48 h or intubation, benzodiazepine administration, or developmental delay. Low dose was defined as patients receiving haloperidol (0.5–1 mg/dose), olanzapine (2.5–5 mg/dose), quetiapine (12.5–25 mg/dose), risperidone (0.25–1 mg/dose), or ziprasidone (10–20 mg/dose). High dose was any dose above low. The primary outcome was re-dosing within 6 h of initial dose. Secondary outcomes included length of stay (LOS), continuation of antipsychotics on discharge, and adverse events (e.g., falls). Between group comparisons and outcome data were analyzed using Mann–Whitney *U* test and Chi-squared test or Fisher's exact test as appropriate (GraphPad Prism version 10.0.0). Alpha was <0.05.

**Results:** Of the 305 patients included, 25 (14%) low dose patients compared to 18 (14%) high dose required re-dosing of an antipsychotic in ≤6 h ($p = 0.9504$). The median (IQR) LOS was [5 days (3–10) vs. 6 (3–10); $p = 0.59$)], discharge antipsychotics prescribed [49 (28%) vs. 33 (26%), $p = 0.66$), and adverse events [43 (24%) vs. 38 (29%); $p = 0.33$] were not significantly different between low and high groups respectively.

**Conclusion:** There was no significant difference in efficacy or safety between low and high doses of antipsychotics in older, hospitalized adults. Additional research on this topic is needed.

### Sun-54. Academic service learning (AS-L) project of medication reconciliation for hospitalized older adults in an advanced pharmacy practice experience (APPE)

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**Introduction:** Academic Service-Learning (AS-L) is an experiential site-based program that involves students in some form of required service that benefits the public good and to understand course concepts. Clinical pharmacy interventions, such as medication reconciliation, is an important course concept for pharmacy students during clinical rotations.

**Research Question or Hypothesis:** What is the feasibility of incorporating AS-L in an eight-week inpatient Advanced Pharmacy Practice Experience (APPE) in an academic hospital?

**Study Design:** Prospective study, patient chart review.

**Methods:** Two pharmacy students conducted medication reconciliation (8/1/23–9/11/23) in an Inpatient Geriatrics APPE. Students identified potential discrepancies, presented them to clinical faculty, and discussed with the geriatric team. Students used a standardized data collection form to document patient age and gender, intervention types, pharmacologic category, and prescriber acceptance. Students determined the percentage of prescriber-accepted recommendations, subdivided by intervention type and pharmacologic category.

**Results:** 64 patients (average age 85 years; age range 60–101 years; female 73%; male 27%) received medication reconciliation. A total of 53 recommendations were made. The most common were dose adjustments ($n = 15$, 28%) and initiation of drug therapy ($n = 11$, 21%). Majority of recommendations pertained to anti-infectives ($n = 13$, 25%), cardiovascular ($n = 12$, 23%), and neuropsychiatric medications ($n = 7$, 13%). Prescribers accepted 38 recommendations (72%). The most accepted types include dose adjustments ($n = 11$, 29%) and initiation of therapy ($n = 8$, 21%). Prescribers accepted most clinical interventions regarding anti-infectives ($n = 11$, 29%) and cardiovascular medications ($n = 10$, 26%).

**Conclusion:** It is feasible to incorporate AS-L in an eight-week inpatient APPE in an academic hospital. Pharmacy students enhance drug therapy in older hospitalized patients through medication reconciliation and clinical recommendations. Incorporating A-SL projects into APPE helps pharmacy students to set search-related goals while completing curriculum requirements.

## Health Services Research

### Tues-58. Paving the way for pharmacist billing in North Dakota

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**Introduction:** Pharmacists' prescriptive authority varies. In North Dakota (ND) pharmacists have limited prescriptive authority for immunizations and tobacco cessation therapies, yet billing presents many barriers. Barriers include time to bill, ease of billing, payer recognition, and reimbursement of services.

**Research Question or Hypothesis:** This study aimed to explore barriers and identify facilitators to billing for pharmacist-provided clinical services in ND.

**Study Design:** Survey research of licensed ND pharmacists to determine the current state of billing practices.

**Methods:** The survey was sent to all ND pharmacists with an e-mail address on file with the ND Board of Pharmacy. Descriptive analysis identified trends in current billing practices, billing code utilization, barriers to billing, and pharmacists' perception of appropriate reimbursement. Data was further divided into rural and urban findings.

**Results:** 236 pharmacists responded: 50 rural, 102 urban, 83 undetermined. 38% of rural pharmacists billed for services, 28% did not, 34% did not respond. 33% of urban pharmacists billed for services, 36% did not, 30% did not respond. 20% of rural pharmacists felt reimbursement from billing sustains their services and 40% did not. In urban areas, 25% felt reimbursement sustains their services while 43% did

not. Most billing codes used were medication therapy management (MTM)-related, with <5% for tobacco cessation. A barrier to pharmacy billing utilization is time. 26% of rural and 16% of urban pharmacists do not use support personnel. Pharmacists without support personnel lack time to provide billable services submit claims.

**Conclusion:** Pharmacists in ND can bill for limited services; however, this survey shows most only utilize MTM billing. Many barriers were identified such as time to bill, ease of billing, payer recognition and reimbursement. Sustainability of services is vital for implementation of any service and can be overcome with increased billing implementation. This research seeks solutions to overcome barriers and examine efficient ways for pharmacists to bill and implement new services.

## Mon-49. A cost–benefit analysis of a social determinants of health program within a clinically integrated network of community pharmacies

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**Introduction:** As healthcare moves towards whole-person care, community pharmacies are integrating sustainable social determinants of health (SDoH) screening and referral programs, addressing both clinical and health-related social needs.

**Research Question or Hypothesis:** To develop a cost–benefit analysis (CBA) within an ongoing SDoH screening and referral program in a clinically integrated community pharmacy network.

**Study Design:** A cost–benefit model using the Proctor framework for implementation strategy with a time-driven activity-based costing (TDABC) analysis from a public health perspective.

**Methods:** The 12-month SDoH program included 17 clinically integrated community pharmacies across New York State in 2023. The TDABC data elements included time spent per intervention step, consisting of patient engagement, screening, and referrals, and were collected from two pharmacies over a 4-month period. Major costing categories were pre-implementation and ongoing activities, training (personnel & fixed), intervention, and operational costs. Personnel costs were determined using Bureau of Labor Statistics wage data and non-personnel costs were itemized by program leads. Annual cost savings per resolved referral were aligned using published literature and adjusted to 2023 US dollars. Study outcomes included net benefits, benefits to cost ratio (BCR), and return on investment (ROI).

**Results:** A total of 1122 screenings were completed over the study period, resulting in 523 referrals, and 134 resolutions to date. The average intervention time was 36.67 min. Total program cost was $102685.30 consisting of pre-implementation ($16789.87), ongoing activities ($31644.60), training ($29429.32), intervention ($16369.86), and operational ($8451.65) costs. Based on literature, the average annual savings for one social needs resolution was estimated at $2127.90 per person, providing an estimated SDoH program benefit of $285138.60 and net benefit of $182453.30. Overall, the BCR was 2.78 and the ROI was 178%.

**Conclusion:** SDoH screening and referral programs within community pharmacies demonstrate positive economic impact.

## Sun-57. Asthma and emergency department utilization during 2020 COVID-19 pandemic

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**Introduction:** Asthma often leads to Emergency Department (ED) visits. The COVID-19 pandemic significantly strained the healthcare system, yet few studies have explored the ED utilization for asthma during this period.

**Research Question or Hypothesis:** Compared to non-asthmatic patients, do asthmatic patients have an increased number of ED visits during COVID-19?

**Study Design:** Cross-sectional study.

**Methods:** This cross-sectional study used data from the 2020 Medical Expenditure Panel Survey, including individuals aged ≥18 years. Frequency of ED visits was compared between individuals with and without asthma, using multivariable logistic regression to identify risk factors.

**Results:** Weighted analysis revealed that asthmatics were more likely to be female (60.49% vs. 51.83%, $p < 0.001$) and younger (mean age 49.20 ± 17.86 vs. 51.17 ± 18.42 years, $p < 0.001$) than non-asthmatics. Racial and ethnic disparities were notable, with higher percentages of non-Hispanic Blacks (14.07% vs. 9.92%) and Hispanics (12.76% vs. 15.19%) among asthmatics ($p < 0.001$). Asthmatics were more likely to fall into lower income categories and had a higher percentage of ED visits (19.35% vs. 11.45%, $p < 0.001$). Comorbidities like angina, emphysema, arthritis, congestive heart disease, and hypertension were significantly higher among ED users ($p < 0.001$). The regression analysis showed females were more likely to visit the ED (adjusted Prevalence Ratio [aPR] 1.15, 95% CI: 1.02–1.30, $p = 0.02$). Individuals with asthma had greater likelihood of ED visits (aPR 1.65, 95% CI: 1.42–1.93, $p < 0.001$). Individuals in the 45–64 age group had more ED visits (aPR 1.71, 95% CI: 1.91–2.45, $p = 0.004$). Additionally, individuals with Medicare (aPR 2.51, 95% CI: 1.97–3.20, $p < 0.001$) and Medicaid coverage (aPR 1.78, 95% CI: 1.40–2.25, $p < 0.001$) had higher likelihood of ED visits.

**Conclusion:** Asthma, age group 45–64, family income, as well as having Medicare and Medicaid coverage, increased the likelihood of ED visits. Socioeconomic and sociodemographic factors remain important in healthcare planning and policy development to reduce ED visits.

**Hematology/Anticoagulation**

### Mon-59. Evaluating bleed risk in hospitalized patients receiving apixiban with hypoalbuminemia

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**Introduction:** Rivaroxaban and apixaban exhibit high protein binding. Hypoalbuminemia could impact the pharmacodynamics of these medications, increasing bleed risk. Rivaroxaban has been associated with increased bleeding in patients with hypoalbuminemia however the effects in apixaban-treated patients remain unknown. This study evaluated hypoalbuminemia and bleeding risk in patients treated with apixaban.

**Research Question or Hypothesis:** Does hypoalbuminemia increase bleeding risk in apixaban-treated patients?

**Study Design:** IRB approved, retrospective cohort study.

**Methods:** Adult inpatients admitted from May to July 2023 were reviewed. Inclusion criteria were: apixaban ≥2.5 mg twice daily given inpatient for ≥48 h or prescribed upon discharge and in patients with an albumin level drawn during index admission. Patients with a stroke or TIA within 14 days, bleeding with another anticoagulant, pregnancy, active COVID-19, cirrhosis, or thrombocytopenia were excluded. The primary endpoint assessed the impact of hypoalbuminemia (albumin ≤3 g/dL) on International Society on Thrombosis and Hemostasis criteria bleeding rates in apixaban-treated patients. Bleeding risk was assessed using multivariable logistic regression with backwards stepwise elimination of variables with a $p$-value <0.2 on bivariate analysis. Alpha was set at <0.05 and SAS version 9.4 was used for analysis.

**Results:** A total of 391 patients were included. Bleeding occurred in 49 (12.5%) patients. Albumin ≤3 g/dL was associated with a 2-fold increase in adjusted bleed risk (OR 2.002, 95% CI [1.003–3.996], $p = 0.0491$). After backward stepwise elimination, gastroduodenal ulcer history (OR 1.428, 95% CI [1.003–2.032], $p = 0.0480$) and proton pump inhibitor use (OR 2.278 [1.225–4.238], $p = 0.0093$) were also associated with bleeding risk in the multivariable model.

**Conclusion:** Albumin does not appear significantly associated with adjusted bleed risk in hospitalized patients receiving apixaban. The effect of hypoalbuminemia on apixaban's clinical pharmacodynamics requires further investigation.

### Tues-59. Evaluation of apixaban use for venous thromboembolism prophylaxis in post-bariatric surgery patients at a community teaching hospital

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**Introduction:** Most thromboembolic events occur following bariatric surgery leading to significant morbidity and mortality. Extended venous thromboembolism (VTE) prophylaxis using direct oral anticoagulants in the post-operative setting following bariatric procedures is not recommended by current guidelines due limited data and malabsorption concerns.

**Research Question or Hypothesis:** To determine post-bariatric surgery 30-day VTE and bleeding event rates, as defined by International Society on Thrombosis and Hemostasis guidelines (ISTH) in those who received apixaban for VTE prophylaxis.

**Study Design:** Retrospective, single-center chart review.

**Methods:** Apixaban 2.5 mg twice daily for 2 to 4 weeks post-operatively was utilized for extended VTE prophylaxis in patients undergoing sleeve gastrectomies or deemed high risk. Risk was calculated via the Cleveland Clinic Risk of Post-Discharge VTE after Bariatric Surgery calculator. A score above 0.4%, previous VTE history, hypercoagulable conditions or venous insufficiency were considered high risk. Eighty-three patients undergoing bariatric surgery discharged on apixaban were included. Demographics and surgical parameters were obtained from the electronic medical record. Any VTE or bleed events within 30 days post-bariatric surgery were described. Results were analyzed using descriptive statistics.

**Results:** The median risk score calculated pre-operatively was 0.16% [0.16–0.27] and 67 (80.7%) patients met criteria for VTE prophylaxis. Sixty-two (74.7%) patients underwent a sleeve gastrectomy procedure. No VTE events were observed, however one patient experienced a splenic infarct that was considered related to surgery rather than apixaban. Four (4.8%) patients were noted to have clinically relevant non-major bleeding per ISTH definition and apixaban was discontinued for three patients.

**Conclusion:** Apixaban use for extended VTE prophylaxis post-bariatric surgery resulted in no VTE events and minimal adverse effects. The patient population may have influenced results as most underwent sleeve gastrectomy procedures with low VTE risk scores. Additional data needed to further determine the efficacy and safety of routine use of apixaban for extended VTE prophylaxis in bariatric surgery.

### Mon-61. Determination of the optimal obesity-adjusted dosing weight for enoxaparin

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**Introduction:** The ideal dosing weight metric for enoxaparin remains elusive. Dosing remains focused on actual body weight, which may inadvertently increase the risk of bleeding in those with obesity,

while the use of ideal weight may relatively underdose those with obesity.

**Research Question or Hypothesis:** determine the optimal obesity-adjusted enoxaparin dosing weight.

**Study Design:** Retrospective data was collected across five metropolitan hospitals over a 2-year period.

**Methods:** Eligible subjects had minimum 48 h of in-hospital twice-daily enoxaparin and Factor anti-Xa level 3–5 h post-dose ($n = 220$). Multiple linear regression calculated the degree of associated variance between a range of nominal dosing weights and Factor anti-Xa levels, adjusted for renal function. Dosing weights were calculated as ideal body weight (IBW) and then incrementally adjusted for increasing percentages of weight above IBW ie IBW + 10% above IBW, IBW + 20% etc. up to actual body weight. Likewise, dosing weights were also tested using lean body weight (LBW).

**Results:** For BMI ≥ 30 kg/m$^2$ optimal variance explained by dosing weight metrics was at IBW + 40% (23%) and similarly for LBW + 40% (23%). Use of actual body weight (ABW) to calculate doses had lowest associated variance with Factor anti-Xa levels (18%) followed by unadjusted IBW (13%) or unadjusted LBW (19%). In those with BMI < 30 kg/m$^2$ there was similar explained variance in the ranges of IBW + 20%–50% and LBW 10%–40% (21%).

**Conclusion:** Compared to IBW + 40% or LBW + 40% use of ABW to calculate dose was poorly associated with Factor anti-Xa levels, as was IBW or LBW when unadjusted for obesity. IBW + 40% and LBW + 40% requires further prospective study and may offer a more consistent Factor anti-Xa response on the background of increasing obesity and bleeding risk profiles.

## Infectious Diseases

### Mon-56. Evaluation of vancomycin heteroresistance prevalence in clinical enterococci isolates

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**Introduction:** Heteroresistance is a phenomenon where subpopulations of bacteria display varying levels of antimicrobial susceptibility; it is often undetected by standard susceptibility testing which leads to therapeutic failures. Vancomycin (VAN) is one of the treatment options for enterococcal infections. Heteroresistant vancomycin-intermediate *Staphylococcus aureus* has been well-documented however, there is limited published data for VAN heteroresistance enterococci.

**Research Question or Hypothesis**: Evaluate the prevalence of VAN heteroresistance among clinical enterococcal isolates.

**Study Design:** In vitro.

**Methods:** Clinical enterococci isolates (65) were obtained across health systems in Phoenix, AZ and Atlanta, GA. Minimum inhibitory concentration (MIC) was determined using broth microdilutions according to CLSI. All isolates were screened for heteroresistance using Brain Heart Infusion agar (BHI, BD Biosciences, Franklin Lakes, NJ) containing VAN 6 and 8 µg/mL (BHI-V6/BHI-V8) and standard VAN Etest (Liofilchem Inc., Waltham, MA). Plates were incubated at 37°C for 48 h (h). Modified population analysis profile (PAP) was performed as described by Pfeltz RF et al using various VAN concentrations. Sensitivity and specificity analyses were used to compare BHI-V6 vs. BHI-V8 and standard Etest using PAP as reference.

**Results:** VAN $MIC_{50/90}$ was 1 and 2 µg/mL for both broth microdilution (range 0.25–4 µg/mL) and VAN Etest (range 0.25–2 µg/mL). Standard VAN Etest detected 6.1% (4/65) heteroresistant. BHI-V6/BHI-V8 plates both detected 10.7% (7/65) strains to be heteroresistant. PAP confirmed 6.1% (4/65) to be heteroresistant. VAN Etest and BHI-V6/BHI-V8 demonstrated a 100% sensitivity; however, specificity was higher with VAN Etest compared to BHI-V6/BHI-V8 (100% vs. 95%). BHI-V6/BHI-V8 both falsely identified 4.6% (3/65) heteroresistance.

**Conclusion:** Our study demonstrated the prevalence of heteroresistance among enterococci to be 6.1%. Further study is warranted in the future to understand VAN heteroresistance among enterococci.

### Tues-66. Retrospective analysis evaluating the efficacy of sofosbuvir/velpatasvir for 8 Weeks versus 12 weeks among incarcerated patients with HCV from the Illinois Department of Corrections (IDOC)

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**Introduction:** Hepatitis C virus (HCV) prevalence is disproportionally higher in correctional facilities than the general population. Reducing the treatment duration from 12 weeks to 8 weeks would lower overall treatment costs, alleviate healthcare burden, and improve access to care for incarcerated individuals.

**Research Question or Hypothesis:** In HCV patients treated with sofosbuvir/velpatasvir (SOF/VEL) ± ribavirin, does the viral load (VL) become undetectable at week 8 versus week 12?

**Study Design:** IRB-approved, retrospective chart review.

**Methods:** Eligible subjects included IDOC patients seen in the Liver Telemedicine Clinic between 6/28/2016 and 12/8/2023. During the 8-week and 12-week treatment periods, patients received either SOF/VEL alone or SOF/VEL+ ribavirin. A total of 329 patient charts were reviewed and data were collected, including patient demographics, VL, treatment duration, Fibroscan results, genotype, and BMI.

**Results:** A review of 329 patient charts showed a predominantly male (89.2%) and White (62.3%) sample, with a median age of 49 (37–61). Of the 252 patients on the 12-week SOF/VEL ± ribavirin, SVR12 rates were 97.5% (77/79) for SOF/VEL and 98.8% (171/173) for SOF/VEL + ribavirin. In the 8-week group ($n = 77$), 46.8% (36/77) received ribavirin, and 100% achieved SVR12 with or without ribavirin. The higher likelihood of achieving SVR in the 8-week group may be due to younger age, lower Fibroscan scores, a higher proportion of White patients, and earlier undetectable VL by week 2 suggesting rapid viral clearance.

**Conclusion:** This retrospective chart review demonstrates that an 8-week SOF/VEL ± ribavirin treatment achieves SVR12 rates comparable to the 12-week regimen. The reduced treatment duration not only provides significant cost savings but also increases treatment completion rates, which is crucial for ensuring timely medical care within the correctional setting. These findings highlight the potential for improved health outcomes and more efficient use of resources in treating HCV among incarcerated individuals.

## Mon-67. Assessing patient outcomes and antibiotic regimens for treatment of hospitalized patients with Lyme carditis

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**Introduction:** Lyme carditis is a cardiovascular complication of early disseminated Lyme disease. Although clinical practice guidelines recommend treatment with intravenous ceftriaxone followed by oral doxycycline with clinical improvement, limited data support this recommendation. This study evaluated clinical outcomes following management of Lyme carditis.

**Research Question or Hypothesis:** What patient outcomes are observed following treatment of hospitalized patients with Lyme carditis?

**Study Design:** Retrospective cohort study (January 2016–May 2024).

**Methods:** Adult patients with a Lyme carditis diagnosis admitted within a large hospital network were included. Outpatients, patients treated at an external hospital, and patients without antibiotic therapy were excluded. Electronic health record review included demographic, laboratory, and Suspicious Index in Lyme Carditis (SILC) score data. The primary outcome was 30-day readmission for Lyme carditis. Secondary outcomes included length of stay (LOS), cardiovascular endpoints, and 30- or 90-day mortality. Data was analyzed using descriptive statistics in Microsoft Excel (Redmond, WA).

**Results:** Sixty-two patients were included: 80.6% male and 93.5% white with a mean (± SD) age of 50.0 (± 19.3) years. Admissions were most common in July (18; 29.0%) with a mean 4.8 (± 4.5) days LOS, and approximately half of the patients had an intensive care unit stay. Fifteen (24.2%) patients received ceftriaxone alone for a mean 24.2 (± 8.1) days of therapy (DOT), while 42 (67.7%) received a mean 5.6 ceftriaxone DOT prior to doxycycline for a total of 24.4 (± 6.5) DOT. SILC scores were commonly intermediate (29; 46.8%) or high (27; 43.5%) suspicion category. Fifty-seven (91.9%) patients experienced heart block. Eighteen (29.0%) patients required temporary pacing, and 10 (16.1%) required a permanent pacemaker. A 14.5% mean reduction in PR interval was observed from presentation to discharge. Three (4.8%) patients were readmitted for Lyme carditis symptoms within 30 days. No 30- or 90-day mortality was observed.

**Conclusion:** Various Lyme carditis antibiotic regimens in this study demonstrated low readmission rates.

## Sun-64. Targeted interventions to improve antibiotic administration timing in patients with presumed sepsis at a community teaching hospital

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**Introduction:** Delays in antibiotic administration are associated with increased mortality in patients with septic shock.

**Research Question or Hypothesis:** What are the root causes of antibiotic administration delays in patients with sepsis?

**Study Design:** Cross-sectional study aimed to identify targeted interventions to improve antibiotic administration times in patients with sepsis.

**Methods:** An IRB-approved cohort study included a retrospective phase with a random sample of adults receiving systemic antibiotics for sepsis at a community teaching hospital from May 1, 2023, to January 31, 2024. Data collected covered antibiotic order entry, verification, preparation, and administration to assess compliance to the hospital's guideline of antibiotic administration within 1 h of order entry. Based on identified barriers, interventions were implemented to optimize antibiotic administration from February 2 to April 28, 2024. The impact of these interventions was assessed using time-series analysis with ARIMA modeling.

**Results:** Retrospectively, 269 orders showed 64% compliance within 1 h, primarily using piperacillin/tazobactam (56%) and cefepime (17%). The emergency department (ED) managed 83% of orders, with critical care units handling 5%. Mean time to administration was 69 min, with delays in critical care preparation and delivery, and in ED administration. To improve efficiency, piperacillin/tazobactam was added to critical care dispensing cabinets in February 2024, and ED leadership emphasized timely administration in April 2024. Prospective evaluation of 83 orders showed piperacillin/tazobactam (53%) and cefepime (23%) remained common, with ED managing 81% and critical care 6%.

Critical care administration time for piperacillin/tazobactam reduced from 90 to 74 min. Overall mean administration time decreased from 69 to 54 min, varying by verification, preparation, delivery, and administration times. However, these changes were not directly linked to the interventions per interrupted time series analysis.

**Conclusion:** Compliance with the hospital guidelines for antibiotic administration in patients with sepsis can be optimized. Next steps include timely inpatient interventions using "code sepsis" alerts and continued interdisciplinary collaboration.

### Sun-61. Evaluation of penicillin susceptible *Staphylococcus aureus* (PSSA) in bacteremia and correlation to daptomycin susceptibility

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**Introduction:** Penicillin resistance mediated by β-lactamase (*blaZ*) among methicillin-susceptible *Staphylococcus aureus* (MSSA) has been ubiquitous for decades. However, recent reports indicate that penicillin-susceptible *S. aureus* (PSSA) is increasing, coinciding with a time period of the clinical introduction of daptomycin. Daptomycin exposure increases β-lactam susceptibility, but it is unknown whether emergence of PSSA is an epiphenomenon or directly related to daptomycin use.

**Research Question or Hypothesis:** This study evaluated PSSA over time and tested the hypothesis that daptomycin exposure increases penicillin-susceptibility.

**Study Design:** MSSA bloodstream isolates were collected over a 13-year period and evaluated for PSSA using phenotypic and genotypic testing. *blaZ* positive MSSA were exposed to daptomycin via serial daily passage and assessed for PSSA.

**Methods:** Penicillin-susceptibility among MSSA bloodstream isolates (2009–2022) were determined by automated testing (MicroScan) and broth microdilution assays. Inducible penicillin-resistance was further tested using the "beach–cliff" disk diffusion phenotype. The presence of *blaZ* was confirmed by PCR. To evaluate the relationship between PSSA and daptomycin, the MSSA strain TX0117 (*blaZ*+) was passaged in daptomycin in vitro using daily serial passages and evaluated PSSA.

**Results:** Among 1187 MSSA isolates, PSSA consistently increased from 23.7% to 44.3% over the study period. Only 3.2% of the 435 PSSA displayed inducible penicillin resistance, and 71.4% (10 of 14) of these contained *blaZ*. In daptomycin passage with TX0117 (*blaZ*+), daptomycin MIC increased 16-fold (0.25–4 μg/mL), while the penicillin MIC reduced 32-fold (64–2 μg/mL).

**Conclusion:** This study observed a steady increase in PSSA among MSSA bloodstream isolates. Inducible penicillin-resistance was rare. Daptomycin exposure appears to directly contribute to PSSA in vitro. Future studies are ongoing to identify whether increasing PSSA in clinical *S. aureus* bloodstream isolates correlates with daptomycin exposure and clinical use in patients, and whether these changes in susceptibility have implications on bacterial virulence properties.

### Sun-63. The impact of a pharmacist-led intervention on discharge antibiotic prescribing

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**Introduction:** Previous literature indicates that discharge antibiotic prescriptions are infrequently monitored by antimicrobial stewardship programs and are often guideline-discordant. Leveraging clinical pharmacists' expertise may optimize discharge antibiotic prescribing, benefitting individual patients and improving public health outcomes.

**Research Question or Hypothesis:** Does pharmacist review and intervention lead to improved discharge antibiotic prescribing?

**Study Design:** This is a multi-center, quasi-experimental study of an intervention in which a pharmacist reviews, documents and communicates discharge antibiotic recommendations to the primary inpatient medical team, aiming to have a significant public health impact.

**Methods:** Included patients were admitted to a participating center between 1/1/2020 and 5/1/2024, treated for an index infection while inpatient and prescribed oral antibiotics for discharge. Patients were compared prior to intervention implementation (pre-intervention group) to those after intervention implementation (post-intervention group). The primary outcome was the overall discharge antibiotic appropriateness, defined as having an appropriate indication, duration, agent and dose. Clinical outcomes, including adverse drug events, 30-day hospital or emergency department readmission and 30-day recurrence were compared.

**Results:** There were 125 included patients from four community hospitals; 76 pre-intervention and 49 post-intervention. Patients were a median of 69.0 years old (IQR 60.0–80.5), 48% male and 83.2% non-Hispanic Caucasian. The predominant index infection sources were urinary tract (56.0%) and pneumonia (34.4%); 70.4% had a positive culture. Pharmacists made 48 unique interventions within the post-intervention group; 53.1% were accepted by the primary medical team. Among the post-intervention group, discharge antibiotic

prescriptions were overall more appropriate (42.9% vs. 23.7%, $p = 0.024$), particularly in terms of agent selection (88.4% vs. 64.5% $p = 0.005$). There was no difference in adverse events, 30-day infection recurrence or 30-hospital or emergency department readmission.

**Conclusion:** A pharmacist-led intervention was associated with improved discharge antibiotic prescribing. Future work should focus on efforts to increase the acceptance and implementation of these antimicrobial stewardship interventions as they could have broader impact on public health.

### Mon-51. Clinical outcomes in patients with candida auris infections: A single-center study

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**Introduction:** Candida auris (C. auris) presents a therapeutic challenge due to undefined susceptibility breakpoints and frequent misidentification by biochemical tests, leading to suboptimal therapy.

**Research Question or Hypothesis:** What are the clinical outcomes of management C. auris infections?

**Study Design:** A retrospective observational cohort study.

**Methods:** The study was conducted between January 2019 and June 2022, including confirmed cases of C. auris infection. The primary endpoint was to assess the clinical outcomes of C. auris management. Secondary endpoints included mycologic cure, 30-day and 90-day infection recurrence, and 30-day all-cause mortality.

**Results:** A total of 56 patients were evaluated, with a mean age of 65.05 ± 16.86 years. Candidemia accounted for 62.7% of cases. Clinical cure was achieved in 57% of patients, while mycologic cure was achieved in 84.4%. Recurrence of C. auris infection occurred in 28.6% of patients at 30 days and 12.7% at 90 days. The 30-day mortality rate was 28.6%. Multivariate logistic regression identified mycologic cure [OR 6.96; 95% *CI* (1.21–39.92)], length of critical care unit stay [OR 0.132; 95% *CI* (0.019–0.907)], and baseline C-reactive protein levels [OR 0.990; 95% *CI* (0.982–0.998)] as the independent predictors of clinical cure.

**Conclusion:** The clinical cure of invasive C. auris infections was predicted by mycologic cure, shorter critical care stay, and low C-reactive protein levels. Further multi-center studies are needed to validate our findings.

### Mon-74. Impact of penicillin allergy on Gram-negative susceptibilities within an antibiogram

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**Introduction:** Around 10% of the population reports a penicillin allergy. Most are not truly allergic, yet little research exists on how penicillin allergies affect antibiograms, particularly gram-negative organisms that contribute to Urinary Tract Infections (UTI).

**Research Question or Hypothesis:** Do documented penicillin allergies adversely affect gram-negative susceptibilities on an antibiogram?

**Study Design:** Retrospective, observational chart review.

**Methods:** Patients admitted in 2022 to a two-hospital community health system with a first positive bacterial culture for common UTI gram-negative organisms were separated into non-penicillin-allergic and penicillin-allergic cohorts. Descriptive statistics were collected, including type (allergy, adverse reaction, or unknown), severity (mild, intermediate, severe, or unknown), and reported reaction (e.g., rash, shortness of breath). Two-sided, independent sample t-tests were used to compare susceptibility rates between cohorts. The primary objective was to determine if a documented penicillin allergy affected susceptibility to common UTI organisms.

Table 1

| | *E. coli* | | | *P. mirabilis* | | |
|---|---|---|---|---|---|---|
| Susceptibility (%) | Penicillin allergic | Non-penicillin allergic | *p*-value | Penicillin allergic | Non-penicillin allergic | *p*-value |
| Levofloxacin | 59 | 76 | <0.001 | 66 | 83 | 0.025 |
| Ciprofloxacin | 59 | 75 | <0.001 | 66 | 83 | 0.025 |
| TMP/SMX | 68 | 78 | 0.002 | 72 | 84 | 0.012 |
| Cefepime | 94 | 96 | >0.05 | 90 | 98 | 0.0015 |
| Gentamicin | 90 | 91 | >0.05 | 75 | 92 | 0.006 |
| Piperacillin/tazobactam | 94 | 96 | >0.05 | 94 | 99 | 0.012 |

**Results:** Penicillin allergy was documented in 484/3757 patients (12.8%). The allergy cohort had significantly lower susceptibilities for the following gram-negative organisms compared to the non-allergic cohort: *Escherichia coli* and *Proteus mirabilis* (Table 1). Twelve percent of allergy types were adverse reactions, not true allergies. Unknown severity (63%) was the most reported, with severe reactions occurring in only 15% of patients. Reported reactions varied significantly, with unknown (35%) and rash (19%) predominating.

**Conclusion:** Self-reported penicillin allergies were frequently unknown in both severity and reported reaction and associated with significant decreases in certain gram-negative organism susceptibility. Future studies should evaluate long-term impacts of de-labeling on antibiograms.

## Sun-65. Evaluating in vitro activity of eravacycline- and tigecycline-based triple combinations against multidrug-resistant *Acinetobacter baumannii* strains

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**Introduction:** Despite the increased prevalence and severity of multidrug-resistant (MDR) *Acinetobacter baumannii*, data on optimal treatment remains limited. Although dual combinations with eravacycline (ERV)- or tigecycline (TGC)-based demonstrate synergy and rapid initial kill, bacterial regrowth occurs soon after. Thus, there is a need for novel tetracycline-based combinations to achieve bacterial kill and suppress the development of resistance.

**Research Question or Hypothesis:** Evaluate the in vitro activities of tetracycline-based triple therapies against MDR-AB.

**Study Design:** Time-kill assay (TKA).

**Methods:** Two A. baumannii strains, H-3945 (pan-susceptible) and CDC-306 (MDR) were evaluated. Broth microdilution was performed according to CLSI using commercially purchased ERV, meropenem (MER), sulbactam (SUL), rifampin (RIF), and TGC. TKA was performed in duplicate at 0.25xMIC and free steady-state (fCss) concentrations based on population pharmacokinetic data. Synergy was defined as ≥2 log10 CFU/mL reduction at 24 h in combination compared to the most active monotherapy, and additive effects as >1 and <2 log10-CFU/mL reduction. Other activities were considered indifferent.

**Results:** H-3945/CDC-306 MICs (mg/L) were as follows: ERV (0.0625/4), MER (0.25/256), SUL (4/64), RIF (4/8), and TGC (0.25/8). At 0.25xMIC, synergy was seen with TGC + SUL + RIF (−3.72 ± 0.2 log10 CFU/mL) and TGC + MER + RIF (−5.08 ± 0.00 log10 CFU/mL) against H-3945. For CDC-306, TGC + MER + RIF achieved additive effect (−1.63 ± 0.75 log10 CFU/mL), and synergy was observed with TGC + MER + SUL (−3.48 ± 0.42 log10-CFU/mL), ERV + MER + SUL (−3.37 ± 0.06 log10 CFU/mL) and ERV + MER + RIF (−2.99 ± 0.11 log10 CFU/mL). Triple therapies at fCss failed to achieve synergy or additive effects for both strains.

**Conclusion:** ERV- and TGC-based triple therapy demonstrated synergy against *A. baumannii*. Further investigation is warranted to evaluate dual vs. triple therapy.

## Sat-70. Potential drug–drug interactions with antivirals for COVID-19 among hospitalized immunocompromised patients

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**Introduction:** When evaluating treatment options for any condition, clinicians consider polypharmacy, comorbidities, and other factors including the potential for drug–drug interactions (DDIs). COVID-19 treatment includes direct-acting antivirals (DAAs), some of which have the potential for DDIs with other medications that could be frequently used by immunocompromised patients.

**Research Question or Hypothesis:** We describe the utilization of drugs that have a potential for DDIs with SARS-2-CoV DAAs among immunocompromised patients hospitalized for COVID-19.

**Study Design:** Retrospective observational study.

**Methods:** Patients with an immunocompromising condition and hospitalized with a primary diagnosis of COVID-19 between May'2020 and December'2022 from the PINC AI Healthcare Database were included. We assessed the administration of medications during their COVID-19 hospitalization that could have potential DDIs with nirmatrelvir/ritonavir, remdesivir, and molnupiravir (per the Emergency Use Authorization factsheet or the package insert). For nirmatrelvir/ritonavir, multiple medications were listed as having potential DDIs categorized as contraindication, avoid concomitant use, or other DDIs (includes recommendation for dose modification, or clinical and laboratory monitoring). For remdesivir, potential DDIs were with chloroquine phosphate and hydroxychloroquine sulfate only. For molnupiravir, no drugs were listed as having potential DDIs.

**Results:** Of the 90 558 immunocompromised patients hospitalized for COVID-19 in 883 hospitals, 72% were $^{3}$65 years of age and 58% had Charlson Comorbidity Index (CCI) ≥3. 93% received medications with potential DDI with nirmatrelvir/ritonavir, and in at least 55%, these DDIs would have been clinically problematic (13% "contraindicated," and/or 49% "avoid concomitant use," and further 90% "other DDI"). The medications utilized that were classified as potentially "contraindicated" to nirmatrelvir/ritonavir included: amiodarone (6%), simvastatin (2.3%) and colchicine (1.1%). Very few (2%) patients received medications with potential DDIs with remdesivir.

**Conclusion:** A significant proportion of immunocompromised patients hospitalized for COVID-19 were administered medications during their hospitalization that had a potential DDI with DAAs; however, this was predominantly seen with nirmatrelvir/ritonavir while few with remdesivir or none with molnupiravir.

### Mon-71. Comparison of cefdinir and cephalexin as step-down therapy in pyelonephritis or urosepsis

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**Introduction:** Cephalosporins are increasingly used to treat severe urinary tract infections (sUTI) due to rising resistance with other first-line agents. When switching from intravenous to oral cephalosporins there is limited outcome data to guide agent selection.

**Research Question or Hypothesis:** Does treatment failure differ between cefdinir and cephalexin when used as step-down therapy from intravenous antibiotics in patients with sUTI (pyelonephritis or urosepsis)?

**Study Design:** Quantitative, multicenter, retrospective study.

**Methods:** Patients admitted to three hospitals for sUTI from 1/1/2019 to 12/31/2019 were assessed. Cases were identified using ICD-10 codes N10, N39.0, and A41.9. Patients who received intravenous antibiotics for >24 h and completed treatment with cephalexin or cefdinir were included. Exclusion included <18 years, pregnancy, nephrolithiasis, neurogenic bladder, chronic catheter, nephrostomy, or ileostomy. Data extracted included demographics, antibiotics used, culture results, and Charlson Comorbidity Index. The primary composite outcome was death, rehospitalization for UTI in 30 days, unplanned clinic or emergency visit for UTI in 30 days, hospitalization for any reason in 90 days, or C. difficile infection. Events were censored after first occurrence. Secondary outcomes included each individual composite outcome element. Chi-square, Fisher's exact, and t-tests were conducted using SPSS. Linear regression was conducted using Stata.

**Results:** Overall, 210 patients qualified: 75 cefdinir and 135 cephalexin cases. Patients were similar in baseline characteristics although there was more pyelonephritis among the cephalexin group (30.2% vs. 46.7%, $p = 0.024$). Composite failure occurred in 8% of patients receiving cefdinir and 14.1% receiving cephalexin ($p = 0.193$). Individual secondary outcomes did not differ except clinic or emergency visit for UTI was lower among patients receiving cefdinir than cephalexin (0% vs. 7.2%; $p = 0.028$). Regression revealed no significant variable associations with treatment failure, but cephalexin use was associated with clinic or emergency visit for UTI ($r2 = 0.075$).

**Conclusion:** Treatment failure rates did not differ between cefdinir and cephalexin; however, patients receiving cephalexin had more unplanned clinic and emergency visits.

### Mon-69. Assessment of antibiotic transition errors from hospitals to skilled nursing facilities

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**Introduction:** Over 1 million Americans live in skilled nursing facilities (SNFs). Antibiotic transition errors among patients transferred from hospital to SNF pose a safety risk and may lead to poor clinical outcomes, but data on such errors are limited.

**Research Question or Hypothesis:** We hypothesized that patients transferred from hospital to SNF will have identifiable characteristics associated with antibiotic transition errors, including treatment-level (e.g., expensive antibiotic choice), patient-level (e.g., demographics and co-morbidities), and/or SNF-level (e.g., quality rating) factors.

**Study Design:** Retrospective cohort study.

**Methods:** We reviewed data from infectious diseases clinics at LA County Department of Health Services, a large safety net health system from 06/01/20 to 11/30/23. We performed logistic regression analyses to identify independent factors associated with antibiotic transition errors and poor infection outcomes.

**Results:** We reviewed 6865 clinic patients' records, of which 112 were SNF residents on antibiotics. Mean age was 62 years, 37% were female, and 57% were Hispanic. Among our population, 32 (29%) had transition errors. Among errors, common medications were carbapenems (28%), cephalosporins (19%) and daptomycin (19%). In our multivariable model of antibiotic transition errors that included age, Charlson Comorbidity Index, number of medications, CMS SNF rating, and therapy duration, we found no significantly associated factors. In our multivariable model of poor infection outcome, older age was the only independent predictor ($p = 0.02$) and there was a non-significant trend for an association with antibiotic transition errors (OR 1.63, 95% CI 0.58–4.81).

**Conclusion:** In our large system, nearly one-third of patients transitioning from hospitals to SNFs on antibiotics experienced ≥1 antibiotic transition error. We did not identify risk factors associated with antibiotic transition errors, suggesting that all patients transferred to SNFs are at risk. We found a non-significant trend of an association between transition errors and poor infection outcomes, suggesting larger data sets may be able to firmly establish this important relationship.

### Mon-66. Delayed antibiotic prescribing for suspected upper respiratory tract infections in adult primary care setting in the United Arab Emirates

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**Introduction:** Delayed antibiotic prescribing (DAP) is a promising antimicrobial stewardship strategy for reducing unnecessary antibiotic use in primary care setting.

**Research Question or Hypothesis:** Is delayed antibiotic prescribing effective for upper respiratory tract infections (URTIs) and should this strategy be generalized to reduce antibiotic prescriptions in the United Arab Emirates (UAE)?

**Study Design:** A quasi-experimental study compared two patient cohorts: one outcomes pre- DAP from September 1, 2022 to February 28, 2023, and the other assessed outcomes post-DAP implementation from October 1, 2023 to May 21, 2024.

**Methods:** The primary endpoint is to assess post- DAP implementation and impact on symptom resolution, infection recurrence within 30 days, and patient satisfaction. Secondary endpoint is to assess clinician satisfaction with DAP implementation.

**Results:** A total of 201 patients were included in the study, with 100 in the pre-DAP period and 101 in the post-DAP period. Fifty percent of patients did not receive antibiotics in the pre-DAP as compared to 1% to patients in the post-DAP ($P \leq 0.001$). In the pre-DAP, 43 (43%) received immediate antibiotics, while 13 (12.9%) and 18 (17.8%) received delayed or no antibiotic treatment post-DAP, respectively. In post- DAP group, there was higher symptom resolution observed in the subset of patients who did not receive antibiotic therapy 72.2% (13/18) ($p = 0.012$). Infection recurrence within 30 days did not differ between the groups ($p = 0.207$). There was no difference in patients' satisfaction rate between delayed vs. no antibiotic use in post DAP ($p = 1.000$). All physician 9 (100%) who encountered DAP reported satisfied.

**Conclusion:** This study, which is the first of its kind in the UAE, aimed to assess the efficacy of DAP. we observed a higher percentage of patients receiving antibiotics in the post-DAP as compared to the pre-DAP. Strategies at our institution should focus on further patient and prescriber education to minimize use of antibiotics in the primary care setting.

## Mon-72. Clinical and microbiological outcomes of carbapenem-resistant organisms (CROs) in adult hospitalized patients from a comprehensive cancer center

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**Introduction:** Carbapenem-resistant organisms (CROs) pose significant challenges in the general population, and these challenges are even more pronounced in cancer patients with a heightened risk of infection. Understanding clinical/microbiological outcomes and the risk factors associated with mortality is crucial for effectively managing these infections.

**Research Question or Hypothesis:** What are the clinical/microbiological outcomes and risk factors associated with mortality of CRO infections in patients with cancer?

**Study Design:** Retrospective cohort.

**Methods:** Inclusion: adult hospitalized patients with new CRO infections during 1/2018–12/2023 at a 232-bed comprehensive cancer center. Exclusion: duplicates, intrinsically imipenem-resistant organisms (e.g., *Proteus* spp.), stool isolates, persistent (presence of baseline pathogen on appropriate antibiotic in a post-baseline specimen)/recurrent (the same infection <14 days after stopping appropriate antibiotics) infections, colonization, hospice/comfort measure. Patient characteristics and clinical/microbiological outcomes were compared for 30-day-mortality(M) and 30-day-survival(S). Inverse-probability-weighting (IPW)-adjusted multivariate logistic regression was performed to assess association between novel agents and 30-day-M using SPSS v.29.

**Results:** 157 new infections/160 isolates from 143 patients with median age of 62 years, 57% male, 63% hematological malignancy and 36% solid tumor, 33% history of hematopoietic-stem-cell-transplants or immune-effector-cell-therapy, 39% neutropenia and 52% lymphopenia were included. *Pseudomonas aeruginosa* was most common (54%) followed by 33% Enterobacterales; 41% from blood, 21% lung, 14% urine. Further resistance developed in 21% of cases (9% on-treatment, 12% after-treatment). 30-day-M was 25% ($n = 40$). Intensive-care-unit (ICU) admission (43%v.11%), do-not-resuscitate/do-not-intubate (DNR/DNI, 83%v.13%), vasopressor (40%v.9%), mechanical ventilation (70%v.15%), renal-replacement-therapy on day 7 (RRT7, 8%v.3%) were significantly higher in 30-day-M v. 30-day-S. 40% received traditional beta-lactams (piperacillin-tazobactam, cefepime, carbapenems; 30%M v.42%S). Only 23% received novel agents (ceftazidime-avibactam, ceftolozane-tazobactam, meropenem-vaborbactam, cefiderocol; 15%M v.25%S). IPW-adjusted multivariate regression controlled for DNR/DNI, ICU, and lymphopenia showed significant decrease in 30-day-M with novel agents (OR 0.293, 95% CI 0.095–0.898).

**Conclusion:** The low usage rate of novel agents coupled with their association with reduced 30-day-M underscores the importance of promptly initiating these agents when CRO infections are suspected.

## Tues-68. Investigation of cefiderocol resistance mechanisms in *Klebsiella pneumoniae*

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**Introduction:** Increasing incidence of antimicrobial resistance limits therapeutic options and worsens patient outcomes. Cefiderocol is a siderophore conjugated antibiotic utilizing iron metabolism pathways for cell entry, whose resistance mechanisms are not fully elucidated.

**Research Question or Hypothesis:** To examine possible mechanisms of cefiderocol resistance in *Klebsiella pneumoniae*.

**Study Design:** Laboratory study.

**Methods:** KP ATCC 13883(wild type), KP MK8(cefiderocol sensitive) and KP 550(cefiderocol resistant) were tested for biofilm formation in cation-adjusted Mueller Hinton broth(CAMHB) and iron-depleted Mueller Hinton broth(ID-MHB). Absorbance at $\lambda_{600}$ was measured to quantitate biofilm density and normalized to bacterial growth. Cellular iron content was measured by streptonigrin resistance assay, siderophores production was measured by chrome azurol test. Bacterial cultures ware incubated with sub-inhibitory concentrations of cefiderocol then assayed by LC/MS and compared to control to detect the presence degrading enzymes. All testing was performed on six biological duplicates for statistical robustness.

**Results:** The normalized absorbance(mean ± SD) in CAMHB(KP ATCC13883; 0.20 ± 0.07, KP MK8; 0.27 ± 0.09, KP 550; 0.49 ± 0.09), in ID-MHB(KP ATCC 13883;0.046 ± 0.002, KP MK8; 0.049 ± 0.003, KP 550;0.128 ± 0.009). Calculated siderophore units were 2.94, 3.10, 3.15 in CAMHB and 4.10, 4.33, 4.45 in ID-MHB for KP ATCC 13883, KP MK8 and KP 550, respectively. As low cellular iron content mediates streptonigrin resistance, analysis of survival showed mean growth(CFU/mL) $1.9 \times 10^2$, $1.7 \times 10^2$, $1.9 \times 10^2$ in CAMHB and $2.6 \times 10^4$, $2.1 \times 10^4$, and $2.4 \times 10^4$ in ID-MHB for KP ATCC 13883, KP MK8 and KP 550 respectively. Mean cefiderocol concentrations at the end of 2-h incubation period were 83% in control 78% in KP ATCC 13883 and 44% in KP 550 of the initial 0-h concentration.

**Conclusion:** Cefiderocol resistant KP did not produce significantly higher biofilm density, higher amount of siderophore nor store more iron relative to the wild type and sensitive isolate. Degradation of cefiderocol was faster in the resistant isolate indicating possible production of hydrolyzing enzymes. These observations will be confirmed by whole genome sequencing to examine corresponding genes.

## Tues-67. Compromised immune response to bacterial infections in G6PD deficient patients

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**Introduction:** Innate immune response involves the recruitment of various myeloid cells that integrate to recognize and combat invading pathogens. Bacterial infections are characterized by an elevated total white blood cell(WBC) count, neutrophils/lymphocytes ratio(NLR) and inflammatory markers, commonly used as diagnostic indicators of disease severity and prognosis.

G6PD deficiency is an inherited hematological disorder that affects immune cell integrity making them more susceptible to infection-induced oxidative stress and consequently compromising the immune capability to fight bacterial infections.

**Research Question or Hypothesis:** To evaluate the diagnostic value of WBC in assessing the immune response of G6PD deficient patients and its relation to infection-related mortality.

**Study Design:** Retrospective review.

**Methods:** Comprehensive data (demographics, clinical manifestations, laboratory parameters, and microbiological details) were extracted records of genetically confirmed G6PD-deficient adult patients with documented bacterial infections. Statistical analysis was performed using R software.

**Results:** A total of 202 G6PD-deficient patients with 334 unique bacterial cultures were included in the study. Male gender, older age, long hospitalization, admission to critical care, and multiple comorbidities were associated with higher 28-day mortality rates. Bacteremia, hospital-acquired infections, and polymicrobial infections were also linked to increased mortality risk. The CBC parameters, including WBC count, neutrophil%, lymphocyte%, monocyte%, eosinophil%, and NLR, were analyzed for their correlation with 28-day mortality. Cox regression analysis indicated a significant association betweenWBC count below the median (>$9.8 \times 10^9$/L) and mortality, with a crude hazard ratio [HR = 1.94, 95% CI:1.17–3.22, $p = 0.009$]. Notably, even after adjusting for confounding factors, the significance persisted[HR = 3.07, 95% CI:1.05–9.02, $p = 0.041$].

**Conclusion:** G6PD-deficient patients with bacterial infections exhibited distinct immunocompromised characteristics and increased susceptibility to mortality. The patient's CBC during infections showed no cellular immune response to infection, particularly WBC and NLR that didn't show any potential diagnostic value in predicting disease severity and prognosis in this patient population. Further research is needed to validate these findings and explore potential interventions to improve outcomes in G6PD-deficient individuals with bacterial infections.

# Managed Care

## Mon-76. CenterWell pharmacy is associated with higher adherence, lower allowed medical costs, and fewer admits for beneficiaries with heart failure with reduced ejection fraction

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**Introduction:** CenterWell Pharmacy (CWP) aims to reduce medical costs through evidence-based practices. Previous work has shown CWP's mail-order with 90-day fills is associated with higher Proportion of Days Covered (PDC), reduced hospitalizations and allowed medical spend. This study extends into patients with Heart Failure with Reduced Ejection Fraction (HFrEF). Our findings confirmed patients who take more medications on Guideline-Directed Medical Therapy (GDMT) have better health outcomes, regardless of pharmacy. In addition, those who filled with CWP had higher adherence and fewer admits compared with patients who fill elsewhere.

**Research Question or Hypothesis:** Does CWP improve outcomes for HFrEF patients?

**Study Design:** Retrospective study using 6 months of medical claims data nationwide from 2022 examined 200 k Humana beneficiaries who were taking at least 1 therapy for HFrEF, in provider groups with 100+ patients.

**Methods:** Propensity Score Matching (PSM) and Doubly Robust Targeted Maximum Likelihood Estimation (DRTMLE) were used to compare member PDC for those who used CWP to fill HFrEF medication(s) with those who didn't while controlling for provider group influences, healthcare policy, and environmental factors. We used mixed linear effect (MLE) regression to model the number of ER visits and allowed medical spend against CWP usage, number of HFrEF therapies, and other covariates including comorbidities and demographics. We included a random intercept for provider group and state issued.

**Results:** PSM and DRTMLE demonstrated within provider groups, CWP usage was associated with a statistically significant 4.8% higher HFrEF therapy PDC. MLE models show that CWP usage was associated with a significant 5.6% fewer ER visits and 3.5% reduced medical spend. This is in addition to the statistically significant effect of 5.6% fewer ER visits and 2.3% reduced medical costs per added GDMT therapy, mirroring clinical findings.

**Conclusion:** Providers can help HFrEF patients by prescribing more GDMT medications. Filling prescriptions at CWP could increase PDC and reduce costs and hospitalizations.

## Medication Safety

### Sun-68. Time-series dual machine learning models to predict vancomycin- and teicoplanin-associated acute kidney injury: A retrospective, multicenter study

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**Introduction:** Acute kidney injury (AKI) associated with the use of vancomycin and teicoplanin is crucial for severely infected patients.

**Research Question or Hypothesis:** This study aimed to develop and validate clinically prognostic machine learning models for predicting vancomycin-associated AKI (VA-AKI) and teicoplanin-associated AKI (TA-AKI).

**Study Design:** This study analyzed the data of patients receiving intravenous vancomycin or teicoplanin therapy between February 2010 and December 2020 in the Taipei Medical University Clinical Research Database.

**Methods:** AKI was determined using serum creatinine criteria of the Kidney Disease Improving Global Outcomes (KDIGO). Features were selected from 198 variables encompassing demographics, admission diagnoses, comorbidities, medication profiles, and laboratory results through recursive feature elimination using feature importance and SHapley Additive exPlanations (SHAP) importance. Twelve models were constructed using two machine learning algorithms: eXtreme Gradient Boosting (XGBoost) and Light Gradient Boosting Machine (LightGBM). Model performance was compared using eight evaluation metrics, including the area under the receiver operating characteristic curve (AUROC).

**Results:** Among 9342 patients, 19.70% (1383/7020) of patients in the training set, 18.58% (326/1755) in the internal validation set, and 20.5% (116/567) in the external validation set developed AKI. The XGBoost model, leveraging time-series data, demonstrated optimal performance in internal (AUROC 0.798, 95% confidence interval (CI) 0.791–0.804) and external (AUROC 0.779, 95% CI 0.767–0.791) validation. Days on medication, BUN, eGFR, number of concomitant nephrotoxic drugs, and total bilirubin were the top 5 features of AKI. SHAP analysis revealed the feature-feature interaction and force plots accessed the individual patient's real-time risk.

**Conclusion:** This model can serve as a tool for clinical decision-making to reduce VA-AKI and TA-AKI. The individualized risk assessment devised personalized adjustment plans. Future prospective studies incorporating the predicting model into the Clinical Decision Support System are warranted.

## Nephrology

### Mon-52. Clinical outcomes of cefepime dosing in patients with *Pseudomonas* infections undergoing renal replacement therapies

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**Introduction:** Data regarding the efficacy of cefepime in treating patients with *Pseudomonas aeruginosa* (PSA) infections undergoing renal replacement therapies (RRT) are limited.

**Research Question or Hypothesis:** Is cefepime effective at recommended dosing in treating patients with PSA infections undergoing RRT?

**Study Design:** Retrospective observational cohort study.

**Methods:** The study was conducted between May 2015 and December 2022. The primary end point was 30-day all-cause mortality. Secondary endpoints including clinical cure, microbiologic cure, infection recurrence rate, and incidence of adverse events.

**Results:** A total of 132 patients met the inclusion criteria, with a 72.7% survival rate. Of these, 81 (62.4%) were male, with a median age of 69 years and a median BMI of 27 kg/m$^2$. The most common diagnoses were pneumonia (58.3%), followed by bacteremia (18.9%). The median minimum inhibitory concentration of cefepime for PSA was 2 mcg/mL. The median daily dose of cefepime was 4000 mg during continuous venovenous hemofiltration (CVVH) and 1000 mg during intermittent hemodialysis (IHD), with a median duration of therapy of 8 days. The 30-day survival rate was 72.7%, clinical cure was achieved in 58.3% of subjects, and microbiologic cure in 31%. The 30-day reinfection rate was 9.1%, with no documented adverse events associated with the doses used. Multivariate logistic regression analysis identified the use of vasopressors (OR 4.6, 95% CI 1.251–17.1) and white blood cell (WBC) level at the end of therapy (OR 1.1, 95% CI 1.01–1.4) as the main predictors of all-cause mortality in this population.

**Conclusion:** Our results suggest that the utilized doses of cefepime in patients with PSA infections undergoing RRT were effective and safe. Larger studies are needed to confirm our findings.

## Mon-53. Efficacy of alfacalcidol versus calcitriol in managing secondary hyperparathyroidism in patients with chronic kidney disease

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**Introduction:** Data comparing the efficacy of alfacalcidol versus calcitriol in managing secondary hyperparathyroidism in patients with chronic kidney disease (CKD) is scarce.

**Research Question or Hypothesis:** Which drug is more effective in managing hyperparathyroidism in patients with CKD Stage 3 to 5?

**Study Design:** A retrospecitve observational cohort study.

**Methods:** The study, conducted from January to December 2022, included adults with CKD stages 3 to 5 who received alfacalcidol for 3 months followed by calcitriol for another 3 months. Assessments were done at baseline, after 3 months of each treatment. The primary outcome was iPTH suppression, and the secondary outcome was total serum calcium levels.

**Results:** A total of 70 patients were included in the analysis. The cohort's mean age was 65.5 ± 15 years, mean body mass index was 31.8 ± 6.6 kg/m$^2$, and 34 (48.6%) were males. CKD Stage 3 comprised 47.1% of the sample. The median dose of alfacalcidol was 0.5 (0.25–0.8) mcg, compared to 0.5 (0.25–0.5) mcg for calcitriol ($p = 0.001$). Alfacalcidol did not significantly suppress iPTH levels, with median values of 13.31 (8.23–24.4) pg/mL at baseline and 12.5 (8.86–24.7) pg/mL after 3 months ($p = 0.937$). In contrast, calcitriol significantly reduced iPTH levels from 12.5 (8.86–24.7) pg/mL to 10.7 (5.7–19) pg/mL ($p = 0.017$). Additionally, alfacalcidol did not significantly increase calcium levels, with values of 2.29 (2.2–2.3) mmol/L at baseline and 2.3 (2.23–2.36) mmol/L after 3 months ($p = 0.237$), whereas calcitriol significantly increased calcium levels from 2.3 (2.23–2.36) mmol/L to 2.34 (2.27–2.43) mmol/L ($p = 0.001$). Throughout the study period, albumin values, follow-up times, and the use of phosphate binders or non-active vitamin D remained consistent for each drug.

**Conclusion:** Calcitriol, at significantly lower doses, was more effective than alfacalcidol in reducing iPTH levels and increasing calcium levels over 3 months. Larger prospective controlled studies are needed to confirm these findings.

## Tues-82. Current practices in estimating kidney function: A real-time survey analysis

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**Introduction:** Numerous equations have been developed to estimate kidney function. The most notable and frequently used for drug dosing is the Cockcroft-Gault (CG) equation and to lesser extent the Modification of Diet in Renal Disease (MDRD) and the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations. Recently the CKD-EPI raceless equation has been advocated for use.

**Research Question or Hypothesis:** The CKD-EPI raceless equation has been widely adopted by institutions for use, whereas individualized equations are specifically utilized for patients with extreme body weights to ensure accurate assessments.

**Study Design:** Observational real-time survey analysis.

**Methods:** A survey was distributed to list serves utilized by pharmacists within the USA and internationally between January and April 2024. Respondents had the option to skip questions. The study received an exemption from the Loma Linda University Institutional Review Board.

**Results:** Out of the 294 pharmacists who participated in the survey, 134 (76.1%) were based in the USA, and 107 (60.5%) were female. Of the respondents, 211 (72.3%) indicated that their institution has a kidney dose adjustment policy with the majority utilizing CG. A total of 149 (60.3%) of respondents indicated that they were unaware if their institution used standardized serum creatinine analysis methodology. Additionally, 88 (38.1%) reported rounding up serum creatinine in the elderly when utilizing CG, with 47 (53.4%) of those rounding, rounding it up to 1 mg/dL. Only 49 (21.8%) of pharmacists indicated that they individualize the eGFR for patients with extreme weights.

**Conclusion:** There is no consistent practice in selecting the appropriate equation for drug dosing in patients with kidney disease in the US and internationally. Extensive education on the different kidney function estimation equations and a recommendation for standardization is necessary to optimize patient care and application of evidence-based medicine.

## Mon-79. The influence of advanced kidney disease on polypharmacy and deprescribing in older adults

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**Introduction:** Polypharmacy contributes to medication-related harm in older adults and increases the likelihood of potentially inappropriate medications (PIMs). Altered pharmacokinetics in advanced kidney disease further increases the risk of medication-related harm. Interventions to deprescribe in older adults with advanced kidney disease are needed to improve medication safety.

**Research Question or Hypothesis:** What is the difference in number of medications, PIMs, and success of deprescribing among older adults with and without advanced kidney disease?

**Study Design:** Retrospective cohort study.

**Methods:** Hospitalized patients 65 years and older admitted to a geriatric internal medicine teaching service were provided a comprehensive polypharmacy intervention developed by an interdisciplinary team. Data from this intervention were collected between 7/1/21 and 6/30/22 including number of home and discharge medications, number and type of medication therapy problem (MTP), and number and type of PIM. Successful deprescribing was defined as discontinuation of a PIM during hospitalization that was carried over to discharge. Patients were categorized as advanced kidney disease if estimated glomerular filtration rate (eGFR) was below 30 mL/min/1.73m$^2$ or known diagnosis of chronic kidney disease stages 4 or 5. Statistical comparison between groups was performed using T, Chi-square, or Wilcoxon tests as appropriate using SASv9.3.

**Results:** The study included 155 patients, of which 32 (20.6%) had advanced kidney disease group with eGFR of 14.1 ± 7.3 mL/min/1.73m$^2$ with 7 having kidney failure on dialysis. In the non-advanced kidney disease group, the admission eGFR was 70.4 ± 23.2 mL/min/1.73m$^2$. Results are in the table.

**Conclusion:** There was no difference in the degree of polypharmacy, number of PIMs, or successful deprescribing between older adults with advanced kidney disease compared to those without.

## Sat-75. Evaluation of kidney function estimates for drug dosing in obese patients using the 2021 CKD-EPIcr equation

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**Introduction:** The 2021 Chronic Kidney Disease-Epidemiology (CKD-EPIcr 2021) equation is preferred for estimated glomerular filtration rate (eGFR). Currently, eGFR values are reported as indexed values (eGFR in mL/min/1.73 m$^2$); however, eGFR adjusted for body surface area (eGFR$_{BSA}$ in mL/min) should be used for drug dosing, an important concept for pharmacists more familiar with the Cockcroft-Gault (CG) equation. There is a need to evaluate variation in kidney function estimates when applied for drug dosing in obese patients.

| | eGFR≥30 mL/min/1.73m$^2$ ($n = 123$) | eGFR<30 mL/min/1.73m$^2$ ($n = 32$) | *P*-value |
|---|---|---|---|
| Admission medications, median (interquartile range) | 11 (8–17) | 11 (8.5–14) | 0.830 |
| Discharge medications, median (interquartile range) | 12 (8–15) | 10.5 (7.5–14) | 0.188 |
| MTPs, mean ± standard deviation | 1.790.98 | 2.06 ± 1.01 | 0.149 |
| PIMs, total n | 208 | 53 | N/A |
| Successful deprescribing, n (%) | 86 (41.3%) | 20 (37.7%) | 0.633 |

**Research Question or Hypothesis:** What are the differences in kidney function estimates using CKD-EPIcr 2021 and CG equations in obese individuals and implications for drug dosing?

**Study Design:** Retrospective review of adult patients at Methodist LeBonheur Healthcare May–July 2023.

**Methods:** Patients with body mass index (BMI) ≥30 kg/m$^2$, eGFR ≤60 mL/min/1.73 m$^2$, and stable kidney function were included. Mean differences in indexed eGFR and eGFR$_{BSA}$, differences with CG estimates [with adjusted body weight (AdjBW) and total body weight (TBW)], and the percent of estimates within common drug dosing thresholds (15–29, 30–44, 45–60, and >60 mL/min) were evaluated.

**Results:** 400 patients were included: mean age 67 ± 12 years, BMI 38 ± 8 kg/m2, 65% female. Mean indexed eGFR and eGFR$_{BSA}$ were 43 ± 11 and 56 ± 16, respectively; [mean difference 13 (95% CI: 12–14)]. The difference was greater in patients with BMI ≥40 kg/m$^2$ compared with BMI <40 kg/m$^2$ (20 vs. 10, $p < 0.001$). Mean differences between eGFR$_{BSA}$ and CG-TBW and CG-AdjBW estimates were 11 (56 vs. 67, 95% CI:10–13) and 6 (56 vs. 50, 95% CI:5–7), respectively. Use of indexed eGFR placed 70% more patients in a lower dosing category compared to eGFR$_{BSA}$ while CG-TBW placed 29% in a higher category.

**Conclusion:** In obese patients, use of indexed eGFR may result in underestimation of kidney function for drug dosing, with increased effect as BMI increases. Pharmacists must understand the potential clinical implications of failure to use eGFR$_{BSA}$ in obese patients.

## Tues-81. Evaluation of extemporaneous sevelamer carbonate suspension use in pediatric patients with advanced chronic kidney disease: A single center experience

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**Introduction:** Hyperphosphatemia is a clinical challenge in children with advanced chronic kidney disease (CKD), due to the limited availability of suitable phosphate binders pediatric dosage forms. A previous study confirmed 14 days stability of an extemporaneous sevelamer hydrochloride 50 mg/mL suspension; however, sevelamer carbonate was not investigated.

**Research Question or Hypothesis:** Is extemporaneous sevelamer carbonate suspension effective, safe, and palatable in hyperphosphatemic children with advanced CKD.

**Study Design:** Retrospective cohort study.

**Methods:** The analysis included pediatric patients (less than 14 years of age at the initiation of sevelamer carbonate 50 mg/mL suspension) with advanced chronic kidney disease and hyperphosphatemia (level of more than 5.5 mg/dL). The suspension was compounded in the pharmacy of the Armed Forces Hospital Southern Region, Saudi Arabia, between January 2018 and March 2024. The preparation method was adapted from the sevelamer hydrochloride study. The outcomes measured included changes in phosphate blood levels after preparation use, reported adverse reactions of the preparation, and palatability of the preparation which was assessed using the five-point hedonic scale.

**Results:** Fourteen children administered the preparation (mean age 10 years 1.7 months ±3 years 9.6 months), with a median duration of treatment 1.25 months (range 0.5–30 months), and an average decline in phosphorus level of 3.5 ± 2.57 mg/dL, $p < 0.001$. Ten children had normal blood phosphorus levels (71.4%). Bicarbonate blood levels showed a non-significant increase (mean change 1.3 mmol/L $p = 0.2$). Five patients (35%) reported nausea or vomiting, and one patient reported abdominal pain (7.1%) that improved on the fifth day of therapy. According to the parents of nine children's feedback, the preparation median palatability score improved from 1 (range 1–3) on the first day of use to 4 (range 3–4) on the fifth day ($p = 0.002$).

**Conclusion:** Extemporaneous Sevelamer Carbonate suspension appears to be effective, safe, and palatable in hyperphosphatemic children with advanced CKD.

## Mon-54. Comparative clinical outcomes of iron sucrose versus ferric carboxymaltose

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**Introduction:** Data comparing the clinical outcomes of iron sucrose versus ferric carboxymaltose is limited.

**Research Question or Hypothesis:** is iron sucrose more effective than ferric carboxymaltose in the management of anemia?

**Study Design:** Retrospective observational cohort study.

**Methods:** This retrospective study, conducted at our quaternary care hospital between May 2015 and June 2019, included adults who received either iron sucrose or ferric carboxymaltose. For patients who received multiple iron courses, only the first encounter was analyzed. The primary outcome was the increase in hemoglobin levels. The Mann–Whitney U test compared outcomes versus baseline

medians within each group, and the Wilcoxon signed-rank test compared the change in hemoglobin levels between the two groups.

**Results:** A total of 643 patients were analyzed, with 311 receiving iron sucrose (group 1) and 332 receiving ferric carboxymaltose (group 2). The median Charlson Comorbidity Index (CCI) was 1 (0–5) for group 1 and 4 (0–7) for group 2 ($p < 0.001$). Both iron formulations significantly increased hemoglobin levels: group 1 from 93 (84–105) to 114 (99–127) g/L ($p < 0.001$), and group 2 from 92 (81–103) to 103 (87–117) g/L ($p < 0.001$). The change in hemoglobin was significantly greater with iron sucrose: 16.5 (5–29) compared to 6.5 (−1–21) for ferric carboxymaltose ($p < 0.001$). Stepwise multivariate linear regression identified baseline hemoglobin [$B = 0.52$ (0.4–0.6); $p < 0.001$], ESA use [$B = -7.4$ (−11 to −3.8); $p < 0.001$], total iron dose [$B = 0.01$ (0.01–0.02); $p < 0.001$], blood transfusion [$B = -9.5$ (−12 to −6.6); $p < 0.001$], CCI [$B = -0.6$ (−1 to −0.12); $p = 0.013$], and ferric carboxymaltose [$B = -9.5$ (−12 to −6.6); $p < 0.001$] as the main predictors of hemoglobin level at the end of the study.

**Conclusion:** Multiple factors were shown to affect hemoglobin levels, which need to be considered when managing anemia, including the type of iron formulation used. Our findings need to be verified in larger prospective studies.

## Neurology

### Sun-70. Characteristics of headache treatment interventions in a traumatic brain injury clinic

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**Introduction:** Headache is a common symptom following traumatic brain injury (TBI). Over half of patients develop headache within 7 days of mild TBI, and a significant number of patients develop delayed onset post-traumatic headache. This analysis intended to identify the types of headache treatments involved in pharmacy interventions in a post-TBI clinic.

**Research Question or Hypothesis:** We hypothesized that most headache treatment interventions involved abortive therapies.

**Study Design:** This analysis was an IRB-approved retrospective chart review of pharmacy interventions in the Brain Injury Center (BIC) clinic at a level one trauma center.

**Methods:** Patients who received clinical pharmacy services in BIC clinic between January 2020 and August 2022 were identified by a documented pharmacy intervention and associated note by the BIC clinical pharmacist. The chart note was reviewed for interventions involving headache treatments. The primary outcome was the type of headache treatment involved in pharmacist intervention.

**Results:** Pharmacy services were documented with a total of 461 BIC visits (399 patients). Of these BIC visits, 101 involved a headache-related intervention (85 patients). The median age of patients with headache-related interventions was 45 (IQR 37–58) years, median GCS at hospital discharge was 15 (IQR 15–15), and median time from injury to BIC appointment was 91 (IQR 51–127) days. New or escalating headache therapy occurred in 57% of identified visits. All visits included counseling regarding one or more headache treatments. Headache interventions involved abortive therapy (51%), preventative therapy (30%), and a combination of both (18%). Interventions involved prescription medications (49%), OTC treatments (38%), and both prescription and OTC medications (13%). Medication over-use headache required intervention in 21% of visits. Headache interventions involved a variety of drug classes, including analgesics (46%), NSAIDs (25%), antidepressants (18%), and beta-blockers (10%).

**Conclusion:** Over 20% of BIC clinic visits involved one or more headache-related interventions. Most headache-related interventions involved abortive treatments, and prescription medications were commonly required.

## Oncology

### Sun-74. Longitudinal trends of comorbidities and survival among kidney cancer patients in Asian population

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**Introduction:** Comorbidity could influence cancer diagnosis, treatment, prognosis, or survival. Although comorbidity burden in kidney cancer patients is high, limited evidence exists on the longitudinal patterns of individual comorbidity prevalence and its impact on overall survival among kidney cancer patients, particularly in Asian populations.

**Research Question or Hypothesis:** What is the burden of comorbidities in kidney cancer patients and its impact on overall survival?

**Study Design:** Longitudinal observational study.

**Methods:** We included adults diagnosed with kidney cancer (2010–2021) using the Korean Nationwide Health Insurance database. Comorbidities assessed were any one of 19 medical conditions, diagnosed within 1 year prior to cancer diagnosis. We calculated incidence and age-standardized incidence rate of kidney cancer, prevalence of individual medical conditions as single or multiple comorbidities, and overall survival probability of kidney cancer patients over a 12-year period. We estimated the odds ratio of having individual and multiple comorbidities with age and sex as independent covariates and adjusted for other comorbidities. Kaplan–Meier curves were used for overall survival at different times up to 5 years of follow-up.

**Results:** Among kidney cancer patients ($N = 42\,740$), 68.7% were men, and median (interquartile range) age was 59 (49–68) years. Approximately 76% of patients had at least one comorbidity at the time of cancer diagnosis. Overall, hypertension (51.3%), dyslipidemia (40.2%), mild liver disease (27.4%), diabetes (25.1%), and peptic ulcer disease (18.9%) were the most prevalent comorbidities. The proportion of patients having three or more comorbidities continuously increased from 2010 (29.4%) to 2021 (44.9%). Having more comorbidities was associated with a lower probability of overall survival.
**Conclusion:** Proportion of patients with multiple conditions is high and has been increased over time. Although survival probability increased over time, it was attenuated by having more comorbidities. Our data emphasizes the importance of comprehensive management for both cancer and comorbid conditions in kidney cancer patients.

## Other

### Mon-102. Payments from pharmaceutical companies to medicaid preferred drug list boards

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**Introduction:** Prior research found four-fifths of Medicaid Preferred Drug List (PDL) boards included at least one physician-member who accepted payments from pharmaceutical companies (PCs). Evidence suggests such payments influence prescribing behaviors, raising concerns about financial biases in PDL decisions. Given the impact on pharmacy practice, we analyzed payments to all PDL board recipients in the CMS Open Payments database, with a more granular analysis of payment types, subgroups, and a longer timeframe.
**Research Question or Hypothesis:** How do PC payments to Medicaid PDL board members differ by type, amount, and frequency, overall and across different subgroups?
**Study Design:** We conducted a cross-sectional study of PC payments to Medicaid PDL board members from 2019 to 2022.
**Methods:** Forty-seven states with PDLs and their boards were identified. Roster names were obtained from state webpages, archived records, the Wayback Machine, and public record requests. Member details were collected using the National Plan & Provider Enumeration System and were matched to CMS Open Payments data for physicians, nurse practitioners, and physician assistants. Members not confirmed as unique individuals were excluded. The primary outcomes were the type, amount, and frequency of payments across subgroups. Data were compiled in Excel and analyzed using R Studio.
**Results:** We collected 92% of available roster years, totaling 711 members, with 345 confirmed covered recipients included for analysis. PC payments were accepted by 57% (196/345) of covered recipients and 44/47 PDL boards. There were 11 048 payments totaling $14.6 million; food and beverage was the most common payment type (8858 payments), while research had the highest dollar amount ($13.2 million). The top 10 recipients accepted 77% of all non-research dollars.
**Conclusion:** Payments from PCs to PDL boards is common, with large variations in amounts and types, and a select few receiving the majority. PDL decisions that affect pharmacy practice are influenced by members who have potential financial conflicts of interest.

### Tues-89. Exploring the readiness to implement an artificial intelligence tool to predict the risk of poorly controlled type 2 diabetes mellitus for use in Singapore

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**Introduction:** The use of Artificial intelligence (AI)-enabled risk stratification model has gained interest among policy makers and researchers as a potential catalyst to population health management and value-based care success. Gaining insights into the perceptions about facilitators and barriers of the healthcare professionals (HCPs) using Normalization Process Theory (NPT) is important towards successful implementation of the complex intervention.
**Research Question or Hypothesis:** How ready are HCPs in implementing AI-enabled risk stratification tool to predict risk of Type 2 diabetes mellitus control for targeted pharmaceutical care in Singapore?
**Study Design:** Quantitative cross-sectional questionnaire.
**Methods:** A web-based, voluntary, anonymous survey using the Normalization Measure Development questionnaire (NoMAD) was used to gather views and perceptions from HCPs at Singapore General Hospital.
**Results:** Three professionals, including doctors ($n = 7$, 23.3%), pharmacists ($n = 22$, 73.3%) and data scientist ($n = 1$, 3.3%) responded to the questionnaire. All groups saw the value of the intervention and were willing to support it. Respondents reported the highest score (mean ± SD, out of 5) in cognitive participation – relation work (4.13 ± 0.53), reflective monitoring – appraisal work (3.89 ± 0.75) and coherence – sense-making work (3.83 ± 0.72). The weakest score was in the collective action – operational work (3.70 ± 0.84). Of note, the doctors showed greater positive tendency than the pharmacists in the NPT constructs of coherence (4.11 ± 0.79 for doctors vs. 3.74 ± 0.69 for pharmacists), cognitive participation (4.36 ± 0.62 for

doctors vs. 4.02 ± 0.45 for pharmacists) and reflective monitoring (4.13 ± 0.76 for doctors vs. 3.82 ± 0.76 for pharmacists).

**Conclusion:** The AI-enabled risk stratification tool implementation should pay attention to the operational work involved in its use and implementation. It should also assess and communicate the ways in which the intervention can affect the pharmacists' work. A common ground is needed to integrate the AI tool as new common practice for successful implementation.

### Sun-76. Evaluating accuracy and reproducibility of large language model performance in pharmacy education

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**Introduction:** Large language models (LLMs) have demonstrated acceptable performance in the context of structured problems; however, model performance may be suboptimal when applied to complex scenarios.

**Research Question or Hypothesis:** How does performance compare across various LLMs when applied to multiple-choice case-based pharmacotherapy questions, and can performance be improved by prompt engineering or model customization?

**Study Design:** Comparative analysis of LLM performance on multiple choice questions.

**Methods:** Performance of five different LLMs (ChatGPT with GPT-3.5 and 4, Claude 2, Llama2-7b and 2-13b) was evaluated on a dataset of 219 multiple-choice pharmacotherapy questions. Each LLM was queried five times to evaluate the primary outcome of accuracy (i.e., correctness) and key secondary outcome of variance. Additional secondary outcomes included performance on knowledge vs. skill-based questions, impact of prompt engineering techniques (zero-shot chain-of-thought (CoT), few-shot CoT, self-consistency) and training of a customized GPT on performance, and performance relative to year 3 pharmacy students on a subset of 120 multiple-choice questions.

**Results:** Chat GPT-4 exhibited the highest accuracy (71.6%), while Llama2-13b had the lowest variance (0.070). All LLMs performed more accurately on knowledge-based than on skill-based questions (e.g., Chat GPT-4: 87% vs. 67%). When applied to Chat GPT-4, few-shot CoT across five runs improved accuracy (77.4% vs. 71.5%) with no effect on variance. Self-consistency and the custom-trained GPT demonstrated similar accuracy to Chat GPT-4 with few-shot CoT. Overall pharmacy student accuracy was 81%, compared to an optimal overall LLM accuracy of 73%. Comparing question types, six of the LLMs demonstrated equivalent or higher accuracy than pharmacy students on knowledge-based questions (e.g., Self-consistency vs. students: 93% vs. 84%), but pharmacy students achieved higher accuracy than all LLMs on skills-based questions (e.g., Self-consistency vs. students: 68% vs. 80%).

**Conclusion:** LLMs demonstrate an accuracy comparable to pharmacy students in knowledge-based assessments. Performance of LLMs in complex tasks can be improved by prompt engineering and model training.

## Pediatrics

### Tues-92. A retrospective descriptive study assessing prevalence of antimicrobial resistance among all pediatric patients at Kamuzu Central Hospital, Malawi

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**Introduction:** Severe bacterial infections cause significant disease burden in developing countries including Malawi. The situation is compounded by scarcity of resources, inconsistent availability of antibiotics and increasing antimicrobial resistance (AMR).

**Research Question or Hypothesis:** There is no antimicrobial resistance in pediatric patients at Kamuzu Central Hospital Malawi, in Sub-Saharan Africa.

**Study Design:** This was a descriptive retrospective study.

**Methods:** This was a descriptive retrospective study where we analyzed blood culture results of pediatric patients admitted to Kamuzu Central Hospital, Lilongwe, Malawi. Data used were from January 2018 to January 2022 and were compared with clinical metadata. Analysis of data was done using STATA version 16.1 and R version 4.2 statistical software packages.

**Results:** Data of 272 isolates from blood culture were obtained; 47.8% (130/272) of participants presented with organisms resistant to first-line antibiotics. There were 13.4% (22/164) resistant Isolates

to 2nd-line antibiotics which included resistance to piperacillin/tazobactam and meropenem. Gram-negative isolates constituted 54.3% (89/164) of the isolates of which *Acinetobacter* spp. was 32% (29/89); while 45.7% (75/164) of the isolates were gram-positive of which 42.7% (32/75) was *Staphylococcus aureus*. Of the *Escherichia coli* isolates totalling 12, 50% (6/12) were highly resistant to piperacillin/tazobactam. Using Fisher's exact test, the antibiotic prescribed after a blood culture test result was significantly associated with the isolate observed ($p = 0.016$).

**Conclusion:** This study highlights high rates of antimicrobial resistance to commonly used antibiotics in pediatric ward at the referral hospital in Lilongwe, Malawi. This calls for the need to revise treatment guidelines in the wake of empiric antibiotic choices for pediatric patients as well as intensify maximal use of blood culture tests as part of management of febrile illness as well as reinforcement of antimicrobial stewardship in pediatric patient care.

### Sat-80. Evaluation of empiric vancomycin guideline in the neonatal intensive care unit (NICU) for late onset sepsis (LOS) and necrotizing enterocolitis (NEC)

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**Introduction:** Overuse of vancomycin can lead to the development of resistant organisms. Studies have demonstrated that guideline implementation reduces the use of vancomycin without increasing morbidity and mortality. The purpose of this study is to evaluate the difference in judicious vancomycin courses and outcomes before and after guideline implementation with the goal of further reducing non-judicious use in the neonatal intensive care unit (NICU).

**Research Question or Hypothesis:** Adherence to the guideline will increase the percentage of judicious vancomycin courses compared to pre-guideline use without adversely impacting clinical outcomes.

**Study Design:** This was a retrospective chart review of infants in the NICU at University of Illinois Hospital & Health Sciences System between 2020 and 2023.

**Methods:** The study evaluated infants who received empiric antibiotics for late onset sepsis or necrotizing enterocolitis in the NICU during that timeperiod. The primary outcome was the difference in judicious vancomycin courses before and after guideline implementation. Secondary outcomes included the difference in survival at discharge and vancomycin levels drawn along with an evaluation of risk factors that could predict the likelihood of vancomycin necessity.

**Results:** Before guideline implementation, 134 of 263 (51%) empiric vancomycin courses were defined as judicious compared to 79 of 110 (71.8%) courses following guideline implementation ($p = 0.001$). In courses where patients grew coagulase negative *Staphylococcus* or methicillin-resistant *Staphylococcus aureus* requiring vancomycin therapy, there was a statistically significant difference in the percentage of those receiving TPN (78.6% vs. 57.3%, $p = 0.0446$) and requiring vasopressors (28.6% vs. 7.3%, $p = 0.0036$) compared to the courses that did not require vancomycin therapy. All-cause mortality (6.2% vs. 7.1%, $p = 0.7917$) and infection-related mortality (3.7% vs. 5.7%, $p = 0.4951$) were not different before and after guideline implementation.

**Conclusion:** Implementation of an empiric antibiotic guideline in the NICU can significantly decrease non-judicious use of vancomycin without negatively impacting clinical outcomes. Continued education remains imperative in decreasing non-judicious use of antibiotics.

## Peri-Operative Care

### Sun-78. Effect of serotonin modulating agents on bleeding rates following partial hepatectomies

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**Introduction:** There is a hypothesized correlation between the use of serotonergic reuptake inhibitors and an increased risk of bleeding complications in the perioperative space. However, there is significant heterogeneity in these studies, with variations observed between methodology and surgical types. This study aims to quantify the risk of perioperative SSRI and SNRI usage and associated bleeding in partial hepatectomies.

**Research Question or Hypothesis:** Is there a statistically significant difference in intraoperative blood loss for patients on a home SSRI/SNRI following partial hepatectomies?

**Study Design:** A retrospective chart review of adult patients who underwent a partial hepatectomy. Pharmacy medication records were used to determine SSRI/SNRI usage.

**Methods:** This is a retrospective cohort study of patients across Indiana University Health who underwent partial hepatectomy procedures from 2018 to 2023. Exclusion criteria included procedures aborted for reasons other than bleeding, recipients or donors of a liver, compliance status of "not taking" on home medication list, and/or multiple operative surgeries. Patients were grouped based on SSRI/SNRI usage. The primary outcome is intraoperative blood loss differences. Secondary outcomes include length of stay, hospital mortality, and changes in hemoglobin.

**Results:** Of the 130 patients included, 65 patients reported usage of an SSRI/SNRI at home while 65 patients did not. No statistically significant distinction was observed in intraoperative blood loss (mL) between the two groups (300 vs. 300, $p = 0.942$). No variations in length of stay (days) (6.27 vs. 6.28, $p = 0.476$), inpatient mortality (2 vs. 0, $p = 0.496$), and change in hemoglobin (g/dL) during admission (2.89 vs. 2.68, $p = 0.46$) were noted.

**Conclusion:** Home utilization of SSRIs/SNRIs showed no difference in intraoperative bleeding, endorsing the continuation of SSRIs and SNRIs for patients undergoing partial hepatectomies. Further prospective research is warranted to validate these findings.

### Sat-83. Extended prophylactic oral antibiotics after total joint arthroplasty: What's the harm?

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**Introduction:** The impact of extended prophylactic oral antibiotics after total joint arthroplasty (TJA) on postoperative antimicrobial resistance is not well quantified.
**Research Question or Hypothesis:** Do TJA patients prescribed ≥7 days of postoperative oral antibiotic prophylaxis demonstrate greater antimicrobial resistance on subsequent microbiologic cultures than patients prescribed ≤1 day of perioperative antibiotic prophylaxis?
**Study Design:** Retrospective cohort study.
**Methods:** Adult elective TJA patients at our center between 7/1/15 and12/31/21 were screened for inclusion. We excluded patients on antecedent antimicrobial therapy, those with off-protocol antibiotic exposure, prolonged hospital stays, and those prescribed 1–6 days of oral prophylactic antibiotic (to ensure adequate group separation). The primary outcome was the rate of speciated microorganism growth in culture with resistance to the prophylactic oral antibiotic, compared between cephalexin vs. no oral antibiotic and between doxycycline vs. no oral antibiotic groups. Speciated microorganisms, resistance patterns, and antibiotic-related harms were also assessed. Chi square tests were used for categorical variables and Mann–Whitney *U*/non-parametric ANOVA for continuous data due to non-normality (SAS, v9.4). Power analysis determined 1398 total patients were required to detect a 15% increase in resistance with 80% power at alpha = 0.05.
**Results:** Study criteria yielded 3676 total patients, with 804 having microbiologic culture data available for assessment during a median follow-up timeframe of 67 months. The rate of cephalexin-resistant microbial growth was similar between patients prescribed cephalexin vs. no oral antibiotic (54.3% vs. 54.9%, $p = 0.867$). Doxycycline resistance was non-significantly greater in the doxycycline group vs. the no oral antibiotic group (93.8% vs. 75.3%, $p = 0.089$), though the subset of intrinsically doxycycline-resistant organisms were significantly more common (93.8% vs. 70.6%, $p = 0.044$). *C. difficile* was significantly more common in the doxycycline group vs. the cephalexin group vs. the no antibiotic group (12.5% vs. 0% vs. 1.7%, $p = 0.004$).
**Conclusion:** This limited study detected potential antimicrobial resistance and harm associated with extended prophylactic oral antibiotics after TJA that warrant further investigation.

## Pharmacoeconomics/Outcomes

### Sat-45. Cost-effectiveness analysis of tirzepatide, semaglutide and liraglutide for weight loss in patients with obesity without diabetes

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**Introduction:** Obesity affects approximately 42% of the population in the United States. With glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and tirzepatide increasingly used for managing obesity, their cost-effectiveness remains underexplored for weight management in adults.
**Research Question or Hypothesis:** Which medication is cost-effective among tirzepatide injection, semaglutide injection, semaglutide tablet, and liraglutide injection for patients with obesity without diabetes?
**Study Design:** This study was a cost-effectiveness analysis.
**Methods:** We developed a decision tree model to assess the cost-effectiveness of these medications over 68 weeks, extending to 3 and 5 years. The model includes costs of medications, serious adverse events, treatment discontinuation, and weight regain after treatment discontinuation, from a US payer's perspective. Clinical data were sourced from randomized controlled trials. Costs were calculated in 2024 US dollars. The incremental cost-effectiveness ratio (ICER) was calculated based on the cost per quality-adjusted life year (QALY) gained, using a willingness-to-pay (WTP) threshold of $150 000/QALY. One-way sensitivity analysis for all estimated variables and probabilistic sensitivity analysis were performed to assess the effect of parameter uncertainty on the results.
**Results:** In the base-case analysis, tirzepatide injection and semaglutide tablet emerged as cost-effective, dominating liraglutide and semaglutide injections. Tirzepatide injection was more cost effective than semaglutide tablet with ICERs of $34 212 at 68 weeks, $14 388 at year 3, and $10 372 at year 5. Sensitivity analyses indicated that the results were highly sensitive to medication costs and the effect on body mass index reduction. The cost-effectiveness acceptability curves suggested that tirzepatide injection was most likely to be cost effective, with a 90% probability at a WTP of $150 000 per QALY.
**Conclusion:** Tirzepatide injection and semaglutide tablet are cost-effective strategies for managing obesity in adults without diabetes than liraglutide and semaglutide injections. These results offer crucial insights for healthcare decision-makers regarding the selection of

anti-obesity medications. Further studies are recommended to explore the long-term cost-effectiveness of these treatments.

### Mon-89. Predictors of healthcare super-utilization post hospital discharge in a primary care patient population

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**Introduction:** Patients characterized as "super utilizers" account for a higher rate of acute care utilization than the general population and often have multiple chronic conditions, complex medication regimens, and unfavorable social determinants of health. Patient characteristics that predispose to healthcare super-utilization have not been well-defined.

**Research Question or Hypothesis:** What patient-specific factors are associated with healthcare super-utilization following hospital discharge?

**Study Design:** A retrospective cohort study of primary care patients from multiple primary care practices in Western New York discharged from the hospital between 2019 and 2022. Primary care practices were a mix of urban and suburban practice sites.

**Methods:** Healthcare super-utilization was defined as five or more emergency department visits or readmissions within 1 year following the index hospital discharge. Variables were analyzed using a multivariable logistic regression model. Covariates with a p-value <0.25 in bivariate analysis were considered candidates for inclusion in the final model. Variables were removed in a backwards stepwise manner based on significance. A 2-sided $\alpha$ value <0.05 was considered statistically significant.

**Results:** A total of 392 patients were included in the analysis, with 57 (17%) identified as healthcare super-utilizers in the year following index discharge. Black patients had a higher risk of increased healthcare utilization compared to White patients (OR 2.4, 95% CI 1.2–4.9, $p = 0.02$) while females had a decreased risk compared to males (OR 0.5, 95% CI 0.26–0.95, $p = 0.0341$). Patients with a high HOSPITAL score, which has been shown predictive of readmission risk, had a higher risk of increased healthcare utilization compared to those with a low HOSPITAL score (OR 6.9, 95% CI 2.77–17.05, $p < 0.0001$).

**Conclusion:** Male gender, Black race, and high HOSPITAL readmission score were predictive of increased healthcare utilization. Further analysis is required to determine how other factors, such as social determinants of health, impact healthcare super-utilization and what interventions can be designed to target patients at highest risk.

## Pharmacoepidemiology

### Mon-114. Efficacy and safety of SGLT2 inhibitors in moderate to advanced CKD population: Real-world data from a single center

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**Introduction:** Sodium-glucose cotransporter 2 inhibitors (SGLT2is) have been shown to benefit individuals with type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD) in randomized controlled trials. However, it remains unclear whether initiating SGLT2 inhibitors (SGLT2is) in patients with moderate to advanced CKD can slow CKD progression in real-world settings.

**Research Question or Hypothesis:** This study aims to evaluate the renal outcomes in CKD patients following the use of SGLT2is.

**Study Design:** Retrospective cohort study.

**Methods:** The retrospective cohort study recruited data from nephrology clinics at Taipei Tzu Chi Hospital in Taiwan. Patients with CKD stage 3–5, who were prescribed canagliflozin or dapagliflozin between 1st January, 2020 and 28th February, 2023, were included. We excluded patients with less than 84 days with SGLT2i prescription, less than two eGFR data after first SGLT2i treatment, kidney transplant, hemodialysis, or unreasonable eGFR value. The primary outcome was the CKD deterioration ratio, defined as progression of CKD stage, reduction over 25% in eGFR level, and end-stage renal disease (ESRD). We also compared the treatment effect between different eGFR intervals and patients with or without T2DM.

**Results:** There were 215 patients with canagliflozin or dapagliflozin use during inclusion period. After the exclusion criteria, 95 patients were included for data analysis. The decline from the first to the fourth recorded eGFR value was 39.3 mL/min/1.73m$^2$ and 37.7 mL/min/1.73 m$^2$ ($N = 90$, $P$-value $= 0.147$). CKD deterioration was observed in 20 patients (21.1%), and ESRD occurred in two individuals (2.1%). Subgroup analysis showed significant CKD worsening in patients with an eGFR between 15 and 30 mL/min/1.73m$^2$ compared to those with an eGFR between 30 and < 45 mL/min/1.73m$^2$ ($P$-value<0.05). There was no significant CKD deterioration between T2DM and non-T2DM patients.

**Conclusion:** Our study demonstrates that SGLT2is are beneficial for slowing CKD progression and reducing the risk of ESRD in individuals with moderate to advanced CKD. The effect may diminish as worsening of renal function.

### Mon-113. Predictors of discontinuation of angiotensin converting enzyme inhibitors use among medicare beneficiaries using sodium-glucose cotransporter 2 inhibitors

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**Introduction:** Angiotensin-converting enzyme inhibitors (ACEis) and sodium-glucose cotransporter-2 inhibitors (SGLT2is) both provide cardiovascular and renal benefits in Type 2 Diabetes (T2D) patients, suggesting advantages from co-administration. However, evidence on ACEi usage patterns among SGLT2i users is limited.

**Research Question or Hypothesis:** To examine ACEi prevalence and discontinuation in SGLT2is initiators and to identify important factors associated with ACEi discontinuation in T2D patients.

**Study Design:** A retrospective cohort study.

**Methods:** Using 2012–2021 Medicare data, we included T2D patients who newly initiated SGLT2is between 04/01/2013 and 12/31/2018. We identified individuals who filled ≥1 ACEi prescription(s) at the time of or after SGLT2i initiation. Patients were followed from the index date (first ACEi prescription date filled after SGLT2i initiation) for 12 months and censored at death, disenrollment, 1 year after the index date, or end of the study (12/31/2020). ACEi discontinuation was defined as a treatment gap of 60 days. Multivariate logistic regressions were constructed to identify factors associated with ACEi discontinuation among a comprehensive list of demographics, clinical characteristics, and medication use.

**Results:** Among 9717 SGLT2i initiators, 4798 were active ACEi users at the time of SGLT2 initiation, and 1221 of these patients (25.45%) discontinued their ACEi within 12 months of SGLT2 initiation. Compared to White patients, Black patients [adjusted odds ratio (aOR) = 1.71, 95% confidence interval (CI): 1.34–1.97] had higher odds of discontinuing ACEi. Patients using angiotensin receptor blockers (aOR = 1.56, 95% CI: 1.21–2.01) and those with a history of stroke (aOR = 1.27, 95% CI:1.04–1.56) were more likely to discontinue ACEi, while patients on metformin (aOR = 0.70, 95% CI: 0.60–0.81) and diuretic (aOR = 0.81, 95% CI: 0.68–0.96) had lower odds of discontinuation.

**Conclusion:** Approximately one-quarter of the ACEi users discontinued their therapy after SGLT2i initiation. Patient demographics, comorbidities, and medication use were associated with ACEi discontinuation in T2D patients initiating SGLT2is.

## Sat-86. Trends in opioid use among adults with cardiovascular disease, 2001 to March 2020

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**Introduction:** Opioids can cause adverse cardiovascular effects (e.g., hypotension and arrhythmias), which can be concerning in individuals with pre-existing cardiovascular disease (CVD). Currently, little is known regarding trends in opioid prescriptions among individuals with CVD.

**Research Question or Hypothesis:** What are the trends in prescription opioid use among adults with CVD from 2001 to March 2020?

**Study Design:** Cross-sectional study using 2001-March 2020 National Health and Nutrition Examination Survey (NHANES) data.

**Methods:** Adults ≥20 years old with ≥1 of the following CVDs – heart failure, coronary heart disease, angina, myocardial infarction, and stroke—were included. Primary outcomes were prevalence of overall, short-term (≤90 days), and long-term (>90 days) prescription opioid use. Trends in prescription opioid use were evaluated in the overall adult population with CVD and within prespecified subgroups by CVD type, comorbidities, and demographic/socioeconomic characteristics. Weighted logistic regression, adjusted for age, was analyzed to assess trends in prescription opioid use in 4-year examination periods. Analyses were conducted using SAS version 9.4, with significance level of 0.05.

**Results:** Among 6250 participants with CVD, no significant trends in overall opioid prescriptions were observed throughout the study period (9.4% to 11.8%, $p = 0.17$). The prevalence of long-term prescription opioid use increased from 6.6% in 2001–2004 to 12.6% in 2013–2016, before decreasing slightly to 10.4% in 2017-March 2020 ($p = 0.03$). During the study period, an increase in the prevalence of overall prescription opioid use was seen among individuals aged ≥65 years (7.5%–11.3%, $p = 0.02$), while a decrease was observed among those without insurance (10.3% to 1.5%, $p = 0.04$).

**Conclusion:** Although overall prescription opioid use remained consistent between 2001 and March 2020, use of long-term opioid prescriptions increased during this period. Prescription opioid use appears to have increased among individuals aged ≥65 years, raising concerns due to their heightened risk of cardiovascular adverse effects from opioids.

## Mon-112. 細胞週期蛋白依賴性激酶 4 和 6 抑制劑 (CDK4/6i) 對晚期乳癌患者的有效性和安全性:一項真實世界研究

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**Introduction:** The effectiveness of cyclin-dependent kinase 4 and 6 inhibitors (CDK4/6i) in patients with metastatic breast cancer can significantly improve the patient's overall survival (OS) and progression-free survival (PFS) has been confirmed by many randomized controlled trials. However, the real-world efficacy and safety of CDK4/6i are still not clearly understood.

**Research Question or Hypothesis:** This study aimed to evaluate the safety and efficacy of CDK4/6i in the treatment of advanced breast cancer in a real-world clinical setting.

**Study Design:** This study is a retrospective study, including patients diagnosed with advanced breast cancer who were treated at Tzu Chi Hospital in Taipei, Taiwan, from October 2019 to March 2023. These patients must have received at least one dose of abemaciclib, Palbociclib, or Ribociclib.

**Methods:** The primary outcomes of treatment efficacy were OS, PFS, and objective response rate (ORR). In addition, adverse events were assessed as a secondary outcome.

**Results:** This analysis included 95 patients with a mean age of 66.2 years. After a median follow-up of 15.5 months, the median PFS was 28.1 months (95% CI: 22.5–33.6). The results showed no significant difference in PFS between CDK4/6is treatments ($p = 0.644$). Seventy patients achieved an ORR (73.7%), with 24 patients (25.3%) achieving complete response (CR) and 46 patients (48.4%) achieving partial response (PR). The most common adverse events were fatigue (57.9%), leukopenia (48.4%), and anorexia (45.3%).

**Conclusion:** Real-world study shows CDK4/6i exhibits survival benefits similar to those observed in clinical trials. In addition, there is no significant difference in efficacy among these three drugs.

### Sat-84. The influence of dapagliflozin on diabetic ocular complications: An observational cohort study

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**Introduction:** The sodium-glucose cotransporter 2 inhibitor (SGLT2i), dapagliflozin, has been shown to reduce the risk of cardiovascular and renal outcomes. However, there is limited data regarding its role in preventing microvascular complications.

**Research Question or Hypothesis:** This study aims to evaluate the risk of developing ocular outcomes, including diabetic retinopathy (DR), open-angle glaucoma (OAG), and visual loss, among patients with type 2 diabetes mellitus (T2DM) who are treated with dapagliflozin compared to those receiving other hypoglycemic agents.

**Study Design:** The study design was an observational, retrospective, multi-center cohort study.

**Methods:** We extracted data from Taipei Medical University Clinical Research Database from 2016 to 2020, including a medical center and two regional hospitals in Taiwan. Criteria for selecting the subjects were as follows: newly diagnosed T2DM within 5 years, and renal function with estimated glomerular filtration rate above 45 mL/min/m2. Those with a history of DR, OAG or visual loss were excluded. There were 23 948 eligible adults identified. Using 1:1 propensity score matching (PSM), 2170 SGLT2i users and 2170 non-SGLT2i users were identified. The primary outcome was a composite of the incidence of DR, OAG, or visual loss.

**Results:** After 1:1 PSM, SGLT2i users developed significantly lower incident DR, OAG or visual loss, compared with non-SGLT2i users (2.67% vs. 3.96%; hazard ratio [HR], 0.67; 95% confidence interval [CI], 0.48–0.94, $p = 0.019$ after 1-year follow-up; 3.5% vs. 4.79%; HR, 0.73; 95% CI, 0.54–0.98, $p = 0.037$ after 2-year follow-up).

**Conclusion:** In this study, dapagliflozin demonstrated a significant protective effect on the incidence of DR, OAG, or visual loss in patients with newly diagnosed T2DM within 5 years during the two-year follow-up. Further investigation into real-world clinical data should focus on the protective effects of diabetic ocular complications among different SGLT2is.

## Pharmacogenomics/Pharmacogenetics

### Tues-100. ABCD score: A real-world study on predicting clopidogrel effectiveness after PCI

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**Introduction:** The ABCD-GENE score, which includes **A**ge, **B**ody mass index, **C**hronic kidney disease (CKD; estimated glomerular filtration rate [eGFR] <60 mL/min/1,73 $m^2$), **D**iabetes, and *CYP2C19* **GENE** variants, is associated with high platelet reactivity (HPR) and increased risk for major cardiovascular events (MACE) in clopidogrel-treated patients following percutaneous coronary innervation (PCI); a score ≥10 predicts increased risk. However, genotype information might not be available for patients undergoing PCI.

**Research Question or Hypothesis:** We sought to determine if the ABCD score alone (without genotype) is predictive of risk for MACE in clopidogrel-treated patients after PCI.

**Study Design:** Multi-center, cohort study.

**Methods:** The ABCD score was calculated for individuals treated with clopidogrel following PCI. Points are allocated as follows: 4 points for age >75 years, 4 points for BMI >30 kg/m$^2$, 3 points for diabetes, and 3 points for CKD. The primary outcome of MACE, defined as the composite of cardiovascular death, myocardial infarction, ischemic stroke, or stent thrombosis, was compared between patients with an ABCD score <10 vs. ≥10. Kaplan–Meier analysis and Cox proportional-hazards regression was performed after adjusting for multiple factors (e.g., gender, smoking status, PCI indication, stent type, and site).

**Results:** Of 2770 patients included (mean age 64 ± 12, 20% ($n = 567$) Black, and 35% ($n = 968$) female), 314 (11%) had a score ≥ 10. The risk of MACE was higher among patients with a score ≥ 10 vs. <10 (10.2 vs. 5.5 events per 100 patient-years, adjusted HR 1.95, 95% CI 1.30–2.90, $p = 0.001$).

**Conclusion:** An ABCD score of ≥10 was associated with an increased risk of MACE in post-PCI clopidogrel-treated patients. Whether alternative $P2Y_{12}$ inhibitor therapy reduces this risk remains to be determined.

## Sat-87. *CYP2C19* genotype-guided antiplatelet therapy after percutaneous coronary intervention in patients with high bleeding risk: evaluating the clinical impact in a real-world setting

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**Introduction:** *CYP2C19* genotype-guided antiplatelet therapy (APT) improves outcomes after percutaneous coronary intervention (PCI). However, patients with high bleeding risk (HBR) have been underrepresented in genotype-guided APT randomized trials.

**Research Question or Hypothesis:** How does HBR impact genotype-guided APT use and clinical outcomes after PCI?

**Study Design:** Single-center retrospective cohort study.

**Methods:** Adult patients who underwent PCI and *CYP2C19* testing from 2012 to 2019 were included ($n = 1895$). Prasugrel or ticagrelor (prasugrel/ticagrelor) was recommended over clopidogrel in CYP2C19 intermediate or poor metabolizers (IM/PMs). HBR status was defined using modified Academic Research Consortium for High Bleeding Risk (ARC-HBR) criteria. The composite of either a major atherothrombotic event (MAE: death, myocardial infarction, ischemic stroke, stent thrombosis, or revascularization for unstable angina) or bleeding event (GUSTO moderate or severe) 1-year post-PCI was compared across CYP2C19-APT groups using multivariable Cox regression after stratifying by HBR status.

**Results:** The population included 755 (39.8%) HBR patients; of which, 249 (33.0%) were IM/PMs. Among IM/PMs, prasugrel/ticagrelor was used less frequently in HBR compared to non-HBR patients (49.0% vs. 72.0%, $p < 0.001$). Among HBR patients, MAE rates were lower in prasugrel/ticagrelor versus clopidogrel-treated IM/PMs (13.1 vs. 37.2 per 100-person-years; adjusted HR 0.38, 95% CI 0.18–0.83, $p = 0.015$); bleeding rates were not significantly different (13.3 vs. 8.7 per 100-person-years; adjusted HR 1.95, 95% CI 0.59–6.47, $p = 0.276$). In IM/PMs, net MAE or bleed rates were not significantly different in prasugrel/ticagrelor versus clopidogrel-treated HBR patients (26.7 vs. 39.8 per 100-person-years; adjusted HR 0.69, 95% CI 0.37–1.30, $p = 0.248$) and non-HBR patients (9.9 vs. 19.7 per 100-person-years; adjusted HR 0.66, 95% CI 0.29–1.50, $p = 0.318$); although, there was a trend towards lower net rates in HBR and non-HBR patients.

**Conclusion:** CYP2C19 IM/PMs with HBR were less likely to receive prasugrel/ticagrelor. Although the results suggest prasugrel/ticagrelor use in IM/PMs may still derive net benefit, larger multicenter studies are needed to assess the clinical utility of genotype-guided APT in HBR patients.

# Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

## Sun-16. Monte Carlo simulation to determine optimal ceftolozane/tazobactam dosing in critically ill patients receiving continuous venovenous hemofiltration

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**Introduction:** Ceftolozane/tazobactam is a preferred agent to treat multi-drug resistant *Pseudomonas aeruginosa*. Paucity of data exists to guide ceftolozane/tazobactam dosing regimens in critically ill patients receiving continuous venovenous hemofiltration (CVVH).

**Research Question or Hypothesis:** What are the ceftolozane/tazobactam doses attaining the pharmacodynamic targets in critically ill patients receiving CVVH with different effluent rates?

**Study Design:** Prospective in-silico study using Monte Carlo simulation (MCS).

**Methods:** Relevant published pharmacokinetic data was utilized to develop mathematical models to predict ceftolozane/tazobactam disposition in 5000 virtual patients receiving CVVH with three effluent flow rates (Qf) of 20, 30, and 40 mL/kg/hr). Four conventional ceftolozane/tazobactam dosing regimens administered over 3 h (e.g. 750 mg loading dose (LD), 150 mg q8h; 750 mg LD, 375 mg q8h; 750 mg LD, 450 mg q8h; 3 g LD, 3 g q8h) were simulated to evaluate the probability of target attainment (PTA). The pharmacodynamic targets used for ceftolozane was 40%, 60%, and 100% free serum

concentrations above the minimum inhibitory concentration (*f*T > MIC) with an MIC of 4 mg/L assuming *P. aeruginosa* infection. Tazobactam target was 20% *f*T > minimum effective concentration of 1 mg/L. Optimal dosing regimens had a PTA of ≥90% during the initial 48 h of therapy.

**Results:** For a 40% fT > MIC target, ceftozozane/tazobactam 750 mg LD, then 150 mg q8h was optimal at Qf of 20 mg/kg/hr. and 750 mg LD, then 375 mg q8h at Qf of 30–40 mL/kg/hr. For the target of 60% fT > MIC, 750 mg LD, then 375 mg q8h was necessary at Qf of 20–30 mL/kg/hr., and 750 mg LD, then 450 mg q8h at Qf of 40 mL/kg/hr. Achieving the aggressive target of 100% fT > MIC required 3 g LD, then 3 g q8h across all tested Qf settings.

**Conclusion:** MCS effectively predicted ceftolozane/tazobactam dosing regimens attaining different efficacy targets in patients undergoing CVVH at varying Qf rates. These findings can assist clinicians in making informed dosing decisions. However, clinical validation is warranted to confirm these results.

## Sun-14. Determination of cefiderocol dosing for patients undergoing prolonged intermittent kidney replacement therapy: A Monte Carlo simulation

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**Introduction:** Cefiderocol is used to treat multidrug-resistant gram-negative bacterial infections which are common in critically ill patients. Attaining adequate drug levels is crucial for successful treatment. While dosing guidelines exist for cefiderocol for other kidney replacement therapies, data is limited for prolonged intermittent kidney replacement therapy (PIKRT).

**Research Question or Hypothesis:** What are the optimal cefiderocol dosing regimens for critically ill patients receiving PIKRT?

**Study Design:** In-silico study using a Monte Carlo simulation (MCS).

**Methods:** Using relevant demographic and pharmacokinetic data, a one-compartment pharmacokinetic model was developed for anuric patients undergoing 8 or 10 h PIKRT. Monte Carlo Simulations (MCS) were utilized to determine the probability of target attainment (PTA) for various cefiderocol doses administered inter-PIKRT or post-PIKRT in 5000 virtual patients for 48 h. The pharmacokinetic/pharmacodynamic target was 75% time of free plasma concentration above the minimum inhibitory concentration (75% fT > 1xMIC) of 4 mg/L assuming *P. aeruginosa* or *Enterobacterales*. Additionally, more aggressive targets of 100% fT > 1xMIC or 75% fT > 4xMIC were evaluated. Doses attaining 90% PTA were considered optimal. Eight doses were tested (500 mg q8h, 750 mg q8h, 1000 mg q8h, 1500 mg q8h, 750 mg q12h, 1000 mg q12h, 1500 mg q12h, and 2000 mg q12h).

**Results:** All tested cefiderocol dosing regimens regardless of drug administration and timing of PIKRT achieved a PTA > 90% for the goal of 75% fT > 1xMIC. No dosing regimens reached a PTA > 90% for 100% fT > 1xMIC. Only 1500 mg q8h achieved a PTA > 90% for the target of 75% fT > 4xMIC.

**Conclusion:** The overall recommendation for cefiderocol dosing in 8 or 10-h PIKRT would be 750 mg q12h. If a more aggressive efficacy target is warranted,1500 mg q8h would be appropriate. These findings need clinical validation.

## Sun-15. Efficacy and safety of post-dialytic meropenem dosing in hemodialysis patients: A Monte Carlo simulation study

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**Introduction:** Optimal meropenem dosing for patients with kidney failure undergoing intermittent hemodialysis (IHD) is not well-defined. Daily dosing is typically recommended, but is inconvenient, necessitating hospitalization or daily clinical visit. Post-dialytic administration of higher meropenem doses offers a practical alternative but lacks data. Monte Carlo Simulations (MCS) can evaluate the feasibility of post-dialytic dosing in an outpatient setting.

**Research Question or Hypothesis:** Is post-dialytic meropenem dosing effective and safe for patients receiving thrice-weekly IHD compared with daily dosing?

**Study Design:** A prospective in-silico study using MCS.

**Methods:** Relevant demographic and pharmacokinetic parameters were used to develop mathematical models predicting meropenem plasma concentrations in anuric kidney failure patients receiving 4-h IHD thrice-weekly (Monday–Wednesday–Friday) at dialysate rate of 600 or 800 mL/min for one-week. MCS assessed probability of target attainment (PTA) for doses including 250-1000 mg daily and 500-2000 mg post-dialytic dosing regimens in 5000 virtual patients. Pharmacodynamic targets were 40%fT > MIC and 40%fT > MICx4 with an MIC of 2 mg/L assuming *Pseudomonas aeruginosa* infections. Doses attaining PTA≥90% each day during 1 week were considered optimal. Potential neurotoxicity risk was evaluated using a toxicity threshold of >64 mg/mL at the end of each simulated day.

**Results:** For the 40%fT > MIC target, meropenem 250–1000 mg daily and 2000 mg post-dialytic doses achieved a PTA ~ 90% in virtual patients receiving thrice-weekly IHD at both dialysate rates over seven simulated days. Achieving the more aggressive target (40%fT > MICx4) required 500–1000 mg daily doses. No tested post-dialytic dose reached this target, resulting in lower PTA on non-administration days. None of the simulated doses elevated the neurotoxicity risk.

**Conclusion:** Post-dialytic meropenem 2000 mg dose is likely effective and safe for patients undergoing thrice-weekly IHD. For achieving more aggressive targets, this post-dialytic dosing strategy may not be optimal, and daily dosing would be necessary to ensure these targets. Clinical studies are needed to validate these MCS findings.

### Mon-37. Pharmacokinetic summary and toxicity profile of recombinant erwinia asparaginase in pediatric patients with leukemia

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**Introduction:** Contemporary treatment for pediatric acute lymphoblastic leukemia incorporates long-acting asparaginase as a cornerstone of therapy. Patients who develop hypersensitivity reactions (HSR) or silent inactivation to these formulations may benefit from transitioning to Erwinia-based asparaginase (Erwinia asparaginase chrysanthemi, E-ASP or recombinant Erwinia asparaginase, R-ASP). However, pharmacokinetic and toxicity data on R-ASP in the pediatric population is limited.

**Research Question or Hypothesis:** We hypothesize that the pharmacokinetic and toxicity profiles of R-ASP are comparable to those of E-ASP in pediatric patients with leukemia.

**Study Design:** We performed a single institution, retrospective review of the pharmacokinetics and toxicities in patients who received R-ASP from October 1, 2021 to September 30, 2023. Pharmacokinetic data were compared to published controls with E-ASP and R-ASP.

**Methods:** The primary objective was to determine the median duration of asparaginase activity above 0.1 IU/mL following a single dose of 25 mg/m$^2$ of R-ASP. A one-compartment model with first-order absorption and elimination was used to fit pharmacokinetic data. Population and individual post-hoc data were estimated using non-linear mixed effects modeling analysis. Clinical toxicities (i.e., HSR, pancreatitis, hyperglycemia, hypertriglyceridemia, and venous thromboembolism (VTE)) were recorded up to 1 week post-dose and graded according to CTCAE v4.0.

**Results:** We identified 24 individuals with 110 serum measurements of asparaginase activity. The median duration of activity above 0.1 IU/mL was 3.4 days for R-ASP compared to 4 days for E-ASP. The most common attributable toxicities in 32 individuals receiving 449 doses of R-ASP were HSR (15.6%, Grade 1), hypertriglyceridemia (9.4%, Grade 3 and 4), pancreatitis (9.4%, Grade 2), and VTE (6.3%, Grade 2).

**Conclusion:** Compared to published controls with E-ASP and R-ASP, our cohort demonstrated a shorter median duration of asparaginase activity above 0.1 IU/mL. The occurrence of subclinical HSR following R-ASP may suggest potential silent inactivation, indicating that additional monitoring of asparaginase activity throughout treatment may be warranted.

## Psychiatry

### Sat-106. Polygenic interactions with anticholinergic burden impact cognition and brain structure in psychotic disorders

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**Introduction:** Cognitive impairment is a common feature of psychosis-spectrum disorders significantly affecting treatment outcomes and daily functioning. Impairment severity varies across patients and is worsened by anticholinergic activity from many commonly used medications. Genetic predispositions to adverse cognitive impacts of anticholinergic medications and related pathophysiological mechanisms have not been extensively investigated.

**Research Question or Hypothesis:** How do genetic predispositions to cognitive ability or psychiatric conditions interact with anticholinergic burden (AChB) to impact cognition and brain structure in individuals with psychotic disorders?

**Study Design:** Cross-sectional.

**Methods:** Individuals with psychosis-spectrum disorders ($n = 1704$) from the Bipolar-Schizophrenia Network for Intermediate Phenotypes,18–65 years of age, representing diverse ancestries, underwent neurocognitive assessments, structural neuroimaging, genotyping, and comprehensive medication review. The primary cognitive outcome was the Brief Assessment of Cognition in Schizophrenia (BACS) composite score, and the primary brain structural phenotype was total gray matter (GM) volume. AChB scores for scheduled medications were quantified using the CRIDECO Anticholinergic Load Scale. Polygenic scores (PGS) for cognition, schizophrenia, bipolar disorder, and depression were quantified using the PRS-CS algorithm, followed by generating a composite psychiatric PGS through principal component analyses. Linear regressions, adjusting for clinical

covariates and correcting for multiple testing with false-discovery rate (FDR), examined AChB-PGS interactions and cognitive/brain structure outcomes. Hypothesis-driven moderated-mediation models explored potential causal pathways, with significance assessed via bootstrapping.

**Results:** Higher AChB was associated with lower BACS performance ($\beta = -0.094$, $p = 9.74 \times 10^{-13}$) and reduced GM ($\beta = -1253.06$, $p = 0.002$). Individuals with higher cognitive PGS exhibited greater impact of AChB on BACS ($\beta = -0.048$, $p_{FDR} = 0.012$), whereas those with lower psychiatric PGS demonstrated more pronounced GM volume reduction from AChB ($\beta = 1421.48$, $p_{FDR} = 0.018$). AChB associations with cognitive impairment were partially mediated by GM atrophy which were moderated by psychiatric PGS ($\beta = 0.008$, bootstrapped 95% CI [0.003, 0.014]).

**Conclusion:** Anticholinergic-polygenic interactions significantly impact cognition and brain structure in psychotic disorders, highlighting a novel gene-by-environment interaction that improves our mechanistic understanding of cognitive impairments in psychotic disorders.

### Tues-106. Effectiveness of pharmacist-provided education on antipsychotic monitoring parameters after the COVID-19 pandemic

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**Introduction:** Shifts to telehealth during the COVID-19 pandemic impeded providers' ability to perform recommended metabolic (MeD) and movement (MoD) disorder monitoring for antipsychotics. As this monitoring is recommended by national guidelines, improving these monitoring rates is important to patient safety. Now that in-person visits are more common, educating providers on the need to perform this monitoring is required.

**Research Question or Hypothesis:** Compare monitoring rates across three time points near the end of the pandemic, after a written educational intervention, and after an educational in-service provided by pharmacists and evaluate the effectiveness of the different educational interventions on improving these rates.

**Study Design:** This retrospective chart review examined monitoring rates for MeDs and MoDs for patients receiving antipsychotics from providers at our community health center. Three specific time points were measured: a baseline measurement near the end of the pandemic; another 6-months after distribution of a written educational flyer regarding the recommended monitoring in October 2022; and a third 8-months after an educational in-service on how to perform the monitoring in February 2023.

**Methods:** Data from a patient sample for each provider at each time point was examined for all recommended parameters, including weight/BMI, lipid panels, glucose/hemoglobin A1c, Abnormal Involuntary Movement Scale results, and other MoD assessments. To ensure appropriate sampling, only providers prescribing antipsychotics to at least 3–5 patients were included in each analysis. Monitoring rates were compared across time points using Chi-square tests for statistical significance at $p < 0.05$.

**Results:** Approximately 25% of all clinic providers and eligible patients were sampled for the analysis. Baseline monitoring rates were lower than guideline recommendations, particularly for MoDs (<15%). While non-significant improvements in MoD monitoring were seen over time (15%–20%), MeD monitoring rates decreased (40%–85% down to 20%–70%).

**Conclusion:** Both written and in-service pharmacist-provided educational interventions did not significantly improve antipsychotic monitoring. Alternative provider education is needed to improve monitoring rates.

## Substance Abuse/Toxicology

### Sun-87. Assessing the impact of a pharmacist-integrated opioid use disorder consult service

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**Introduction:** Medications for opioid use disorder (MOUD) are the standard of care for opioid use disorder (OUD) due to demonstrated reductions in both morbidity and mortality, however, uptake and appropriate use of these medications are lacking, especially in the acute care setting. In July of 2022, a pharmacy-integrated medication-assisted recovery (MAR) OUD consult service was established at the University of Illinois Hospital to assist with MOUD therapy among inpatients.

**Research Question or Hypothesis:** How has the implementation of a MOUD consult service affected MOUD utilization, safety, and care coordination in an acute care setting?

**Study Design:** Retrospective Cohort.

**Methods:** Adults with OUD, opioid overdose, or opioid abuse during a hospitalization between 7/1/2022 and 6/30/2023 were included in the study. The rate of initiating or continuing MOUD between patients who received an OUD MAR consult was compared to those who did not. Additionally, the study compared the safety, effectiveness, and coordination of care for patients receiving MOUD between the two groups. Results were analyzed descriptively and using inferential statistics.

**Results:** Out of 1456 encounters, 222 (15.2%) involved MAR consultation, and 1234 (84.8%) did not. MOUD was given in 81.5% of consult encounters compared to 14.9% in non-consult encounters ($p < 0.001$). Consulted encounters were more likely to receive additional withdrawal medications (73.5% vs. 31.5%, $p < 0.001$) and were less likely to return to the hospital within 30 days of discharge (21.5% vs. 31.5%, $p = 0.031$).

**Conclusion:** Involvement of a pharmacist-integrated OUD consult service was associated with greater use of MOUD and withdrawal management medications and reduced 30-day readmissions.

### Sun-86. Misuse of prescribed medications for approved versus non-approved indications: predictors and implications for ambulatory care

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**Introduction:** Misuse of prescription drugs may result in adverse effects or inadequate pharmacotherapy. Misuse for indication (MUI, e.g., pain relievers for pain, tranquilizers for anxiety) may indicate persistent symptoms, whereas misuse for nonindicated reasons (MUNIR) may indicate desires for other psychoactive effects.

**Research Question or Hypothesis:** This study aimed to assess prevalence and predictors of MUI versus MUNIR in 4 therapy classes: opioids, sedatives, stimulants, tranquilizers.

**Study Design:** This retrospective cross-sectional analysis used data from the 2021 National Survey on Drug Use and Health (NSDUH).

**Methods:** Associations of MUI and MUNIR with independent variables (demographics, prior non-therapeutic drug use) were tested for statistical significance with Pearson chi-square and multivariate logistic regression analysis ($\alpha < 0.05$) using IBM SPSS v29.0.

**Results:** Of 2809 respondents with prescription misuse, 69% had MUI and 31% MUNIR. Compared with MUNIR, MUI were older (e.g., aged ≥50 years: 18% vs. 34%). Most (71%) MUNIR used illicit drugs or marijuana before age 18. Common MUI reasons included pain relief (49%, opioids) and anxiety (28%, tranquilizers). In bivariate analyses, MUI rates increased with age of first alcohol use, ages ≥21 years (83%). As past-year days of alcohol use increased, MUI decreased, from 75% who used no alcohol to 61% who regularly used alcohol ($p < 0.001$). The strongest predictors of MUI were any past-year tranquilizer use (adjusted-odds-ratio [AOR] = 2.099, 95% confidence interval [CI] = 1.745–2.524) and aged ≥50 years (AOR = 1.747, CI = 1.386–2.202). Past-year alcohol use ≥300 days (AOR = 0.500, CI = 0.361–0.694) and first use of illicit drugs or marijuana before age 18 (AOR = 0.677, CI = 0.548–0.838) were associated with decreased odds.

**Conclusion:** In a national sample of U.S. adults misusing prescription medications, MUI occurred in 69%. MUI was common in respondents aged ≥50 years, potentially indicating increasing health conditions or symptoms. MUNIR was prevalent in respondents with long histories of substance use. These findings reinforce the need to determine why misuse occurs to guide appropriate interventions.

### Sat-110. Impact of an addiction medicine consult service on medications for opioid use disorder initiation in hospitalized patients

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**Introduction:** Total overdose deaths rose by 60% between 2019 and 2021. Medications for opioid use disorder (MOUD) have been associated with reduced overdoses and opioid-related hospitalizations. Involvement of addiction medicine consult services (AMCS) in patient care have been shown to reduce all-cause 90-day mortality post-discharge. This study aimed to expand on the of AMCS on initiation of MOUD in hospitalized patients.

**Research Question or Hypothesis:** Does access to an AMCS increase MOUD initiation in inpatients with untreated OUD?

**Study Design:** This is a retrospective, quantitative, cohort study.

**Methods:** Site 1 developed an AMCS in 2021, while site 2 has no AMCS. Data on MOUD initiation and demographics were collected as a baseline. Another set of data for each site was collected for a period after development of an AMCS at site 1. We compared the change in MOUD initiation rates between these periods at site 1 to site 2. The primary objective was to assess how an AMCS influences MOUD initiation in patients with untreated OUD.

Adults aged 18 or older with ICD-10 codes related to OUD not currently receiving treatment were included. Patients with an active cancer diagnosis were excluded.

Z-Tests for proportions were used to estimate and test the difference in rates of MOUD within each site. Multiple logistic regression was used to estimate the slope of change in the MOUD rate.

**Results:** 504 patients were assessed. Rate of MOUD initiation for site 1 was 8% (10/126) for the baseline and 21% (26/126) for post-period (difference in proportions = 0.2; 95% CI 0.04–0.21; $p = 0.004$). Rate initiation for site 2 was 5% (6/126) for the pre-period and 6% (8/126) for the post-period (difference in proportions = 0.016; 95% CI -0.04-0.75; $p = 0.582$).

**Conclusion:** Availability of a hospital AMCS increased MOUD initiation in patients with a history of OUD.

## Transplant/Immunology

### Sat-109. Coccidioidomycosis outcomes among lung transplant recipients transferring care to a center within the highly endemic region

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**Introduction:** *Coccidioides immitis* is a geographically restricted environmental fungus associated with high rates of disseminated disease and mortality in lung transplant. At St. Joseph's Hospital and Medical Center (SJHMC), a strategy of universal lifelong azole prophylaxis was previously found to be protective against post-transplant coccidioidomycosis. Whether lung transplant recipients relocating to the *Coccidioides* endemic region are also at risk and would benefit from antifungal prophylaxis is unknown.

**Research Question or Hypothesis:** What is the risk for coccidioidomycosis among lung transplant recipients transferring care to SJHMC, which is located within a highly endemic region for *Coccidioides* (Phoenix, AZ)?

**Study Design:** Retrospective, descriptive cohort study.

**Methods:** Lung transplant recipients transplanted between 2010 and 2023 before transferring to SJHMC for re-transplant or general post-transplant follow-up were included. The primary outcome was the incidence of proven or probable coccidioidomycosis per 2020 Mycoses Study Group consensus definitions. A secondary outcome was to describe azole antifungal prophylaxis before and after transfer and comment on its potential effectiveness in preventing coccidioidomycosis in this population.

**Results:** Forty lung transplant recipients transplanted at outside facilities were included, with 62.5% not receiving antifungal prophylaxis upon transfer. In patients receiving prophylaxis, fluconazole represented the most common azole. Of those not on prophylaxis, 96% were initiated on azole therapy at first clinic visit, with 48% prescribed itraconazole capsules. *Coccidioides* serologic testing was performed in 30% of the cohort. After a median follow-up of 31 months, one proven case of pulmonary coccidioidomycosis (2.5%) occurred during the study period, occurring 4.8 years post-transplant and >2 years post-transfer in a patient with cystic fibrosis who had paused azole prophylaxis for over a month due to gastrointestinal intolerance and access issues.

**Conclusion:** Initiation of azole prophylaxis at the time of transfer was associated with a low rate of coccidioidomycosis among lung transplant recipients relocating to the highly endemic region.

## Sun-90. Comparison of direct-acting oral anticoagulation versus warfarin following Kidney transplantation: A single center experience

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**Introduction:** This study assesses the safety and efficacy of direct-acting oral anticoagulants (DOACs) in a predominantly obese population of kidney transplant recipients (KTR), who experience higher rates of venous thromboembolism (VTE) and atrial fibrillation (AFib) compared to the general population. Despite their common use for VTE and AFib treatment, limited studies describe DOAC use in KTR.

**Research Question or Hypothesis:** Do KTR taking DOACs have a lower risk of bleeding events compared to those taking warfarin for AFib and/or VTEs?

**Study Design:** Single-center, retrospective study.

**Methods:** Adult KTR at the University of Illinois Health Hospital between 1/2018 and 8/2023 and were prescribed a DOAC or warfarin within 12 months post-transplant were included. Exclusions apply to those with mechanical or prosthetic valves, antiphospholipid syndrome, other anticoagulant indications, multi-organ transplants, pregnancy, or incarceration. The primary outcome is the composite of bleeding events. Secondary outcomes include major and minor bleeding, and VTE or stroke incidence. Outcomes were analyzed using descriptive, categorical, and continuous data, with a multivariate model to assess bleeding risk factors.

**Results:** 31 warfarin patients and 59 DOAC patients met criteria. The patients were predominantly Black (47.7%) and median BMI was 34 kg/m$^2$. There was a difference in the reduction of composite in the DOAC group compared to the warfarin group (10.2% vs. 32.3%; $p = 0.009$). One thromboembolism event occurred in the warfarin group. The multivariate model demonstrated that having a surgery history (OR 0.27 (95% CI: 0.08–0.96; $p = 0.043$) had an increased risk of developing a bleeding event.

**Conclusion:** DOACs significantly reduced bleeding events compared to warfarin, showed no difference in VTE incidence, and were effective in KTR. More studies are needed to support these findings.

## Sat-110. Concurrent apixaban with itraconazole or posaconazole pharmacokinetic and clinical outcome evaluation in cardiothoracic transplant recipients

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**Introduction**: Itraconazole and posaconazole are frequently prescribed following transplantation to prevent and treat fungal infections. Navigating drug interactions is challenging due to these agents' potent CYP3A4 inhibition and literature describing concurrent apixaban, a CYP3A4 substrate, is limited.

**Research Question or Hypothesis**: We hypothesized that routine apixaban dose reduction with itraconazole or posaconazole would be associated with goal apixaban levels.

**Study Design**: Single-center, retrospective, case series of adult cardiothoracic transplant recipients taking itraconazole or posaconazole with apixaban 2.5 mg twice daily (BID) for atrial fibrillation or venous thromboembolism (VTE).

**Methods**: Institution practice reduces apixaban to 2.5 mg BID with itraconazole or posaconazole and obtains apixaban calibrated anti-Xa assay within 5 days with goal trough 50–150 ng/mL. Antifungal and apixaban levels were drawn within 7 days. The primary outcome was the impact of itraconazole and posaconazole on apixaban exposure. Clinical outcomes of major bleed per ISTH criteria, VTE, stroke, and clot resolution are described. Apixaban levels and clinical outcomes were compared using Wilcoxon rank sum and Fisher's exact tests.

**Results**: Twenty-six transplant recipients were identified: 18 (69%) lung, 2 (8%) heart, 6 (23%) multi-organ. Seventeen levels from 14 patients on itraconazole displayed median [IQR] apixaban trough 143 ng/mL [95–183], 59% within and 41% above goal. Fourteen levels from 12 patients on posaconazole displayed median [IQR] apixaban trough 124 ng/mL [93.8–156.8], 71% within and 29% above goal. Linear regression performed suggests any itraconazole or posaconazole exposure potentiates increased apixaban exposure. Two major bleed events, two VTE, two stroke, and eight clot resolution were identified.

**Conclusion**: Apixaban 2.5 mg BID with itraconazole or posaconazole generally results in goal apixaban exposure but with notable variability. Empiric apixaban dose reduction is likely appropriate with any itraconazole or posaconazole exposure as data could not demonstrate a proportional increase in apixaban exposure with increasing azole concentrations. Apixaban TDM is highly encouraged for individualized dosing with itraconazole or posaconazole.

## Mon-103. Impact of early hyperglycemia on development of post-transplant diabetes mellitus after kidney transplant in those without diabetes mellitus

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**Introduction:** Post-transplant diabetes mellitus (PTDM) is a common complication for kidney transplant recipients (KTRs). PTDM is diagnosed after 45 days post-transplant, and early hyperglycemia (EH) is not recognized as a risk factor for development of PTDM. There is limited data assessing the impact of EH on those without diabetes mellitus (DM) at time of transplant.

**Research Question or Hypothesis:** KTRs without DM at time of transplant who experience EH will have higher incidences of PTDM.

**Study Design:** A single-center, retrospective cohort study was conducted in adult KTRs who underwent kidney transplantation from January 1, 2019 to May 25, 2023.

**Methods:** KTRs who developed EH within 45 days post-transplant were compared against those who did not. The primary outcome was the difference in incidence of PTDM between the EH and control group at 6 months. Secondary outcomes included incidence of PTDM, tacrolimus trough concentrations and coefficient of variation, prednisone use, rejection, graft and patient survival, renal function, rehospitalizations, infections, and cardiovascular events within 12 months.

**Results:** A total of 279 KTRs (EH group, $n = 204$ vs. control group, $n = 75$) were included. Baseline characteristics were similar between groups, except for male gender (58.3% EH vs. 38.7% control, $p = 0.004$), Black race (34.6% vs. 58.6%, $p < 0.005$), baseline A1c (4.97 ± 0.48% vs. 4.82 ± 0.38%, $p = 0.018$), and alemtuzumab induction (54.4% vs. 68%, $p = 0.041$). There were significantly higher incidences of PTDM in the EH group compared to control group at 6 months (11% vs. 1.4%, $p = 0.012$) and 12 months post-transplant (18.5% vs. 5.5%, $p = 0.007$). KTRs with EH had 2.9 times greater odds of PTDM (OR 2.9; 95% CI 0.845–10) at 6 months. Other confounding variables were not significant for impacting PTDM at 6 months or within 12 months. No statistically significant differences were identified in the secondary outcomes.

**Conclusion:** KTRs with EH had an increased incidence of developing PTDM.

## Sat-107. Hypogammaglobulinemia and intravenous immune globulin use following lung transplant: A retrospective, single-center, descriptive study

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**Introduction:** Hypogammaglobulinemia is a common complication that can increase infection risk after lung transplant, therefore subcutaneous or intravenous immune globulin (IVIG) replacement is recommended for solid organ transplant recipients with hypogammaglobulinemia. However, current use patterns of IVIG in lung transplant have not been well described in real world clinical practice.

**Research Question or Hypothesis:** What are the hypogammaglobulinemia monitoring patterns, incidence rates, risk factors, and IVIG treatment patterns within 1 year after lung transplant?

**Study Design:** Retrospective, single-center, descriptive study.

**Methods:** This study included adult patients who received a lung transplant at a quaternary care hospital from 01/2018 until 03/2021. Patients who received multiple simultaneous transplanted organs were excluded. The primary outcome was the indication of IVIG doses administered during the first year after lung transplant. Descriptive statistics and multivariable logistic regression modeling were performed. Statistical significance was set as $p < 0.05$.

**Results:** Among 198 lung transplant recipients included, IgG levels were monitored 5 times on average during the first year following transplant. Hypogammaglobulinemia (IgG < 700 mg/dL) occurred in 177 (89%) patients, and severe hypogammaglobulinemia (IgG < 400 mg/dL) occurred in 88 (44%) patients. A total of 166 (84%) patients received IVIG during the first year following lung transplant for the following indications: hypogammaglobulinemia without an infection in 81 (41%) patients, hypogammaglobulinemia with an infection in 95 (48%), donor-specific antibodies in 71 (36%), and antibody-mediated rejection in 28 (14%). Risk factors significantly associated with severe hypogammaglobulinemia included: underlying obstructive lung disease (adjusted odds ratio, aOR = 3.6; $p < 0.001$), baseline immunodeficiency due to corticosteroids (aOR = 5.9; $p = 0.001$), IgG administration within 1 year before transplant (aOR = 11.0; $p = 0.004$), and higher body mass index (aOR = 1.1; $p = 0.045$).

**Conclusion:** The use of IVIG for hypogammaglobulinemia with or without an infection was common in this quaternary care hospital. Additional studies are needed to evaluate the economic and clinical outcomes of IVIG for hypogammaglobulinemia forinfection prevention among high-risk patients following lung transplant.

## Sat-111. Granulocyte colony stimulating factor use in alemtuzumab vs. anti-thymocyte globulin induction with rapid steroid withdrawal regimen in adult kidney transplant recipients

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**Introduction:** Neutropenia is seen in kidney transplant recipients (KTRs). Apart from reduction in immunosuppression to combat neutropenia, granulocyte colony stimulating factors (GCSF) are used. Conflicting outcomes are reported on GCSF use with alemtuzumab (ALZ) compared to anti-thymocyte globulin (ATG), and there is a gap in literature on its impact of healthcare resources.

**Research Question or Hypothesis:** KTRs receiving ALZ induction will have a higher use of GCSF and its associated healthcare resources.

**Study Design:** A single-center, retrospective cohort study was conducted in adult KTRs who underwent kidney transplantation from October 31, 2019 to October 31, 2021.

**Methods:** Adult KTRs were compared between ALZ and ATG induction with both groups having a rapid steroid withdrawal regimen. The primary outcome was the difference in GCSF use within 6 months post-transplant. Secondary outcomes included difference in associated healthcare resources (number of clinic visits where GCSF was given or for GCSF alone, related telephone calls), number of rounds of GCSF, change in absolute neutrophil count (ANC) after first GCSF injection, time from transplant to first GCSF use, mycophenolate mofetil (MMF) doses and ANC at 3 and 6 months, and the incidence of rejection and development of donor specific antibodies within 12 months.

**Results:** A total of 31 of the 146 (21.2%) KTRs receiving ALZ received GCSF compared to 6 of the 79 (7.6%) KTRs receiving ATG ($p = 0.008$). Demographics were similar between the two groups. There was a higher use of associated healthcare resources with ALZ compared to ATG with 45 vs. 5 clinic visits, 73% vs. 40% of clinic visits for GCSF use alone ($p = 0.152$), and 44 vs. 5 telephone calls. There was no difference in the other secondary outcomes except for MMF at 3 months (782 mg/day vs. 1416 mg/day, $p = 0.007$).

**Conclusion:** The use of GCSF was significantly higher with ALZ induction, which required higher use of associated healthcare resources.

## Sat-113. Evaluating impact of high versus low kidney donor profile index (KDPI) kidneys on clinical outcomes

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**Introduction:** The kidney donor profile index (KDPI) is used to qualify deceased donor kidney transplants (KT). While use of higher KDPI kidneys is associated with worse outcomes, current literature still outlines its benefit in lowering overall cumulative mortality by increasing access to donor kidneys. However, investigation among recipients with multiple comorbidities is sparse.

**Research Question or Hypothesis:** We hypothesized the use of high versus low KDPI kidneys will confer worse clinical outcomes at the University of Illinois Hospital (UIH).

**Study Design:** This was a retrospective chart review.

**Methods:** Adult deceased donor isolated KT recipients at UIH between 9/1/2021 and 9/1/2022 were identified. The low KDPI cohort consisted of KT recipients with donor KDPI <85% compared to the high KDPI cohort with KDPI ≥85%. Primary outcome was kidney graft failure at one-year post-KT (defined as death or definitive return to hemodialysis). Secondary outcomes included delayed graft function (DGF) [defined as need for dialysis within 7 days post-KT], length of hospital stay, acute rejection rates, and estimated glomerular filtration rates. A 2-tailed $p < 0.05$ was deemed statistically significant.

**Results:** 174 KT recipients were identified with 160 subjects in the low KDPI cohort and 14 subjects in the high KDPI cohort. At 1 year, kidney graft failure was higher in the high KDPI cohort vs. low KDPI (28.6% vs. 8.8%, $p = 0.020$). There were no differences in DGF (35.7% vs. 20%, $p = 0.168$), length of hospital stay (7.5 days vs. 6 days, $p = 0.053$), or acute rejection rates (35.7 vs. 33.8 per 100 persons, $p = 0.882$). Estimated glomerular filtration rates were lower in the high KDPI cohort at 3, 6, and 12 months post-KT.

**Conclusion:** These results suggest at UIH, the use of high KDPI kidneys is associated with worse outcomes in kidney graft failure and 1-year eGFR, but no difference in other transplant outcomes compared with low KDPI kidneys.

### Tues-109. Survey of the United States solid organ transplant centers on genotype-guided tacrolimus management

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**Introduction:** Despite the recommendations published by CPIC in 2015, *CYP3A5* genotype-guided tacrolimus management has not been incorporated into routine clinical practice. While several studies have described the patient and provider perspective, limited data exists on the current state of clinical implementation of tacrolimus pharmacogenomics (PGx) at the transplant center level across the United States (US).
**Research Question or Hypothesis:** What are characteristics of tacrolimus PGx in the US transplant programs and what barriers prevented clinical implantation of tacrolimus PGx?
**Study Design:** Survey of US transplant centers.
**Methods:** A 33-question electronic survey was distributed to the American College of Clinical Pharmacy Transplant Practice & Research Network and the American Society of Transplantation Transplant Pharmacy Community of Practice listservs between 1/22/24 and 2/19/24. Pharmacist members were asked to complete questions regarding utilization of tacrolimus PGx in adult/pediatric heart, lung, kidney, and pancreas transplant programs at their center and perceived barriers to clinical implementation of tacrolimus PGx. Descriptive statistics summarized the responses.
**Results:** A total of 90 programs from 69 transplant centers (28.1% of 245 active US transplant centers) were included. Tacrolimus PGx was utilized for patient care in 14 programs (15.6%), primarily in adult kidney and heart transplant. Eleven had PGx pharmacist support. For PGx testing, a multi-gene panel was used by 8, an external lab was used by 7, and cost was billed to insurance/patient by 7. Only 3 programs had protocolized PGx-based tacrolimus dosing versus 6 where dosing was determined by individual clinicians. Only 1 incorporated clinical decision support for recommendation versus 9 that used verbal/written communication. The perceived barriers for clinical implementation included PGx testing cost and availability, lack of evidence to support benefit, and lack of transplant-specific guideline recommendation for PGx testing.
**Conclusion:** There is a need for increased education and development of effective strategies to overcome the barriers for clinical implementation of tacrolimus PGx across the US transplant centers.

### Sun-88. Assessment of cognitive function before and after conversion from immediate release tacrolimus to LCP-tacrolimus (Envarsus XR®) (ACOFTE)

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**Introduction:** Tacrolimus (Tac-IR) is the backbone of immunosuppressive therapy for kidney transplant recipients (KTR) due to its superior outcomes. Its adverse effect profile includes neurotoxicity and cognitive impairment. Neurotoxicity from tacrolimus is documented in case reports, although there is minimal published clinical trial research. It is thought that these toxicities are primarily related to peak tacrolimus levels. LCP-tacrolimus (LCP-Tac) is a sustained release formulation of tacrolimus that has a significantly reduced peak. Use of LCP-Tac may help to maintain kidney function while reducing neurotoxicity.
**Research Question or Hypothesis:** Conversion to LCP-Tac from Tac-IR significantly improves cognitive function in kidney transplant recipients using an objective measure of cognition.
**Study Design:** This is a prospective clinical trial to assess cognitive function of KTR while on Tac-IR and at least 90 days after conversion to LCP-Tac using Montreal Cognitive Assessment (MoCA) and the NIH Toolbox Cognitive Domains.
**Methods:** Adult KTR on Tac-IR for at least 2 months being converted to LCP-Tac underwent an initial cognitive evaluation and a second cognitive evaluation approximately 90 days after starting LCP-Tac. Patients were excluded if non-English speaking, had a history of stroke or dementia, and if they were unable to provide informed consent. Primary objective was to compare the uncorrected Cognition Fluid Composite score (CFC) before and after conversion to LCP-Tac. Secondary objectives included each individual test within the NIH Toolbox and the MoCA. Statistics were completed using GraphPad Prism. Descriptive statistics were used for demographic data. Paired t-test was used to compare normally distributed continuous data with a $p < 0.05$ considered significant.
**Results:** 19 patients completed an initial and second cognitive assessment. The mean of differences of the CFC was 3.526 ($p = 0.0381$). The mean of differences of the uncorrected Patten Comparison (PC) Test was 8.053 ($p = 0.0019$).
**Conclusion:** Patients had improvements in cognitive function when converted to LCP-Tac, driven primarily by the PC test, which measures processing speed.

### Sat-112. Contemporary immunosuppression management in dual organ heart transplantation: A united network for organ sharing database analysis

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**Introduction:** Recent data suggest worse one-year survival for simultaneous heart-kidney transplant (SHKT) recipients in the new allocation era. Limited reports exist on immunosuppression strategies and outcomes in dual organ heart transplant populations, especially after the 2018 UNOS heart allocation policy change.
**Research Question or Hypothesis:** How have immunosuppression strategies and outcomes for SHKT recipients evolved since the UNOS allocation policy change?

**Study Design:** Retrospective cohort study.

**Methods:** This UNOS database analysis included adults (16+ years) who underwent SHKT from August 2013 to December 2022. Immunosuppression regimens and post-transplant outcomes including rejection, infection, graft failure, and all-cause mortality in the first-year post-transplant were evaluated.

**Results:** A total of 2384 patients were included, 708 (29.7%) before and 1676 (70.3%) after the policy change. The extent of decrease in anti-thymocyte globulin induction (46.5% vs. 37.1%, $p < 0.001$) was mirrored by the increase in basiliximab use (29.2% vs. 38.8%, $p < 0.001$). Compared to before the policy change, at one-year post-transplant, a greater proportion of recipients were on tacrolimus (86.8% vs. 92.1% $p = 0.002$) and an mTOR inhibitor (6.3% vs. 9.7%, $p = 0.023$) while fewer were on mycophenolate (82.6% vs. 78.0% $p = 0.044$). Hospitalization for infection was similar (OR 1.02 95% CI 0.75–1.38). Adjusted odds of hospitalization for rejection were lower in both kidney (OR 0.44, 95% CI 0.26–0.72) and heart allografts (0.52, 95% CI 0.36–0.77). The risk of graft failure was higher after the allocation change for the kidney (HR 1.72, 95% CI 1.17–2.52) with no evidence of a difference for the heart (HR 1.30, 95% CI 0.66–2.64). The one-year survival was comparable (89.7% vs. 88.5%, HR 0.79 95% CI 0.52–1.22).

**Conclusion**: Our analysis did not find a survival difference for SHKT patients after the allocation change. The rates of organ rejection were lower in the post allocation change era despite the less intensive induction therapy.

## Women's Health

### Tues-113. Surviving the storm: Exploring gender-based burnout in Lebanon during the COVID-19 pandemic

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**Introduction:** COVID-19 exacerbated burnout in Lebanon, amid economic collapse, political turmoil, and the Beirut Port explosion, with limited gender-specific data.

**Research Question or Hypothesis:** This study examined burnout in Lebanese women and men during COVID-19, exploring gender differences and mitigation strategies.

**Study Design:** A cross-sectional survey of 423 adults (July 2021–August 2022) used the Maslach Burnout Inventory – General Survey.

**Methods:** Utilizing the Maslach Burnout Inventory – General Survey (MBI-GS), participants reported exhaustion (≥12), cynicism (≥11), and low professional efficacy (≤21). Burnout was defined as exhaustion with either cynicism or low efficacy. The survey gathered demographic, family, and professional data, stressors, and burnout mitigation strategies. Analyses were gender-stratified, using descriptive statistics and Pearson's chi-squared test. Bivariate associations between burnout indicators and sample characteristics were tested using Pearson's chi-square. Odds ratios (OR) and adjusted ORs for burnout were estimated via logistic regressions.

**Results:** Lebanese women experienced higher rates of burnout compared to men during the pandemic, with significant differences observed in emotional exhaustion ($p = 0.006$). Factors associated with burnout varied between genders, with women more likely to exhibit exhaustion when residing in the Beqaa, Mount or North Lebanon governorates, being single, having children aged 10–15 years, and most interestingly when lacking support from their boss/institution. Stressors such as the Lebanese economic crisis and the Beirut Port Explosion were significantly linked to burnout in both genders, with the economic crisis particularly associated with higher levels of exhaustion in men ($p = 0.011$) and cynicism in both genders ($p = 0.001$ for men, $p = 0.039$ for women). Coping strategies, including COVID-19 precautions, social activities, and religious practices, were effective in reducing burnout among both women and men who experienced burnout ($p = 0.039$ and 0.03, respectively).

**Conclusion:** Gender-sensitive approaches are essential to addressing pandemic burnout, advocating tailored interventions and supportive work environments, especially for women.

### Sat-114. Impact of #PlanA reproductive health seminars on college students' contraception and safe sex knowledge

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**Introduction**: Decreasing the 41.6% unintended pregnancy rate, which is high (51.1%) among college-aged women 20–24 years old, is a Healthy People 2030 goal. Reproductive health literacy is low among college students. Pharmacy delivered college sex education programs could increase knowledge and safe sex behaviors.

**Research Question or Hypothesis**: Do college reproductive health programs increase students' contraception and safe sex knowledge?

**Study Design**: Pre/post surveys.

**Methods**: Trained student pharmacists offered 12 1-h health education programs on fertility, contraception and emergency contraception

| | Pre % correct | Post % correct | *P*-value |
|---|---|---|---|
| Sperm lifespan | 29.2% | 85.0% | <0.001 |
| Fertilization time | 56.6% | 93.8% | <0.001 |
| Missed birth control pill | 41.6% | 79.6% | 0.013 |
| Plan B® effectiveness window | 60.2% | 89.4% | <0.001 |
| Male condom use | 49.6% | 94.7% | <0.001 |
| Prescription contraception access | 84.1% | 96.5% | 0.001 |

via live and Zoom presentations. A 10-item reproductive health quiz was created and piloted to college students. Attendees used a code to anonymously complete the pre-survey (quiz plus six demographic items) and post-survey (quiz plus 12 program evaluation items). Matched surveys were analyzed with descriptive, paired *T*-test and Wilcoxon signed rank test statistics using SPSS v29; $p \leq 0.05$ significant.

**Results**: 128 students attended a seminar with 113 completing both surveys (88.3% response). Students were 22.3 ± 4.4 years old, 85% female, and 30% non-White. Post quiz scores were significantly higher than pre (84% v. 56%, respectively, $p \leq 0.001$). Significant changes were.

Attendees would recommend #PlanA seminars to other students (97.1%). They agreed the student pharmacists were knowledgeable (99%) and respectful (96.2%), the program was fair and unbiased (97.2%), information was helpful to prevent unintended pregnancies (97.2%), and reproductive health and safe sex knowledge greatly increased (98.2%).

**Conclusion**: College students had reproductive health and safe sex behavior knowledge gaps that were corrected from student pharmacist delivered reproductive health campus presentations. Student pharmacists were well received as presenters. Pharmacy professionals have an important role in reproductive health.

### Sun-91. #PlanA trivia event to assess the reproductive knowledge gap among college students

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**Introduction:** Unintended pregnancy rate for women 20–24 years old is 51%. Precollege sex education doesn't provide all needed information for safe sex behaviors. To decrease knowledge gaps, implementing college reproductive health programs including student pharmacist delivered events could help decrease unintended pregnancies.

**Research Question or Hypothesis:** Can trivia events identify reproductive health knowledge gaps and be informative?

**Study Design:** Quasi formative program evaluation.

**Methods:** Student pharmacists were trained to provide reproductive health education and needed 90% on post training quiz. Fourteen multiple choice and true/false questions were created to assess misconceptions and misunderstandings of fertility, nonhormonal and hormonal contraceptives, and emergency contraception. Twenty trivia events conducted by 1–3 student pharmacist(s) over 1–3 h occurred in various university buildings to capture a convenience sample of college students. Students spun a trivia wheel to determine question(s) and provided answer(s). Correct answers with explanations were supplied for wrong answers. Gender, college status, duration, and educational value (scale 1–10 high) were collected each encounter. Descriptive and Chi square statistics were calculated with SPSS v29, $p < 0.05$ significant.

**Results:** 462 students participated in the trivia event; 65% female; 90% undergraduate, 10% graduate/professional. Trivia duration was 2.6 ± 1.7 min/student (range 1–13). Students answered 2.9 ± 1.1 questions (range 1–14) with 59.1% ± 30.8% answered correctly. Percent wrong responses were sperm lifespan 63%; fertilization window 49%; pregnancy potential during menstrual cycle 21%; condom effectiveness 49% and correct use 33%; withdrawal method effectiveness 71%; contraception indications 14%, ingredients 29%, formulations 13%, and missed oral pills plan 62%, pharmacists prescribing contraception 36%; Plan B use window 34% and weight limitations 26%; and Ella use window 68%. Correct responses did not vary by gender ($p = 0.620$) or college status ($p = 0.586$). The educational value of the trivia was 9.1 ± 1.3 (range 2–10).

**Conclusion:** College students have knowledge gaps regarding reproductive health and safe sex behaviors. Student pharmacist delivered reproductive and contraception education was considered valuable.

## R&S ACADEMY ORIG RESEARCH

### Cardiovascular

### Sun-24. Evaluation of major inpatient statin-drug interactions in inpatient older adults prescribed simvastatin compared to all other statins

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**Introduction:** Statin-drug interaction frequencies occur at rates of 10%–25% in outpatients. Simvastatin and lovastatin have the greatest

number of listed drug interactions, however, the frequencies that these occur in older adults are rarely reported in the inpatient setting.
**Research Question or Hypothesis:** There is a higher likelihood of major statin-drug interactions in inpatient older adults prescribed simvastatin compared to other statins.
**Study Design:** Retrospective cohort study.
**Methods:** This study was conducted in a rural health system of five inpatient locations. Included patients were aged 65 years and older and received at least one dose of statin in the inpatient setting from October 1, 2020 to September 30, 2022. The primary outcome was the odds of a major statin-drug interaction between patients prescribed simvastatin compared to all other statins, identified using the Lexicomp® Drug Interactions Module and the drug FDA package inserts. Statistical analyses performed using SPSS were the student's *t*-test or Mann–Whitney U test, and Chi-square or Fisher's exact test, as appropriate.
**Results:** Of 1375 patients evaluated for study inclusion, 1291 patients were included in the final analysis. In total, 1072 (83.0%) patients were prescribed atorvastatin, 202 (15.6%) prescribed simvastatin, 12 (0.9%) prescribed rosuvastatin, and 5 (0.4%) pravastatin. Major statin-drug interactions, occurred in 11 patients (5.4%) in the simvastatin group and 5 (0.5%) in the other statin group (OR, 12.49; 95% CI, 4.291, 36.34; *p*-value <0.001).
**Conclusion:** Among patients aged 65 years and older receiving an inpatient statin, those who received simvastatin had a 12 times higher odds of a major statin-drug interaction compared to other statins. The results suggest that replacement of simvastatin with an alternative inpatient formulary statin could reduce the likelihood of prescribing major statin-drug interactions.

## Education/Training

### Sun-34. STARx Simulation trial: Comparison of three SimulaTion modalities in an acute caRe simulation course for Pharm.D. Students at Pitt School of Pharmacy

*Julie Clarkson, Pharm.D.*[1], Sandy Kane-Gill, Pharm.D.[1], Pam Smithburger, Pharm.D.[1], Amanda Korenoski, Pharm.D., MHA[1], Lawrence R. Kobulinsky, *[2] and Amy Lynn Seybert, Pharm.D[3]
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**Introduction:** Currently, there are no comparative data evaluating the educational impact of VR (Virtual Reality) compared to other modalities of simulation in pharmacy education.
**Research Question or Hypothesis:** We aim to assess the impact of VR simulation compared to HFPS (High-Fidelity Patient Simulation) and SP (Standardized Patient) simulation in the Pharm.D. Program.
**Study Design:** This is a prospective, randomized, crossover study conducted during an Advanced Cardiac Life Support (ACLS) experience for Pharm.D. students.
**Methods:** A pre-quiz regarding ACLS topics was administered prior to class. Students were randomized to one of three groups. Each group completed each of three different ACLS cases, varying regarding the simulation modality experienced. Each student experienced the three learning strategies. Evaluation of knowledge consisted of post-case quizzes, rubric performance, and a final clinical exam. Pre-quiz scores were compared to individual final clinical exam scores. Mean post-case quiz scores of each learning strategy were calculated within each case. Scores were then compared using analysis of variance and Tukey test by setting $\alpha$ at a 0.05 level. Team rubric scores within each case were compared. Student perception was evaluated with a survey at the conclusion of the experience.
**Results:** Quiz scores from HFPS were higher than SP for cases 1 ($p = 0.01$) and 2 ($p < 0.01$). Quiz scores from VR were comparable to HFPS in all cases. Each group demonstrated an increase in their knowledge from baseline, with a median improvement of 25%. When surveyed, 52% agreed or strongly agreed that VR improved their knowledge of ACLS compared to SP; and over half of respondents agreed or strongly agreed that they would like to participate in another experience that incorporates VR.
**Conclusion:** VR simulation is an effective learning strategy. When compared with HFPS, students had comparable knowledge-based quiz scores. The use of VR in the Pharm.D. curricula may be associated with greater satisfaction scores compared to standardized patient simulation.

## Health Services Research

### Mon-55. Pharmacy school engagement in clinical trial participant diversification: A preliminary environmental scan for the PACT network

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**Introduction:** Ensuring representation of racial and ethnic minority populations (REMP) as participants in clinical trials is a challenge in biomedical research. The Pharmacy Advances Clinical Trials (PACT) Network is being developed to address this by capitalizing on the accessibility of pharmacists. The network will engage community pharmacists, community-based organizations, and pharmacy schools. Pharmacy schools' current role in this space is unknown.
**Research Question or Hypothesis:** Are pharmacy schools participating in activities to diversify clinical trials, and if so, what are the characteristics of these activities?
**Study Design:** This was a qualitative study.
**Methods:** A preliminary environmental scan survey with open-ended questions was distributed to nine pharmacy schools, selected for participation based on prior knowledge of activities related to clinical

trials and diversity occurring at the schools. A code book, including non-mutually exclusive categories and tags grouped into themes, was created in advance and then refined based on scan results. Three investigators independently coded the activities until consensus was reached. Participants provided feedback on coding.

**Results:** The environmental scan found 14 distinct activities conducted at five institutions. Activities were coded into categories: "Research," "Education," and "Service," with each activity having one primary category and secondary categories, as appropriate. Primary category coding resulted in 10 "Research" activities, three "Education" activities, and one "Service" activity. In total, nine activities dealt with "Education" and four dealt with "Service." Activities were tagged with characteristics in the following themes: Collaborators and Partners, Disease States, Engagement/Communication Strategies, Funding Source, and Target Audience.

**Conclusion:** Pharmacy schools are working to diversify clinical trial participants, especially through research and education activities. The environmental scan will be expanded to all pharmacy schools with a modified tool and results will be made available in a public online database. Results will inform the scope of future PACT Network activities to connect pharmacy schools with pharmacies and community-based organizations.

## HIV/AIDS

### Mon-62. Long-acting (LA) intramuscular (IM) cabotegravir and rilpivirine (CAB/RPV) in adults for the maintenance of HIV suppression in county-based clinics in Riverside county

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**Introduction**: Multiple randomized controlled trials demonstrated IM CAB/RPV effectively maintained HIV viral suppression. Real-world data on CAB/RPV implementation is limited.

**Research Question or Hypothesis:** The study aimed to apply CAB/RPV trial results in a county population, and to characterize socioeconomic factors affecting CAB/RPV implementation.

**Methods**: We conducted a pre-post study including adult HIV patients with viral suppression on oral antiretroviral who switched to CAB/RPV. Patients received at least one oral or IM CAB/RPV dose from Riverside University Health System clinics between January 2021 and 2024. We collected data by manual chart review. The primary outcome was the patient proportion of HIV-1 RNA < 50 copies/mL. Secondary outcomes included virologic failure, change in CD4 count, adverse events, and discontinuation. We compared outcomes at baseline versus 6 months post-CAB/RPV switch using McNemar's test for categorical variables, and paired *t*-test for continuous variables. We used univariant analysis to evaluate risk factors for the primary outcome; we used a binary logistic regression model to assess risk factors for discontinuation. Statistical analysis utilized SPSS.

**Results:** 169 patients were included for safety and discontinuation analysis, with 128 patients included for efficacy analysis. 123/128 (96.1%) patients maintained HIV-1 RNA ≤50 copies/mL ($p = 0.727$). CD4 count did not significantly change ($p = 0.115$). 4/128 (3.1%) patients had virologic failure. Older age, clinic sites, comorbidities and discontinuation were associated with HIV-1 RNA > 50 copies/mL. 62/169 (36.7%) patients discontinued therapy. Higher California Healthy Place Index, longer commute, and Injection site reaction were significant risk factors for discontinuation. Patients reported more adverse events post-switch (43.6%; $p = 0.002$), highest being injection site reactions (54/169, 32%).

**Conclusion:** 96.1% county patients maintained HIV viral suppression after CAB/RPV switch, consistent with prior trials. We observed a higher discontinuation rate than prior reports, associated with multiple socioeconomic factors. Resources for social and financial barriers are important for implementing CAB/RPV to ensure treatment success and patient retention.

## SCOPING REVIEWS

## Ambulatory Care

### Mon-10. Impact of continuous glucose monitoring in low-income settings in adults with type 2 diabetes within the United States: A scoping review

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**Background:** Continuous glucose monitoring (CGM) has improved diabetes management but remains underused among low-income populations who have a higher diabetes prevalence. With the additional consideration of socioeconomic factors limiting resources to maintain health, further understanding of the effectiveness of CGM in patients receiving care in low-income settings is needed. This scoping review synthesizes evidence on health outcomes impacted by CGM use in adults with type 2 diabetes receiving care in low-income settings.

**Methods:** The PRISMA-ScR guidelines were used to identify studies through PubMed, Embase, and CINAHL. A search strategy combined MeSH terms and keywords from a review of titles and abstracts. The review included English-language quantitative studies using CGM in low-income settings from inception to May 2024; studies had to have reported diabetes-related clinical outcomes in adults with type 2 diabetes. Studies in pregnant patients, meta-analyses, and systematic reviews were excluded. Two reviewers, using Covidence©,

independently performed study selection, data extraction, and quality assessment.

**Results:** The review identified 1176 studies, with 198 duplicates, resulting in 978 screened titles and abstracts. Forty-six studies underwent full text review, and 35 were excluded. Ultimately, 11 studies (5 abstracts, 5 manuscripts and 1 case study) met the review criteria. CGM use led to reductions in A1C levels across settings such as Federally Qualified Health Centers, clinics serving the underinsured, county health departments, and rural clinics. Other benefits included reduced hypoglycemia, improved glucose levels, weight loss, and increased time in range.

**Discussion:** Studies described show an improvement in diabetes-related clinical outcomes with CGM use in low-income patients. Difficulty identifying the setting of the studies was the main limitation of this review. Insights highlight the need for research on interventions to enhance CGM access and address barriers to promote health equity in underserved populations especially as CGM becomes available over-the-counter.

**Other:** No funding was issued for this research.

## Community Pharmacy Practice

### Tues-32. Moving care for asylum-seeking and refugee populations from "culturally competent" to "trauma-informed": Scoping review and implications for pharmacy practice

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**Background:** Persons displaced from their homelands by war or other catastrophes suffer high rates of health-determinant challenges: chronic diseases; infections; psychiatric comorbidities; long stays in unsanitary conditions; and experiences with governmental violence (e.g., torture and rape) that commonly lead to mistrust of authorities, including healthcare providers. How these challenges affect pharmaceutical care is unclear. Previous reviews on asylum-seeker/refugee (ASR)-pharmacist interactions covered only barriers/facilitators to access, using research published before recent global events (e.g., Ukrainian invasion). Objectives: Assess current literature on medication-related behaviors/beliefs of ASRs; describe gaps; identify implications for pharmaceutical care.

**Methods:** Searches of PubMed and PsycINFO (peer-reviewed articles published 1990-May 2024; no "gray" literature due to possible sensationalism/bias), combined terms "refugees" or synonyms (e.g., "parolees"; "asylum-seekers") with pharmacy-related terms (e.g., "medication adherence"; "medication beliefs"; "vaccination"). Guidelines on trauma-informed care (TIC) were reviewed for pharmacy-relevant information. Studies of U.S. natural disasters and disease-screening programs/treatments were excluded. A health psychologist knowledgeable about ASRs and TIC reviewed titles, abstracts, and articles; tabulated/summarized findings; and identified themes.

**Results:** Of 622 titles, 252 were retained after exclusions and duplications. The overarching theme was substantial heterogeneity, both geographically and by legal status, in factors affecting medication-taking behaviors/beliefs: disease prevalence, perceived etiologies (e.g., spiritual and biomedical), specific traumas (e.g., physical/sexual assault and positional torture), and trust in community leadership. Despite availability of TIC guidelines for medical settings, no reports on trauma-informed pharmaceutical care were identified. Nonetheless, key TIC features—secure relationships; seeking permission before eliciting history to avoid re-traumatization; promoting patient empowerment using individual or community collaboration—could be applied in pharmacy settings. ASR-community collaboration in interventions/education is associated with increased vaccine uptake.

**Discussion:** Heterogeneity makes "one-size-fits-all" pharmaceutical care inappropriate for ASRs. Although peer-reviewed evidence to guide trauma-informed pharmaceutical care is limited, available evidence suggests pharmacists could potentially improve care for ASRs by incorporating TIC into practice and staff oversight.

**Other:** Unfunded research.

## Medication Safety

### Sat-74. Select drug–drug interactions with colchicine and chemotherapy medications: A review

*Wenyi Zang, Pharmacy Student*[1], Demyana Markos, Pharmacy Student[1], Armin Pasukanovic, Pharmacy Student[1] and Azita H. Talasaz, Pharm.D., PhD[2]

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**Background:** Colchicine is widely used in various cardiovascular diseases, but its high toxicity requires careful administration. Combining colchicine with certain anticancer drugs can lead to severe adverse effects due to potential drug interactions involving enzymes like cytochrome P (CYP) 3A4 and the transporter P-glycoprotein (Pgp).

**Methods:** This review aims to serve as a guide for the appropriate use of colchicine in terms of dosing and potential interactions in patients with cancer. A literature search in the PubMed database was performed from March to May 2024, retrieving articles in the English language that involved human studies. The key search terms included: colchicine, chemotherapy, anticancer, and drug interaction.

**Results:** Out of 1062 papers, 15 were selected, comprising 1 clinical trial, 4 case reports, 6 reviews (including 3 systematic reviews), 1 comparative study, 2 research supports, and 1 journal article. The concurrent use of colchicine and CYP3A4 inhibitors has been linked to hematologic toxicity, notably thrombocytopenia. The combined use of colchicine and p-glycoprotein inhibitors can result in severe adverse effects, such as severe diarrhea, metabolic acidosis, fever, pneumonia, and abnormalities in white and red blood cells. Adjustments in colchicine dosage are necessary for patients undergoing chemotherapy with strong or moderate CYP3A4/P-glycoprotein inhibitors. Use

with strong combined inhibitors should be avoided. If concurrent use with strong inhibitor is necessary, or using with moderate inhibitors, colchicine dose reductions of one to two third are recommended for therapeutic purposes, and 50%–75% for prophylaxis. For weak inhibitors close monitoring for colchicine toxicity is essential.

**Discussion:** Patients with concurrent use of CYP3A4 or P-gp strong inhibitors often had more severe side effects. It is essential to consider dose adjustments of colchicine and closely monitor these patients when CYP3A4 or P-gp inhibitors are present.

**Other:** Not applicable.

## Oncology

### Sun-71. Combination therapy or monotherapy in treatment chemotherapy-induced neuropathy: A scoping review of clinical trials

*Hager Salah, BCPS/MSc./MBA*[1], Ahmed Hassan, MD, PhD[2], Mona A. Abdelrahman, PhD[3], Hasnaa Osama, PhD[4] and Asmaa M. El-Kalaawy, PhD[5]

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**Background:** Chemotherapy-induced peripheral neuropathy (CIPN) is a condition that may impact up to 80% of patients. Treatment of CINP is very challengeable. Objectives: To analyze the existing research on clinical trials for treatment of CIPN using duloxetine or alternative therapies, either monotherapy or combinations.

**Methods:** Data Sources: Articles published from January 1, 2010 to January 30, 2024, were selected from the PubMed, Cochran, and Embase databases in the English language. Data Extraction and Synthesis: The review was guided by Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines. Two independent reviewers screened 7536 records in databases 7017 Records Excluded (articles without pharmacological treatment). After quality appraisal, only 15 articles were assessed for eligibility. Data related to study design, interventions, controls, outcome measures, and relevant findings were extracted, and then narrative analysis was performed.

**Results:** Study Selection: Clinical trials recruited individuals who were post-chemotherapy, experienced CIPN symptoms, and received medications for treatment. Of 15 studies, only 10 were included (2 records did not address the research question, 1 duplicate). And two records addressed prevention, not treatment. In studies, duloxetine showed exceptional tolerance. However, a recent clinical study, conducted showed that duloxetine had a low tolerance. 20% of the patients discontinued the medicine due to its lack of efficacy, while 37% discontinued it due to experiencing side effects.

**Discussion:** Conclusion From this scoping review., it is advised to integrate many therapeutic approaches and modify the dosage to prevent negative occurrences. Using combinations may be beneficial for conditions that are unresponsive to treatment or opioid-dependent and who have difficulty tolerating high doses of duloxetine.

**Other:** Limitations: In this scoping review, there are significant limitations, such as inconsistent outcome measurements and the absence of standardized treatment methods, as well as various forms of cancer.

### Mon-86. Scoping review on racial/ethnic disparities in receipt of medication in pancreatic cancer patients

*Olga Monika Trejos Kweyete, Pharm.D., BS, BA*[1], MegCholack Awunti, Pharm.D.[2], Mary-Pearl Ojukwu, Pharm.D. Candidate[3], Angeles Morales, Pharm.D. Candidate[3], Yasmine Ibrahim, Pharm.D. Candidate[2], Deyaneira Laboy Baiz, Pharm.D. Candidate[2] and John M. Allen, Pharm.D., BCPS, BCCCP, FCCM[4]

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**Background:** Pancreatic cancer (PC) is a leading deadly cancer in the US with variance in outcomes among different racial and ethnic groups. Medication use, including chemotherapy and supportive care drugs, plays a crucial role in the management of pancreatic cancer yet differences related to medication use have not been extensively studied. This scoping review aims to explore these racial and ethnic disparities in medication use among pancreatic cancer patients.

**Methods:** The specific objectives of this review were to identify and characterize disparities in medication use among racial and ethnic minorities. A systematic search of original and gray literature was conducted using PubMed, Embase, Cochrane Library, and Web of Science databases to studies conducted in the US that identify racial and ethnic disparities in medication use among pancreatic cancer patients published from 2000 to June 2023. A data extraction form developed on Covidence was used to chart study characteristics, patient demographics, medications analyzed, and disparities in medication access.

**Results:** The initial search yielded 1521 studies. Following removing duplications and screening, 24 studies met the predefined inclusion criteria, with most of the studies being cohort studies ($n = 22$). Most studies ($n = 19$) included analysis of the receipt of chemotherapy, while the rest evaluated various supportive care medications (SCM). SCM studies included pain, psychiatric, pancreatic enzyme replacement, and receipt of statins. Collectively, results strongly implied the presence of racial disparities in the receipt of medications, particularly among African Americans (AA), with only one study reporting equivalent results among all racial-ethnic minority groups studied.

**Discussion:**Findings indicate significant disparities in medication use among racial and ethnic minority groups. Addressing these disparities requires targeted interventions to improve access to medications, culturally sensitive patient education, and further research to understand the underlying reasons.

**Other:** n/a.

## SPECIAL—HOT TOPIC THEMED PRESENTATIONS

### Ambulatory Care

#### Sun-4. Pharmacist billing achievements in a university-based primary care setting with a focus on value-based care

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**Service or Program:** Colorado has a strong legislative base for pharmacist scope of practice, including some provisions for direct billing. When Medicaid provider status was obtained in 2021, University of Colorado (CU) primary care pharmacy faculty collaborated with medical partners to initiate pharmacist billing for clinical services. The first pathway was Medicaid direct billing for chronic disease care delivered through collaborative drug therapy management, followed by incident-to billing at practice sites where permitted, Medicare Annual Wellness Visits, and a specialty practice-initiated pharmacist billing in 2024. A new pathway utilizing Principal Care Management codes will be implemented in fall of 2024. Emboldened by success, we convened clinical pharmacy leadership, medical directors, state pharmacy society legislative experts, and CU Medicine's Associate Director of Contracting to brainstorm opportunities to seek pharmacist provider status through commercial contracting agreements. Conversations with the first payer are scheduled for September 2024.

**Justification/Documentation:** Eleven primary care pharmacy faculty support 14 CU Medicine Primary Care Clinics totaling 8 FTE devoted to clinical care. Billing opportunities vary according to practice population and hospital-based status differences. Revenue generation has grown from a few hundred dollars per month in 2023 to a few thousand per month in 2024. One pharmacist in a specialty practice began incident-to billing in March 2024, and has generated revenue to support nearly 80% of her clinical time.

**Adaptability:** Several elements have contributed to CU's success and may be key elements for success in other ambulatory care settings: strong medical provider support, skilled and motivated pharmacists willing to forge new paths, persistent follow-up to prod administrative barriers, and collaboration with a strong state society.

**Significance:** The value of pharmacist services in improving healthcare quality and provider satisfaction is well-established and could be expanded through billing-derived revenue streams.

#### Sun-7. Revolutionizing care: Innovative billable pharmacotherapy services for enhanced patient outcomes

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**Service or Program:** Establishing a pharmacotherapy clinic embedded in an academic health-system faculty medical group.

**Justification/Documentation:** Leadership at Loma Linda University school of pharmacy (LLUSP) and faculty medical group (FMG) approved a collaborative practice agreement (CPA) for a selected group of LLUSP faculty members to initiate a billable pharmacotherapy service at a standalone clinic. Serving faculty are residency trained, board certified, and credentialed. The team sought to provide chronic condition management through referrals from cardiology, endocrinology, family medicine, adult general medicine, and preventive medicine clinics. The purpose of this service is to enhance patient access to healthcare professional and timely adjustments in medications to prevent disease or medication related complications and improve medication therapy efficacy.

**Adaptability:** The inclusion criteria for referrals are adult patients with hemoglobin A1C of equal or greater than 8% and or systolic blood pressure of equal or greater than 130 mmHg and or diastolic blood pressure of equal or greater than 90 mmHg and or patients diagnosed with heart failure and difficult to controlled symptoms. Referred patients will be seen by the pharmacist at the clinic for an initial visit. Follow up visits are at 2 weeks for two visits and then monthly for another two visits either in-person or through tele-health. The goal for clinical outcomes is to bring the above-mentioned measures to the normal ranges. Patients will be discharged from pharmacotherapy clinic as the measures get stable within normal ranges and their condition is controlled.

**Significance:** This innovative pharmacotherapy service creates a new venue of pharmacist-based patient centered care under an approved CPA and establishes preventive care services to several vulnerable patient populations. The pharmacist services will be reimbursed by an insurance entity that covers Loma Linda University employees and their beneficiaries. The billing has been defined and approved based on the type and length of the visits.

### Education/Training

#### Mon-36. Clinical trial pharmacists: Improving patient outcomes and optimizing research outcomes

*Maureen Shin, Pharm.D., MS*[1], Anu Patel, Pharm.D.[1] and Katherine Yang, Pharm.D., MPH[2]
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**Service or Program:** Pharmacists, as highly trained clinicians, are crucial in clinical research. Here, we emphasize the experiences of a pharmacist-led clinical trial team and advocate for greater pharmacist participation in clinical trials to increase scientific rigor and improve patient outcomes. This single-site pharmacokinetic study (NCT04534153) investigates the impact of sodium lauryl sulfate (SLS) on fexofenadine absorption when co-administered to healthy individuals.[1] The multidisciplinary team, primarily pharmacists, includes a clinical pharmacy principal investigator, pharmacist research coordinators, drug service pharmacists, and a physician monitor.

The study pharmacists ensure trial accuracy and patient safety by evaluating study design, subject eligibility, and interventions. Operational tasks include protocol writing and medication lifecycle and supply management. Clinical tasks include order processing, result reviews, triaging, medication management, interaction monitoring, adverse effect assessment, and communicating medical information effectively.[2]

**Justification/Documentation:** Pharmacist involvement in clinical trials, as medication specialists, improves drug safety, access, and outcomes. Expertise in drug therapy optimizes trial design and execution, ensuring patient safety and potentially reducing costs.[3] With increasingly complex trials, multidisciplinary team involvement is essential for efficiency and reduced work burden.[5]

**Adaptability:** Pharmacists' roles can be adapted to various patient-facing settings, such as ambulatory, community, or primary care clinics. Notably, Walgreens Pharmacy has recently partnered with the US government to increase clinical trial access. Expertise in medication management can be applied to facilitate patient enrollment and access as well as ease monitoring, making the trial process more efficient and inclusive.

**Significance:** Clinical trial pharmacists skillfully perform patient monitoring, medication reconciliations, and adverse event follow-ups. Expertise in pharmacotherapy aids in refining protocols, such as removing unnecessary screening tests and detailing exclusion criteria to improve recruitment. Additionally, pharmacists collaborate with nursing teams on medication-related issues and effectively communicate study risks to participants, while also providing educational opportunities for students and trainees, thereby showcasing essential clinical skills that enhance patient care.

## Managed Care

### Mon-75. Development of a pharmaceutical care tool in an electronic system

*Tatiana Marins, Master's in health sciences*[1], Silvana Almeida, PhD in health sciences[2], Roberta Santos, Pharmacy[2], Cristina Kunii, Pharmacy[2] and Ernane Silva, Pharmacy[2]
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**Service or Program:** The Albert Einstein Hospital in São Paulo, Brazil, has a clinical pharmacy service with 33 pharmacists split between the Prescription Care Center and Bedside Care. The Prescription Care Center is where clinical pharmacists conduct an initial evaluation of medication orders. This assessment includes evaluate medication orders, checking doses, patient allergies, medication availability, and dilution and infusion instructions. Bedside pharmacists work in inpatient units, collaborating with nursing and multidisciplinary teams. They provide patient-centered care by reviewing medical records, assessing medication indications, interpreting lab results, identifying drug interactions, ensuring medication compatibility, enforcing antibiotic and anticoagulant protocols, offering administration guidance, and answering healthcare team questions. **Justification/Documentation:** To further enhance our clinical pharmacy service and strengthen pharmaceutical monitoring, we are developing a dedicated page for clinical pharmacists within the hospital's electronic health system. This page will focus on key monitoring points critical to ensuring optimal patient care. With the current clinical pharmacy team performing approximately 3584 interventions per month, we anticipate that this new tool will lead to a significant increase in the number of interventions, thereby further enhancing patient safety. **Adaptability:** In the dynamic hospital environment, it is crucial to integrate tools that bolster patient safety. While our hospital already has a robust clinical pharmacy service, we aim to elevate the effectiveness of medical record analysis through advanced technology. This system will be designed to prioritize and highlight critical aspects of patient prescriptions, thereby streamlining the focus of bedside clinical pharmacists on the most important areas. **Significance:** The implementation of this pharmaceutical care tool represents a significant advancement in the support provided by bedside clinical pharmacists. By enabling more targeted and efficient interventions, this tool will not only improve the quality of care but also contribute to better patient outcomes across the institution.

## Women's Health

### Tues-112. Pharmacist-led telehealth services for management of postpartum hypertension

Natalie Kinstler, Pharm.D.[1], Bailee Belcher, Pharm.D.[2], Judy T. Chen, Pharm.D.[3] and *Kelly Cochran, Pharm.D*[2]
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**Service or Program:** Hypertensive disorders of pregnancy are a leading cause of maternal morbidity and mortality in the United States and its prevalence is on the rise. There is a need for expansion of Women's Health services and pharmacists are qualified practitioners to provide hypertensive medication management. During the pandemic, an innovative Women's Health Specialty Service was implemented at Community Health Network utilizing clinical pharmacy specialists to provide Collaborative Drug Therapy Management telehealth services targeting vulnerable high-risk postpartum patients with hypertension.

**Justification/Documentation:** Maternal mortality caused by hypertensive disorders of pregnancy is highest in the first 6 weeks postpartum. Practice guidelines recommend follow up blood pressure assessment within 7–10 days for patients with hypertension and within 72 h for severe hypertension. However, postpartum patients often encounter multiple barriers to care after deliveries. Pharmacist-led telehealth services increase access to care and ensure safety of care for patients on multiple antihypertensive medications by providing blood pressure monitoring, medication titration and optimization.

**Adaptability:** Telehealth services can be used to expand access for patients who live in remote or underserved areas, or who experience barriers to attending office visits. Additionally, virtual services provide shorter wait-times and allow for more frequent follow-up for high-risk postpartum populations. Utilization of video visits makes service implementation more successful and helps to eliminate transportation and childcare barriers while providing flexibility of scheduling. This patient-centered model of care can transform care of high-risk postpartum patients with hypertension.

**Significance:** Telehealth postpartum hypertension service provides pharmacists an opportunity for early-identification and management of high-risk patients. Pharmacists, through collaboration with a multidisciplinary team, can help address gaps in current medical care by increasing access, promoting adherence to guidelines, and evaluating medication effectiveness and safety, all with the goal of improving health outcomes and reducing maternal mortality in the United States.

## SYSTEMATIC REVIEWS/META-ANALYSIS

### Endocrinology

### Mon-44. Meta-analysis of the risk of pancreatitis for GLP-1 receptor agonists for weight management

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**Background:** The Glucagon-like Peptide-1 receptor agonists (GLP-1RAs) are used in the management of type 2 diabetes mellitus and have recently gained popularity for weight management. However, concerns have been raised regarding GLP-1RAs and acute pancreatitis in post-marketing reports. Our meta-analysis examined the risk of pancreatitis-related events in GLP-1RA users for weight management in randomized controlled trials (RCTs).

**Methods:** A systematic search of two databases, Embase and PubMed/MEDLINE, was performed up to July 12, 2023. Studies were eligible for inclusion if they were RCTs that evaluated a GLP-1RA against placebo for a duration of at least 6 weeks, enrolled at least 20 adult participants, had a primary outcome related to change in body weight, and reported at least 1 adverse event. We estimated the risk difference comparing GLP-1RAs to placebo for both pancreatitis and acute pancreatitis overall, by specific GLP-1RA and in those with and without type 2 diabetes. The risk of bias was evaluated using the Cochrane Risk of Bias Tool.

**Results:** The meta-analysis included 38 RCTs, with a total of 50 pancreatitis-related events among 23 783 participants. The mean baseline weight and BMI were 102.1 kg and 36.0 kg/m$^2$, respectively. There was no statistically significant association between GLP-1RAs and pancreatitis-related events (RD 1.4 per 1000 participants; 95% CI −0.4 to 3.1; $p = 0.12$), including acute pancreatitis (RD 0.5 per 1000; 95% CI −1.0 to 2.0; $p = 0.53$) and pancreatitis (RD 0.9 per 1000; 95% CI −0.7 to 2.5; $p = 0.27$). Subgroup analysis in patients without type 2 diabetes mellitus revealed a statistically significant association between GLP-1RAs and pancreatitis-related events (RD 1.9 per 1000; 95% CI 0.1–3.8; $p = 0.049$). No significant association was found in the pancreatitis-related events for specific GLP-1RAs.

**Discussion:** Overall, we did not observe an association between pancreatitis-related events and GLP-1RAs for weight management. Further research is needed to assess the risk.

**Other:** None.

### Geriatrics

### Sun-52. Potentially inappropriate prescribing among older adults in Gulf Cooperation Council countries: A systematic review

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**Background:** This study addresses the lack of systematic reviews on the prevalence of potentially inappropriate prescribing (PIP) among geriatrics in GCC countries. It aimed to estimate PIP prevalence and determine associated factors.

**Methods:** The inclusion criteria were peer-reviewed studies using validated explicit criteria for PIP; conducted in all care settings in GCC countries; reporting PIP prevalence among adults aged ≥60; and published in English. It excluded studies lacking explicit criteria and non-primary research articles. The literature search used specific search terms in the following databases: Embase, PubMed, Web of Science, Scopus, and Google Scholar from January 2010 to December 2023, the search initially found 650 records, reduced to 301 after removing duplicates using EndNote 20. After title and abstract screening, 234 records were excluded, leaving 67 for full-text review. The final selection of 19 studies ensured they met inclusion criteria and reported relevant outcomes, following the PRISMA guidelines. The JBI Prevalence Critical Appraisal Tool was used to assess the risk of bias.

**Results:** The selected 19 studies were published between 2013 and 2023, mostly from Saudi Arabia (52.6%) and within hospital settings (73.7%). They predominantly had cross-sectional study design and

used Beers Criteria (89.5%). They included 66 636 patients (range: 135–23 417). The median (IQR) prevalence of PIP was 52.8% (38.9–63.1) with common PIMs including NSAIDs, PPIs, skeletal muscle relaxants, antipsychotics, and TCA antidepressants. Predictors for PIP included polypharmacy, multiple chronic diseases, advanced age, and female gender.

**Discussion:** This first systematic review highlights a high PPI prevalence among geriatrics and underscore the need for more comprehensive research to inform targeted interventions. Most of the studies at moderate-high risk of bias, common limitations included inappropriate sample frames, short observation periods, small sample sizes, and reliance on single-center data.

**Other:** Not registered with PROSPERO due to the study's objectives nature and full PICO concept was not applicable.

Self-funded.

## Hematology/Anticoagulation

### Sun-59. Systematic review of venous thromboembolism (VTE) Occurrence in hospitalized patients receiving prophylactic unfractionated heparin twice vs. three times daily

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**Background:** Guidelines recommend subcutaneous unfractionated heparin (UFH) 5000 U twice (BID) or three times daily (TID) for venous thromboembolism (VTE) prophylaxis in medically-ill hospitalized adults, but data comparing dosing frequencies is limited. This systematic review's objective was to compare VTE and bleeding in patients receiving BID or TID prophylactic UFH.

**Methods:** A search of PubMed, EMBASE via Elsevier, Web of Science, CINAHL Plus, Cochrane Central Register of Controlled Trials, and Clinicaltrials.gov was completed on 3/7/2024. The primary outcome in this review was VTE. Secondary outcomes were DVT, PE, or bleeding events. Individual study reporting of any of these outcomes warranted review inclusion. Non-human studies, review articles, non-English texts, and high VTE risk populations (e.g., surgery) were excluded. Bias was assessed using the Cochrane Risk-of-Bias or Newcastle-Ottawa Quality Assessment Form. Covidence and Excel were used for data organization/synthesis.

**Results:** Searching identified 2320 studies after deduplication. Nine observational and 12 randomized studies were included, published between 1973 and 2023. Four (44.4%) observational studies were rated good quality and 5 (55.6%) poor quality. Four (33.3%) randomized studies were rated low risk of bias, 3 (25.0%) with some concerns, and 5 (41.7%) high risk of bias. Patients had a 3.3% occurrence of VTE (10 studies, $n = 140/4193$) with TID regimens compared to 4.0% (8 studies, $n = 217/5374$) with BID regimens. Patients receiving TID regimens experienced 5.2% DVTs (9 studies, $n = 240/4642$) and 0.4% PEs (9 studies, $n = 20/4912$) compared to 9.9% DVTs (10 studies, $n = 198/2010$) and 0.9% PEs (8 studies, $n = 17/1922$) with BID regimens. Bleeding was less common in patients on BID (9 studies, 3.3%, n = 198/6080) compared to TID regimens (12 studies, 4.4%, $n = 378/8562$).

**Discussion:** Fewer VTE events and more bleeding occurred with TID prophylactic UFH compared to BID in medically-ill hospitalized adults. Limitations include a wide range of publication dates and data quality.

**Other:** The review was registered with PROSPERO (CRD42023493327). Funding was not received.

## Infectious Diseases

### Tues-70. Comparative efficacy of high- and low-dose ceftriaxone regimens: systematic review and meta-analysis

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**Background:** Ceftriaxone, a third-generation cephalosporin, treats various bacterial infections. Dosing ranges from 1 to 2 gm intravenously (IV) daily for non-central nervous system (CNS) infections depending on indication and severity. This meta-analysis compared the efficacy of ceftriaxone 1 gram IV daily to higher dosing regimens for the treatment of non-CNS infections in adults.

**Methods:** Literature was queried from PubMed, Embase, Scopus, and Web of Science database inception to August 8, 2023. Randomized controlled trials and observational studies reporting clinical cure (CC), length of hospital stay (LOS), mortality, and/or toxicity requiring therapy alteration were included. First abstracts were screened for relevance and selected abstracts were independently reviewed for inclusion by at least two authors; a third adjudicated disagreements. The risk of bias was assessed using ROB-2 and ROBBINS-I scores. CC was evaluated using a Mantel–Haenszel random-effects model with Peto odds ratios (pORs) and 95% confidence intervals (CIs) reported. Heterogeneity was measured using Cochrane $I^2$ statistic. Publication bias was assessed by visual inspection of a funnel plot of the studies and Egger's regression. Comprehensive Meta-Analysis 3.0 was used for analyses.

**Results:** Seven studies ($N = 5020$) met inclusion criteria; 4 were analyzed for CC ($n = 725$); 5 for LOS ($n = 4769$); 4 for mortality ($n = 4675$); and 5 for toxicity ($n = 4576$). No statistically significant

difference was found between 1 versus 2 grams IV daily for CC [pOR 1.113, 95% CI (0.681–1.817); $p = 0.669$, I2 = 0.000]; mean LOS [difference in means 0.411, 95% CI [−1.330 to 2.152; $p = 0.644$, I2 = 96.047]; 90-day mortality [pOR 0.937, 95% CI [0.810–1.084]; $p = 0.380$, I2 = 0.000]; or toxicity [pOR 0.528, 95% CI [0.231–1.210]; $p = 0.131$, I2 = 0.000].

**Discussion:** Ceftriaxone dosing regimens exceeding 1 gram IV daily resulted in no difference in clinical outcomes or mortality. Limitations include the number of studies identified and indication variability. Further studies are needed to compare dosing regimens and confirm findings.

**Other:** Funding: None; PROSPERO register: CRD42023469147.

## Managed Care

### Sat-72. A systematic review of coordinated care in cardiovascular-kidney-metabolic (CKM) conditions

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**Background:** Cardiovascular-Kidney-Metabolic (CKM) conditions are associated with increased risk of morbidity and mortality, thus there is a need for improved treatment delivery. This systematic review assessed coordinated care programs for CKMs, including program types, components, and outcomes.

**Methods:** We searched Embase and Medline for studies on coordinated-care programs from Jan 2015 to Mar 2023, and congress abstracts from Jan 2021 to Mar 2023. Studies were included if patients had ≥2 CKMs and all 3 CKM were addressed through treatment, monitoring, or risk reduction. Two reviewers extracted and assessed for data accuracy. Randomized controlled trials (RCTs) were assessed for potential bias in the design, conduct, and reporting of clinical trials risk of bias (RoB) using the Cochrane RoB tool, version 2. Observational studies were assessed using the Newcastle–Ottawa Scale.

**Results:** Twenty-two interventions met our inclusion criteria. The sample size of RCTs and observational studies ranged from 25 to 1598 and 14 to 9601, respectively. Interventions included patient visits to multidisciplinary team (MDT) care clinics ($n = 9$), pharmacist integration ($n = 5$), patient engagement and education ($n = 6$), or MDT/multispecialty team meetings ($n = 2$). Of the 12 interventions that specified a program lead, 45% were led by a pharmacist or nurse. Benefits of pharmacist- or nurse-delivered interventions included lower costs and empowering patients to manage their conditions, therefore improving clinical outcomes. Pharmacist-physician collaboration present an opportunity to optimize care for patients; through regular medication reviews, pharmacists identified unsuitable therapies, treatment-related adverse events, and adherence issues.

**Discussion:** Coordinated care is effective in improving clinical outcomes and reducing healthcare costs. Integrating pharmacists into the care team has proven effective in identifying medication adverse events and optimizing medication management. Limitations included heterogeneity in the interventions' design, delivery, CKM population, and outcomes assessed.

**Other:** This study was funded by Boehringer Ingelheim Pharmaceuticals Inc. and Lilly USA LLC. The protocol was prospectively registered with PROSPERO (CRD42023409731).