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ACCP ABSTRACTS

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2021 MERIT PRIMER PARTICIPANTS – COMPLETED RESEARCH

Community Pharmacy Practice

Mon AM-21. MeRIT Project: Implementation of Pharmacist Patient Care Services Facilitators and Barriers: Insights from the Ohio Medicaid Project.

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Introduction: Four managed Ohio Medicaid payers provided pharmacist services to their patients delivered through independent community pharmacies, Federally Qualified Health Centers, and ambulatory clinics beginning in October 2020. The individual payers designed their own programs and took different implementation approaches. These programs provided reimbursement to pharmacists for healthcare services, offering a new access point for patients and an incentive for pharmacists to engage in patient care. The goal of this qualitative research was to examine the facilitators and barriers for pharmacist provided services under the Ohio Medicaid Pharmacist Providers Law.

Research Question or Hypothesis: What are the facilitators and barriers to the implementation of new billing models for pharmacist-provided patient care services?

Study Design: Qualitative analysis using semi structured interviews followed the Consolidated Framework for Implementation Research (CFIR). Themes related to barrier and facilitators were identified.

Methods: Pharmacists involved in implementation were interviewed. CFIR constructs allowed for systematical assessment of barriers and facilitators to elicit generalizable themes. Questions used from CFIR framework focused on inner pharmacy setting, outer payer setting, and process implementation. Three major codes emerged: implementation process, barriers, and facilitators. Additional minor codes are under currently under evaluation.

Results: The preliminary results are in progress. Eleven interviews were completed involving 16 different sites with 12 organizations. Pharmacists described expansion in services including patient education, remote patient monitoring and follow-up on comprehensive medication reviews. Pharmacists identified various barriers to service implementation that varied among site specific characteristics. Facilitators of the services included support networks, payer involvement, technology resources, and staff ingenuity.

Conclusion: The results of this study are expected to inform process change for other pharmacists to expand covered patient care services.

Critical Care

Mon AM-23. Association of opioid utilization in the medical intensive care unit and opioid prescriptions at hospital discharge in opioid naïve patients who received enhanced oxygen therapy.

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Introduction: Little is known about the association between opioid utilization in the intensive care unit (ICU) and the continuation of opioid use after ICU discharge in opioid naïve patients.

Research Question or Hypothesis: exposure to increased ICU opioid utilization will increase the risk for a new opioid prescription at hospital discharge in opioid-naive medical ICU patients who receive enhanced oxygen therapy.

Study Design: Nested case-control

Methods: Adult patients admitted to the medical ICU at two sister community hospitals from 01/2020 to 07/2022 were included if they were opioid-naïve at the time of hospital admission, were admitted to medical ICU for more than 48 hours and received enhanced oxygen therapy. Patients were excluded from the cohort if they were allergic to opiate and opiate-derivative, diagnosed with cancer, expired or received palliative care, had major surgery during hospital admission, or were diagnosed with alcohol withdrawal. A REDCap instrument converted all inpatient opioid administrations and discharged opioid prescriptions to opioid utilization metrics of total morphine milligram

equivalents (MME) and MME/day. Logistic regression will be used to evaluate the effects of opioid utilization in the ICU on the incidence of opioid prescriptions at hospital discharge.

Results: Of 2,981 patients admitted to medical ICU, 276(9.2%) were included in the final cohort. Patients were excluded for ICU stay of <48H (n=1,271, 42.6%), not on enhanced oxygen therapy (n=815, 27.3%), expired (n=455, 15.3%), received opioid within 45 days before admission (n=297, 10%), received palliative care (n=179, 6.0%), had cancer (n=111, 3.7%), had major surgery (n=143, 4.8%), were diagnosed with alcohol withdraw (n=80, 2.7%), and were allergic to opioid (n=75, 2.5%). Based on a sample of 24 included patients, 4(16.7%) were discharged with new opioid prescriptions.

Conclusion: The study is still in progress, and the results are preliminary.

Family Medicine

Mon AM-26. MeRIT Project: Evaluation of Preventative Screening Services Provided to Sexual and Gender Minorities in Family Medicine Clinics in the Deep South.

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Introduction: Sexual and gender minorities (SGMs) face many health disparities including increased risk of sexually transmitted infections, depression, substance use disorders, and cancers. Healthcare providers within family medicine clinics can screen for these conditions, however they must first accurately identify patients who identify as SGMs. Recent studies indicate that healthcare providers do not often ask patients for their sexual orientation or gender identity (SOGI) and when collected, SGMs are not provided appropriate screening services compared to heterosexual and cisgender patients.

Research Question or Hypothesis: Do healthcare providers in family medicine clinics in the Deep South assess and document patient's sexual orientation and gender identity, and in patients who identify as sexual and gender minorities, have healthcare providers perform appropriate health screening services within the previous 12 months?

Study Design: Cross-sectional study.

Methods: The methods being used include a survey that was administered to healthcare providers within family medicine clinics associated with medical residency programs in AL, GA, MS, and LA to evaluate whether the providers collect and document patient's SOGI data and to evaluate how this data drives clinical decision making. Preliminary data analysis includes descriptive statistics.

Results: The preliminary results to date include responses from 13 providers. Results indicate that there is a discrepancy between the collection of sexual orientation (mean frequency= 50.33%) and gender identity (33%) and the documentation of data (46% and 38%, respectively). Preliminary results indicate that for HIV screening, tests are provided at an average of 75.36% of the time, with HIV treatment initiated 50.75% of the time and HIV pre-exposure prophylaxis offered 40.86% of the time.

Conclusion: Efforts to improve the collection and documentation of sexual orientation and gender identity data within family medicine clinics are needed. Furthermore, HIV PrEP services require attention and expansion to further reduce HIV infections in the Deep South.

HIV/AIDS

Mon AM-27. *MeRIT Project:* Pharmacist Impact of co-located comprehensive medication management on providers managing persons living with HIV.

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Introduction: Persons living with HIV (PLWH) have an increased risk of developing diabetes, cardiovascular disease, chronic kidney disease, and their associated complications compared to non-HIV counterparts. Many PLWH seek management of their chronic conditions, yet HIV providers' comfort and knowledge managing non-infectious comorbidities may be limited, negatively impacting outcomes and provider work-life. Pharmacists providing comprehensive medication management (CMM) have demonstrated benefits across the Institute for HealthCare Improvement's Quadruple Aim. Yet the pharmacists' impact on CMM for PLWH and their providers within an HIV clinic is not described.

Research Question or Hypothesis: How do providers within a Ryan White-funded HIV clinic benefit from a clinical pharmacist providing co-located Comprehensive Medication Management of non-infectious comorbidities?

Study Design: Explanatory sequential, mixed-methods design consisting of a retrospective survey with semi-structured interviews of HIV providers within the Ryan White clinic.

Methods: Eleven HIV providers were surveyed regarding knowledge of CMM, and what impact the pharmacist has on each step of CMM. Six HIV providers completed Semi-structured interviews exploring themes related to pharmacist effects on provider work-life and additional benefits of pharmacist-provided CMM utilizing meta-inference and an existing codebook. Secondary endpoints include perceived benefits of CMM from the provider survey.

Results: Similar to previous literature in non-HIV providers, interviewees overwhelmingly spoke of the pharmacist serving as an added resource and collaborative partner in patient care. Additional echoed

themes included: decreased workload, decreased mental exhaustion, satisfaction patients are receiving better care, and reassurance. Moreover, a new theme of pharmacists adding value emerged. Areas of opportunity from CMM were also described.

Conclusion: These results suggest co-located CMM in an HIV clinic benefits PLWH and their providers. Targeted interventions may justify the expansion of pharmacists in specialty clinics

Neurology

Mon AM-31. MeRIT Project: Scoping review of rational polytherapy in patients with drug resistant epilepsy.

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Introduction: There is a paucity of literature regarding the optimal selection of combination anti-seizure medications (ASMs) for drug resistant epilepsy (DRE). The aim of this scoping review is to evaluate current evidence related to "rational polytherapy" among adults with DRE.

Research Question or Hypothesis: What is the current evidence of clinical and health-related humanistic and economic outcomes of rational polytherapy with ASMs in DRE? If DRE is mentioned, is the appropriate definition applied? What are the current gaps?

Study Design: Scoping review

Methods: Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-SCr) guidelines, PubMed, ProQuest, CINAHL, and Cochrane databases were searched using DRE- and polytherapy-related keywords. The exclusion criteria applied included: non-English; non-human studies; non-research studies; participants less than 18 years; status epilepticus; ASM monotherapy; and certain ASMs. In Covidence, two researchers independently reviewed articles for inclusion at each phase, with a third resolving conflicts. Data were extracted, with quality appraisal using the Mixed Methods Appraisal Tool (MMAT).

Results: Of the 6477 studies imported for screening, 33 studies were included. Clinical, humanistic, and economic outcomes were reported by 26, 12, and one study, respectively. Common efficacy-related clinical outcomes included ≥50% reduction in seizure frequency (n=14), seizure freedom (n=13), and percent reduction in seizure frequency (n=8). Common humanistic outcomes included quality of life (n=4), medication adherence (n=2), sleep-related outcomes (n=2), and physician and patient global assessments (n=2). The economic study reported quality-adjusted life years. Two studies referenced the standard definition of DRE. Five studies did not specifically define DRE. Gaps in the literature include limited generalizability, minimal reports in pregnancy, and lack of optimal ASM combinations.

Conclusion: Strengths of the evidence include addressing a variety of outcomes. Inconsistent definitions of DRE, small sizes, and heterogeneity among studies limit the ability to draw meaningful conclusions. Optimal combinations of ASMs for rational polytherapy for DRE is unclear.

ADVANCES IN INTERNATIONAL CLINICAL PHARMACY PRACTICE, EDUCATION, OR TRAINING

Adult Medicine

Sun-67. Role of Clinical Pharmacists in Improving Pneumococcal Vaccination Rates Among Medical Inpatients.

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Service or Program: A combination of strategies for change was implemented by clinical pharmacists. Pre-intervention surveillance data were collected from the medical inpatient unit at a general hospital in Qatar in September 2021, and post-intervention data collection was from October 2021 to May 2022. Actions included standardized patient screening for eligibility by clinical pharmacists, monthly physician education about pneumococcal vaccination guidelines, benchmarking of performance, adding pneumococcal vaccine (PCV) vials into Pyxis™ machine in medical units, and carrying regular meetings with the stakeholders to discuss the progress and the challenges.

Justification/Documentation: During the 4-week surveillance period, 64/178 (36%) patients were eligible for the PCV, but none were offered it. We aimed to increase the percentages of PCV immunization before hospital discharge for eligible high-risk groups -as defined by the Centers for Disease Control and Prevention (CDC)- from 0% to 30% by the end of Jan 2022 and to 60% by the end of May 2022. This latter target is similar to the overall average vaccination rate in the United States. After intervention, 191/654 (29.2%) patients were eligible to receive the vaccine. The PCV rate increased for eligible patients to a median of 55% (IQR 50%-60.2%) and 67% (IQR 60.2%-66.7%) over the first and second post-intervention periods, respectively. Patients with electronically documented eligibility notes were 82% (IQR 60%-86%), and those educated on the vaccine were 74% (IQR 60%-86%).

Adaptability: Training was standardized for all involved clinical pharmacists, and a template progress-note to screen patients for eligibility was shared before providing the service.

Significance: Evidence is lacking about pneumococcal vaccination rates in Qatar and methods to improve them. The Advisory

Committee on Immunization Practices (ACIP) lists pharmacists as key healthcare team members that can engage in "shared clinical decision-making" (SCDM) recommendations. There is evidence that involving pharmacy in the PCV screening and selection process improves compliance with CDC guidelines.

Clinical Administration

Sun-74. The Impact of Implementing Clinical Pharmacy Key Performance Indicators (cKPIs) at Hamad Medical Corporation.

Eman Alhmoud, MSc, BCPS, CPHQ, Mohamed Saad, Pharm.D., BCPS, BCCCP, *Sara Mahmoud, Pharm.D., BCCCP*, Hassan Mitwally, Pharm.D., BCPS, BCCCP and Rasha El Enany, BSc(Pharm), Pharm.D. ; Pharmacy Department, Hamad Medical Corporation, Doha, Qatar

Service or Program: This initiative aimed to select and monitor clinical pharmacy key performance indicators (CpKPIs). After literature review, the clinical pharmacy (CP) team adopted 4 CpKPIs: number of resolved drug-related problems (DRPs) per 100 admissions, percentage of patient education at discharge, and percentage of medication reconciliation on admission and discharge. The project was commenced on June 2020.

Justification/Documentation: Professional pharmacy societies including the Canadian Society of Hospital Pharmacists (CSHP) and the ACCP advocated for replacing CP workload measures with quality measures that are associated with improved patient outcomes. All clinical pharmacists documented their clinical interventions on Cerner. Electronic reports of interventions, hospital admissions and discharges were generated through Cerner, and CpKPIs were captured monthly across the following specialties: internal medicine (IM), cardiology (CA), surgery (GS), pediatrics (PED) and obstetrics and gynecology (OBGY). CpKPIs data were regularly shared with the team and pharmacy leadership. CpKPIs monitoring resulted in a sustained improvement in CP documentation rate. From January 2020 to May 2022, median patient education at discharge improved from 18% to 40% in IM, 5% to 46% in GS and 2% to 29% in OBGY. Median discharge reconciliation improved from 20% to 42% in CA and from 29% to 51% in PED.

Adaptability: The defined KPIs are generalizable to all inpatient settings. They were relevant to CP services and feasible to measure via electronic reports. Staff shortages, variations in clinical pharmacist to patient ratio and the heterogeneity of patients' complexities across different specialties should be considered upon benchmarking and setting targets for each CpKPI.

Significance: Monitoring CpKPIs over time is a successful and feasible method to measure CP performance, increase professional accountability and transparency. It permits benchmarking within and between organizations and supports decision making and quality improvement initiatives. Regular performance updates promoted staff ownership and uptake of the process and improved documentation rate.

Community Pharmacy Practice

Mon AM-44. Community Pharmacist-Led Vitamin D Point-of-Care Testing.

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Service or Program: The aim was to establish a framework for community pharmacist-led Vitamin D point-of-care testing (POCT). Vitamin D POCT devices were appraised. A framework consisting of a Data Collection Sheet, Standard Operating Procedure for POCT and Action Plan for patient management and collaborative practice was developed and validated amongst an interprofessional expert panel. The feasibility of implementation of the developed framework was tested within a community pharmacy setting on 80 participants recruited by convenience sampling.

Justification/Documentation: With increasing awareness of the relevance of Vitamin D to immunomodulation, patient and general practitioner requests for access to Vitamin D level testing increased. A need was identified for the provision of a service that ensures patient safety, quality and reliability of the testing process. The review identified a semi-quantitative POCT to assess Vitamin D (sensitivity 4ng/ml, cost €6 per kit), which conforms with EU medical device regulations and is feasible to be applied within the community pharmacy setting. The POCT results were validated against the laboratory-driven test (gold standard) for 20 patients ($\kappa = 0.84$, $p<0.001$). Feasibility testing of the Vitamin D POCT framework was carried out on 80 participants in a community pharmacy; 49 participants had insufficient, and 8 participants had deficient Vitamin D levels.

Adaptability: The development of the Vitamin D POCT framework enables standardisation of pharmacist- led service provision of Vitamin D POCT testing and is feasible to be implemented as a service provision in the community pharmacy setting.

Significance: The developed framework has led to the implementation of an innovative service of POCT of Vitamin D levels with appraisal of patient identification of risks and recommended personalised action plan. The community pharmacist-led service expands clinical pharmacy provision in the primary care setting and responds to a health service need that was identified with respect to Vitamin D level testing.

Tues-30. Development and validation of a framework to standardise clinical pharmacy services in primary care.

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Service or Program: A multi-language questionnaire exploring public perception of clinical pharmacy services (CPS) and a multidisciplinary focus group evaluating feasibility of these services in primary care settings informed development of a framework to support patient-centric care in community pharmacy practice in Malta. An expert panel consisting of pharmacists and physicians practising in Malta and England validated the framework, broadening the perspective and assessing the feasibility of applying the framework internationally. The developed framework defined the standards for service provision and included 22 Standard Operating Procedures (SOPs) covering medicines review, point-of-care testing services, and advice and treatment for minor ailments.

Justification/Documentation: Community pharmacy services improve safe and timely access to care and promote self-care. This framework facilitates CPS implementation by providing a standardised process for collecting patient data, recording test results performed, and documenting interventions and advice given to patients. Adopting standardised procedures for delivering CPS in primary care will strengthen the evidence supporting the benefit of pharmacist interventions and ensure successful and sustainable provision of CPS.

Adaptability: The standards for service provision and SOPs developed as part of this framework are easily replicable in all settings where pharmacists provide patient care. This framework enables a systematic approach to patient care and supports decision-making, allowing adaptation to other international primary care models. The services included in the framework do not require additional certification; clinical skill proficiency and competency are recommended before delivering these CPS.

Significance: The developed framework can support standardisation for provision of CPS, reinforce the pharmacist's role as an integrated primary care team member in patient care, and assist policymakers and other stakeholders in developing services delivered in community pharmacies. The step-by-step approach adopted in this framework would promote evidence-based practice, encourage systematic thinking, and foster consistency in the ongoing patient documentation and monitoring of clinical and humanistic outcomes.

Critical Care

Sun-34. Documentation of pharmacy progress notes in medical and surgical intensive care units in a general hospital in Qatar.

Hassan Mitwally, Pharm.D., BCPS, BCCCP[1], Eman Alhmoud, MSc, BCPS, CPHQ[1], Farah Zahrah, BSc (Pharm), Pharm.D.[1], Mohamed Saad, Pharm.D., BCPS, BCCCP[1], *Sara Mahmoud, Pharm.D., BCCCP*[1] and Rasha Z. Al Anany, Pharm.D.[2]; [1]Pharmacy Department, Hamad Medical Corporation, Doha, Qatar [2]Hamad Medical Corporation, Doha, Qatar

Service or Program: The aim of this project was to establish a standardized approach for documenting clinical pharmacists' therapeutic recommendations and care plans in medical and surgical intensive care units (ICU) of a general hospital in Qatar. A working group was established to revise relevant literature and set standardized procedures for documentation, which included: defining criteria for the minimum number of notes required per ICU admission, standardizing the format of the progress note through creating shared template, deciding on documentation etiquette and providing peer review of the notes with regular feedback. A minimum of 1 note was decided for ICU admissions lasting < 48 hours and cardiac ICU patients, and 2 notes for ICU stay of > 48 hours.

A pre-specified key performance indicator (KPI) to achieve at least 80% of the targeted progress notes per month was decided.

Justification/Documentation: Despite being essential members of the multidisciplinary team in the ICU, pharmacists' care plans were rarely documented in the patients' medical records. With support from Information Technology (IT) Department, a monthly report of pharmacists' progress notes and ICU admissions was generated and validated by the pharmacy team. KPI data was shared with the team with regular performance feedback.

Over 8 months, a total of 514 pharmacist progress notes were written, which represents 81% compliance.

Adaptability: Key elements of the success of this initiative were: adequate training, consensus building, setting clear expectations, standardization, IT support, peer review, regular monitoring, and feedback.

Significance: Pharmacist progress notes promote accountability, emphasize the integral role of pharmacists in patients care, and serve as a tool for effective and efficient communication among health care professionals. Our efforts are aligned with the American Society of Health System's Pharmacists' (ASHP) recommendation of developing quality indicators that evaluate pharmacist documentation in the health records as part of pharmacy departments continuous quality improvement efforts.

Dermatology

Sat-14. Development and implementation of a pharmacist-led eczema service in an ambulatory care setting.

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Service or Program: Eczema is the most common skin disease treated at the outpatient clinics at the National Skin Centre (NSC), Singapore. A pharmacist-led, chargeable, appointment-based eczema service was implemented collaboratively with dermatologists to refer suitable patients for optimization of eczema control.

Three clinical pharmacists underwent video tutorial training conducted by dermatologists, clinical attachments, self-study and an assessment at the end of the training period.

Justification/Documentation: An effort to reduce acute eczema flares leading to unplanned patient visits and allow dermatologists to care for more complex cases, were justification for opportunistic implementation of this service.

Upon receiving a referral, the pharmacist assessed the severity of eczema, prescribed medications within a collaborative practice agreement, provided medication and disease counselling, and shared good skin-care habits. In addition, special counselling was provided for those on biologic injection (dupilumab) including monitoring of adverse effects.

Standardised notes detailing individualized plans and patient progress were documented in electronic patient records.

Twelve patients were referred to the service. The pharmacist consult lasted between 20 and 40 minutes.

Success will be measured by the mean improvement of patient reported Atopic Dermatitis Control Tool score, sleep score and itch score, compared to the baseline. Service will be evaluated by a patient experience survey.

Adaptability: This is an opportunity for trained pharmacists to be integrated into specialist dermatologist clinics, based on institution-specific needs. Although this model focuses on eczema, it can be expanded to other chronic skin conditions.

Significance: The use of this model raised patient awareness of self-management and control of eczema, allowed clinical dermatology pharmacists to develop specialized skills, and reduced workload of dermatologists.

Future research will determine if patients are significantly more adherent to their treatment plans or less likely to arrive for an unplanned clinic visit due to an exacerbation of eczema.

Education/Training

Sat-16. Adaptation of a Competency Framework for Development and Assessment of Pharmacists.

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Service or Program: In 2020, the Development Framework for Pharmacists (DFP)[(1)] was introduced by the Ministry of Health, and adopted by the National Skin Centre (NSC) Singapore, for assessment and seamless transition of pharmacists from entry level to advanced practice.

The framework incorporated an individualized needs assessment plan and a portfolio, and was implemented at NSC by a trained pharmacist who is familiar with portfolio building and assessment, and clinical practice.

Justification/Documentation: Empowering self-directed professional development, lifelong learning and harmonizing the progression of pharmacists regardless of practice area, were unmet needs at NSC.

All pharmacists were sent for portfolio building and assessment workshops. The portfolio comprised of demonstrated competencies to perform professional activities to a desired standard. Success was measured by the number of competency standards achieved listed under the 7 domains in the DFP: Care provider, Collaborator, Leader, Manager, Educator, Researcher and Professional.

Furthermore, pharmacists were trained to self-assess their current and expected level of expertise, identify learning needs, and discuss with a domain 'expert' and seek guidance on achieving the desired standard. Discussions were conducted minimally once a year.

Moreover, the competencies listed in the DFP were adopted for overall assessment of an individual pharmacist's performance and progression to the next level, in addition to their development.

Successful implementation was measured in stages targeting all pharmacists achieving competencies listed in 2-3 domains initially, with expectations to design and structure personal development plans to meet competence by 2023.

Adaptability: The DFP, implemented in a specialized dermatology outpatient setting, can similarly be adapted for progressive development of pharmacists at any level of competency or setting.

Significance: A shared, well-structured national framework to align competencies at each stage of the development of pharmacists, ensured competency expectations for all levels of learners and a transparent professional direction.

Reference:

1. Development Framework for Pharmacists, Ministry of Health Singapore, 2020

Emergency Medicine

Sun-66. Implementing Antimicrobial Stewardship in Emergency Department.

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Service or Program: The Emergency Department (ED) is highly dynamic with lack of restriction on antimicrobials and indefinite primary diagnosis with requirement to make a quick decision. This makes the implementation of ASP in the ED challenging with poor consequences such as antimicrobial resistance. Therefore, antimicrobial stewardship program was implemented in the ED.

Justification/Documentation: Stewardship champions: ASP multidisciplinary committee is formed. The process is based on three pillars: education, auditing, and restriction. Outcomes include increase awareness, improve prescribing pattern for ED patients and reduce prescribing un-necessary IV antimicrobials for ambulatory patients by ED physicians.

Ambulatory IV prescribing: ED physicians are privileged to prescribe intravenous antimicrobials for patients and re-assess them in IV room daily. Three sets of data was collected in March, May and August of 2019 where antimicrobial prescribing pattern was analyzed.

Outpatient IV antimicrobials were required to be co-stamped by the shift consultant and the process is continuously monitored. monitored and presented. In addition, physicians who were not compliant to guidelines were approached individually for personalized education.

Adaptability: Awareness: The recent survey showed that 71% of ED professionals are aware of the antibiotic ED guideline. ED Prescribing: Compliance to local guidelines increased from 41% to 68% over two years.

ED outpatient IV prescribing: an average of 140 patients per month were prescribed with IV antimicrobials with 80% inappropriate prescription with cases not either not requiring IV antimicrobial or choosing the wrong agent. The latest data shows a 90% reduction of IV antimicrobial agents (n=14) with 60% appropriateness.

Significance: Implementing a structured antimicrobial stewardship project in the ED composed of guidelines review, education, antimicrobial restriction and continuous monitoring improves antimicrobial prescribing in the emergency department.

Health Services Research

Mon AM-68. Engaging community pharmacists in a breast cancer survivorship shared care model in Singapore: a mixed-method report.

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Service or Program: Cancer survivorship care is jointly provided by oncologists, family physicians, and community pharmacists from a Singapore-based community pharmacy chain since 2021. This model was piloted among 35 early-stage breast cancer (ESBC) survivors minimally three years post-primary treatment and ascertained to be 'low-risk' for recurrence by treating oncologists. Pharmacists offered teleconsults every three months, addressing survivorship care areas like monitoring for physical or psychosocial issues; managing chronic diseases; advising on medication, complementary and alternative medicine usage; and health promotion. Care provision was facilitated by a survivorship care plan shared among all clinicians. Routine pharmacists training included e-learning modules, case, and workflow discussions.

Justification/Documentation: ESBC is the most common cancer diagnosis among women in Singapore, with high survival rates. The unsustainable, extensive utilization of oncologist services could be mitigated by increasing community pharmacists' involvement in extended survivorship. Preliminary qualitative feedback reinforced pharmacists' strengths in addressing health-related queries on medications and supplements. Survivors found the pharmacists friendly and were keen to extend the rapport built. Among survivors who completed quantitative surveys, the majority (64%) found the consult frequency to be appropriate, with pharmacists usually providing the desired amount of health-related information (64%) in an understandable manner (73%). Most survivors reported higher confidence in self-management (82%) and were willing to continue with the model (91%).

Adaptability: The locally adapted educational material can be readily expanded to empower other community pharmacists on basic principles of cancer survivorship. Compatibility of the care plan dissemination with information systems and the appropriate charging model for such services require optimization.

Significance: This pilot clarified the roles that community pharmacists could play in cancer survivorship care – an area traditionally managed exclusively by oncologists. This initiative expanded survivors' awareness of pharmacists' clinical care expertise to manage survivors in the community and created interprofessional collaborative opportunities across care settings.

Medication Safety

Sat-35. EFFECTIVE IMPLEMENTATION OF CLINICAL PHARMACIST AT A TERTIARY CARE HOSPITAL IN KARACHI, PAKISTAN.

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Service or Program: As per multiple studies there are many near miss errors reported yearly which are avoidable under supervision of Clinical Pharmacist (CP). Thus, at Indus Hospital and Health Network Karachi – Pakistan, we have fully devoted Clinical Pharmacist service composed of seven CP covering all faculties. The CP reviews hospitalized patient's medication record, Lab investigations, ensures proper medication reconciliation along with communication with healthcare providers in daily rounds, to optimize patient's pharmacotherapy plan. CP identifies pharmacotherapeutic problems, intervenes via discussion with the primary physician, further document their respective interventions as a part of routine work in predesigned intervention log sheet.

Justification/Documentation: Comorbidities, Complex regimen, frequent therapy modification, poor lab correlation and turnover of residents every few months contribute to drug related errors. Thus, need of CP arises. We aimed to highlight CP role in providing patient oriented standard care. Total 2635 intervention were extracted over a period of one year. Highest interventions were Dosage related (639), Addition of drug (288), Lab based (223), Renal and Hepatic dose

adjustment (187). Most interventions correspond to therapy appropriateness, contraindications, proper duration/dose of therapy given and discrepancies in medication reconciliation. Our data showed 99.9% physician acceptance and 0.07 % rejection.

Adaptability: Our CP services filled the void of pharmacotherapy optimization. Conclusively leading to positive outcome. Government at developing countries, like ours should work on the significance of CP and ensure proper recruitment of CP at every Hospital setup.

Significance: CP services are essential to ensure proper delivery of standard care and minimizing errors. This facilitates overall decrease in health care cost and harmful effects of improper therapy. At International level CP services are well utilized, yet at developing country like ours it is still underutilized. Our study emphasizes the inclusion of CP at every Hospital and implies towards prioritizing the CP as a core member of healthcare team.

Urology

Sun-75. Impact of implementing antimicrobial stewardship program in urological surgeries..

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Service or Program: Surgical site infection (SSI) is one of the leading cause of healthcare associated infection depending on the type of procedure.

To prevent SSI, ASHP recommends administration of an appropriate antimicrobial approximately 30-60 minutes (120 mins for vancomycin) prior to incision time and continued for 24 hours up to 3 days post-procedure and maybe on discharge.

This report measures appropriateness of antimicrobial for prophylaxis and on discharge.

Justification/Documentation: A medication use evaluation (MUE) was conducted by the clinical pharmacists in the surgery department to assess the appropriateness of antimicrobials in patients admitted for urological procedures at Al Wakra Hospital (AWH).

Clinical pharmacists reviewed clinical guidelines and updated it based on international guidelines by the American Society of Health System Pharmacist and American Urology Association. Local guidelines were provided and a post-implementation MUE was conducted.

Adaptability: Total of 72 patients. Most common urological surgeries are: uretroscopy (58.9%) and cystoscopy (8.2%). Urine cultures were performed in 55 patients (76.3%). Patients whose cultures were not performed (23.6%) were admitted for prosthesis, TURP, urethroplasty or emergent procedures and one for elective. Prior to clinical pharmacy intervention, compliance to local guidelines was only 17% administering ceftriaxone for most surgeries which was too broad and in-compliant with local guidelines.

Post intervention, **compliance was 97% to local guidelines**. Urine cultures were mostly gram-negative bacteria with low incidence of Ecoli ESBL. The antimicrobial agents that were used include: Cefuroxime, Cefazolin/Amoxicillin-clavulante, gentamicin & Vancomycin for penile prosthesis. However, patients are still being discharged on oral antimicrobials for a prolonged duration which is inappropriate.

Significance: Clinical pharmacists have a positive impact on utilizing appropriate antimicrobial prophylaxis in urological surgery patients through updating guidelines, education and improving compliance to local and international guidelines.

CASE REPORTS

ADR/Drug Interactions

Mon PM-4. Case Report: Enhancement of Warfarin Anticoagulation by Intramuscular Testosterone Therapy.

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Introduction: Patient stable on warfarin anticoagulation for one year prior had a 2.5-fold INR increase following intramuscular testosterone therapy. This interaction has been theorized from evidence with other androgens, but it has not been specifically demonstrated with intramuscular testosterone. This case provides insight into whether, and to what degree, a warfarin dose reduction is required.

Warfarin has been used for nearly 70 years, yet previously unknown interactions continue to arise. With endocrine interventions for low testosterone growing in popularity, understanding this interaction has important implications for practice.

Case: 53-year-old African American male presents for routine warfarin monitoring. Patient had stable INR and no changes to regimen for one year prior. Workup showed supratherapeutic INR.

Table denotes timeline of interventions made by the ambulatory pharmacist.

	Day 0	Day 2	Day 11	Day 21	Day 29
Warfarin dose in mg	16mg	held	6mg	8mg	13mg
% dose change			-62.5%	-50%	-18.8%
INR	7.08, 7.57	3.00	1.72	1.62	2.15

Discussion: Case reports reference interactions between warfarin and oxymetholone (Edwards, Lancet 1971), Danazol (Meeks, Ann Pharmacother 1992) and topical testosterone (Lorentz, Clin Pharm 1985). Warning of the potential interaction is included in multiple testosterone product package inserts. Current recommendation is to increase monitoring and reduce warfarin doses up to 80%.

A score of 6, indicating a probable adverse drug reaction, was calculated using the Naranjo ADR Probability Scale. The case was strong as patient's INR was stable prior to androgen therapy, which was administered in a clinic with detailed documentation. Limitations include reliance on subjective history from the patient regarding medication adherence and intake of vitamin K rich foods.

Conclusion: This case adds to the body of literature demonstrating the interaction between different androgens and warfarin and supports the need for dose reduction.

Sun-6. Chest pain unrelated to myocarditis or pericarditis following the administration of COVID-19 mRNA vaccines (Pfizer-BioNTech or Moderna): A case report.

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Introduction: To date, there has been no reported case of adverse reaction characterized by chest pain related to neither myocarditis nor pericarditis after the administration of COVID-19 mRNA vaccines (Pfizer-BioNTech or Moderna). We report 33 such cases.

Case: A total of 33 patients with a mean age of 32±9 years sought medical attention at the hospital outpatient clinic after vaccination (30 were administered Pfizer-BioNTech and 3 were administered Moderna). The chief complaint of all patients included chest pain, and both myocarditis and pericarditis were ruled out in the diagnosis. Chest pain occurred 0–89 days (median = 4 days; mode = 0 days) after vaccination. Twenty-nine patients (88%) were treated with bisoprolol, 19 (58%) with acetaminophen+carisoprodol, and 17 (52%) with prednisolone. After treatment, major improvement or recovery was achieved in 16 patients, slight improvement was achieved in 9, no improvement was achieved in 4, and 4 were lost to follow-up.

Discussion: Reports of chest pain without excluding myocarditis and pericarditis were not found in electronic databases (Micromedex, PubMed, and UpToDate) or package inserts of Pfizer-BioNTech or Moderna. The symptoms of the 33 patients in this study were speculated to have therapeutic relationships with the following drug responses: bisoprolol decreases cardiac stress-related chest pain, acetaminophen+carisoprodol alleviates muscle pain near the chest, and prednisolone decreases inflammation of muscle or lung tissue. Limitations of this study include that patient heterogeneity was not analyzed and that there are many factors affecting chest pain.

Conclusion: If chest pain occurs after COVID-19 mRNA vaccine administration when myocarditis and pericarditis diagnoses are ruled out, increased cardiac stress, muscle pain, or inflammation near the chest must be considered. Treatment with bisoprolol, acetaminophen, carisoprodol, or prednisolone should be considered.

Ambulatory Care

Mon PM-19. Accidental once-daily use of dulaglutide: A case report.

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Introduction: This is the first case report of a once weekly glucagon-like peptide-1 receptor agonist (GLP-1 RA) being used once daily. It will describe the steps taken after the event was discovered. This report will add to the medical literature by providing guidance for monitoring and adjusting diabetes medications following once daily use of the weekly GLP-1 RA, dulaglutide.

Case: A 65-year-old female with type 2 diabetes was seen by a pharmacist-managed diabetes clinic. Patient did not smoke or drink alcohol. Medications for diabetes included dulaglutide 1.5 mg injection every Monday, metformin 1000 mg one tablet twice daily, insulin degludec 48 units every morning, and insulin lispro 12 units with dinner and 4 units with evening snack. Despite being prescribed dulaglutide once weekly, she accidentally took this medication daily for 6 days in a row. She experienced numerous hypoglycemic episodes, which required multiple reductions to her insulin regimen. Interestingly, the patient did not experience any adverse gastrointestinal effects. Hypoglycemia resolved 17 days after the last dulaglutide dose.

Discussion: The elimination half-life of dulaglutide is approximately 5 days. Therefore, hypoglycemia resolution coincided with most of the medication being eliminated from her system. Fasting blood glucose levels increased linearly from day 17 to day 29. Although gastrointestinal side effects did not occur in this case, they cannot be discounted, as they are common with this class. A strength of this case is that the incident was identified in a timely manner, which enabled close monitoring.

Conclusion: Once weekly GLP-1 RA agents are not studied or approved for daily use. Should dulaglutide be accidentally taken once daily, frequent monitoring is recommended for one month following the incident. Initial adjustments should include a dose reduction of insulin (or other diabetes medications) to prevent/minimize hypoglycemia. Once the medication has been cleared, the diabetes regimen will likely require intensification.

Cardiovascular

Mon PM-31. Case Report: Thrombus on Right Pacemaker Lead While on Direct Oral Anticoagulation.

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Introduction: Mobile thrombi are a recognized complication after cardiac implantable electrical devices (CIED). Patients with ejection fraction (EF) ≤ 40% are at higher risk for thrombi. This report describes the treatment of a Veteran with atrial fibrillation (AF) and normal EF who developed a thrombus on the right atrial pacemaker (PM) lead despite receiving apixaban for stroke prevention.

Case: A 72-year-old Veteran, with a history of AF, EF of 55-60%, sick sinus syndrome, status post PM implantation 08/25/21, presented for AF ablation on 03/15/22. A preprocedural transesophageal echocardiogram revealed a 3-4 cm elongated, mobile mass on the lead in the right atrium despite confirmed adherence to apixaban therapy (per patient, patient's spouse, and pharmacy records). Patient was asymptomatic and infective endocarditis was ruled out. Wells Score for pulmonary embolus indicated low risk. Ablation was cancelled and intravenous heparin was started, then transitioned to warfarin (target INR 2-3) with enoxaparin bridge due to suspected apixaban failure. Follow-up imaging to evaluate thrombus resolution is scheduled for 7/29/2022.

Discussion: There are few published case reports of optimal treatment of CIED thrombosis. In symptomatic patients, surgical resection of the thrombus and removal of PM leads are required. This case is unique as the patient was on oral anticoagulation with apixaban for AF, yet still developed a pacemaker-lead thrombus in the RA. We were unable to confirm anti-Xa activity to assess apixaban adherence. No studies have established the safety and efficacy of direct oral anticoagulants for left ventricular thrombus and treatment with warfarin is usually preferred. In this case, we extrapolated this data to our patient with a RA thrombus.

Conclusion: This case may indicate both a need for prophylactic anticoagulation in some patients receiving CIED and that DOACs may be less effective for this anticoagulation indication.

Mon PM-26. Effect of Short Bowel Syndrome on Ticagrelor Inhibition of Platelet Aggregation Post Percutaneous Coronary Intervention (PCI): A Case Report.

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Introduction: Short bowel syndrome occurs when proximal areas of the gastrointestinal tract are surgically resected, leading to impaired nutrient and medication absorption. After PCI, dual antiplatelet therapy is imperative to prevent major adverse cardiac events. Here, we present the use of ticagrelor on inhibition of platelet aggregation in a patient with short bowel syndrome post-PCI.

Case: A 65-year-old Veteran with a history of Roux-en-Y gastrojejunostomy, duodenectomy and proximal jejunum bypass, coronary artery disease with prior CABG and CVA underwent coronary angiography. He was found to have multivessel disease and required placement of a drug-eluting stent in the left main coronary artery extending into the left circumflex artery. Although initially loaded with clopidogrel at the time of the PCI, he was later switched to ticagrelor due to provider preference for more potent antiplatelet therapy. Prasugrel was contraindicated due to CVA. Given the patient's GI surgeries, there was concern for adequate ticagrelor absorption and platelet inhibition. Platelet aggregation studies were performed.

Discussion: Unlike clopidogrel and prasugrel which are irreversible prodrugs requiring enzymatic conversion to form active metabolites, ticagrelor does not require conversion from a prodrug and is rapidly absorbed from the small intestine. A previous report in a patient with short bowel syndrome demonstrated insufficient platelet inhibition with standard clopidogrel and prasugrel doses as well as high dose clopidogrel, while ticagrelor 90 mg twice daily demonstrated adequate platelet inhibition.

Conclusion: In patients with short bowel syndrome undergoing PCI, there is little information guiding the relative efficacy of P2Y12 inhibitors. A single report shows increased platelet inhibition with ticagrelor compared to the prodrugs clopidogrel or prasugrel guiding our use of ticagrelor in this patient. Results of platelet aggregation studies for our patient will be available by the presentation.

Mon AM-37. Ultra-Slow, Low Dose Alteplase Infusion and Prosthetic Valve Thrombosis: A Case Report Highlighting a New Therapeutic Approach.

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Introduction: Prosthetic valve thrombosis is a life-threatening medical condition that typically requires immediate surgical intervention. However, the high risk of mortality and post-operative complications should be considered. Prior data suggest that ultra-slow, low dose alteplase infusion is associated with high success rates and low risk of mortality and complications.

Case: A 77-year-old female presented to the Emergency Department with worsening shortness of breath and chest pain for the past 2 days. Her symptoms began when her warfarin was held 2 weeks earlier for a spinal injection. Medical and surgical history include congestive heart failure, mechanical aortic prosthetic valve replacement, and spinal stenosis. A left heart catheterization revealed a frozen leaflet of

her mechanical aortic prosthetic valve. Transesophageal echocardiogram demonstrated aortic stenosis with significant valvular thrombus. The decision was made to opt out of surgery and initiate alteplase 25mg infusion over 25 hours. After 4 rounds of alteplase infusions, an echocardiogram showed mechanical aortic valve replacement with normal function. A fluoroscopy demonstrated normal motion of both leaflets. The alteplase infusion was stopped, and warfarin and a heparin infusion were initiated. The patient's symptoms resolved, and she was discharged on enoxaparin and warfarin.

Discussion: In the HATTUSHA study, 158 patients with prosthetic valve thrombosis received either alteplase or surgery. There was a 90.4% success rate in the alteplase group. Additionally, lower rates of complications and 3-month mortality rate were observed. Because of this study, the ACC/AHA guidelines now recommend alteplase or surgery for symptomatic prosthetic valve thrombosis. However, the European Society of Cardiology/European Association for Cardio-Thoracic Surgery guidelines still recommend surgery.

Conclusion: Our patient was successfully treated with alteplase without surgical intervention and serious adverse events. Due to conflicting guideline recommendations, further studies are needed to compare the efficacy and safety of alteplase versus surgery in the treatment of prosthetic valve thrombosis.

Hematology/Anticoagulation

Sun-68. Emicizumab Use in a Patient with Acquired Hemophilia A: A Case Report.

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Introduction: Acquired hemophilia A (AHA) is a rare, potentially life-threatening bleeding disorder characterized by autoantibodies against factor VIII (FVIII). AHA is considered an idiopathic disease but associated with malignancy, pregnancy, infection, and other autoimmune disorders. Real-world experience of treatment with emicizumab, a novel bi-specific monoclonal antibody that mimics FVIII function by binding factors IX and X, is limited.

Case: We report a case of an 82-year-old male who presented to the hospital with symptoms concerning for Ludwig's angina and spontaneously developed a left subcutaneous shin hematoma. Workup revealed a past medical history of prostate cancer and rheumatoid arthritis. His activated partial thromboplastin time (aPTT) was prolonged (89.1 seconds) with low FVIII activity of 5% and high FVIII titers of 7.7 Bethesda units (BU). He was started on activated prothrombin complex concentrate (aPCC) to control bleeding and prednisone to eradicate inhibitors. Five days after prednisone initiation, the patient failed to show significant clinical improvement, resulting in intensification of immunosuppressive therapy with rituximab. Once the bleeding stabilized, aPCC was converted to recombinant factor VIIa while initiating emicizumab. His FVIII titers nearly normalized (0.6 BU; measured by bovine chromogenic Bethesda assay) after seventy-seven days of immunosuppressive therapy.

Discussion: Prior to emicizumab, only short-acting bypassing agents were available to attain hemostasis and required frequent intravenous infusions. Advantages of emicizumab, including rapid hemostatic efficacy, favorable safety profile, and potential outpatient therapy, are beneficial in patients who have multiple comorbidities and increased risk factors for thrombosis. His aPTT normalized (36.1 seconds) after two days and FVIII activity improved to 34% (measured by bovine chromogenic FVIII assay) after eighteen days of the first emicizumab dose, which were similar and faster, respectively, than previously reported, supporting potential emicizumab use as a first-line agent.

Conclusion: Emicizumab effectively treated and prevented future bleeding in a patient diagnosed with AHA, while restoring FVIII activity.

HIV/AIDS

Tues-58. Development of Multiclass Resistance in a Person with HIV with an Incomplete History Experiencing Perpetual Antiretroviral Intolerance: A Case Report.

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Introduction: Persons with HIV increasingly present to care with incomplete treatment histories making decisions around antiretroviral therapy (ART) more complicated when drug-drug interaction (DDI) potential exists or there is medication intolerance. This case report describes a patient with multiple comorbidities, medication intolerance, and incomplete history developing virologic failure and resistance.

Case: A 64-year-old female with multiple comorbidities was admitted for hematochezia and remained for over a month due to heart failure (HF) exacerbation. Her unusual regimen of rilpivirine/dolutegravir plus doravirine/emtricitabine/tenofovir disoproxil fumarate was administered for 7 days, however, the patient's supply of the latter combination product ran out and was stopped. She received famotidine, followed by pantoprazole during the admission despite a DDI with rilpivirine. She requested a new HIV provider upon discharge, who switched the rilpivirine to doravirine due to the DDI. At the initial visit, there were insufficient copies for a genotype (110 copies/mL) and over six months, the patient complained of gastrointestinal issues. After another HF exacerbation, she became depressed and stopped her ART. Another genotype was sent, with mutations identified to both agents (V106M, V108I,E138R,I178L, G118R,T66I). After intolerance to other regimens, the patient

remains virologically controlled on etravirine, fostemsavir, and emtricitabine/tenofovir alafenamide.

Discussion: Treating patients with extensive ART experience but unavailable records is increasingly common. Guidelines only briefly discuss treatment interruption, advising against it without delineating how to navigate ongoing intolerance. Although we could have ordered a proviral DNA genotype to identify preexisting resistance, its role remains undefined in such settings. Nonetheless, the potential for useful information may outweigh the cost of this test. The development of dolutegravir resistance should remain a concern for practitioners.

Conclusion: Complicated patients with incomplete histories will remain a challenge for HIV practitioners. Closer monitoring and a lower threshold for laboratory testing is warranted when switching regimens and/or if medication intolerance persists.

Infectious Diseases

Sun-73. Fidaxomicin irrigation: A *C. diff-erence* in outcome for fulminant *Clostridioides difficile* with partial colectomy.

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Introduction: *Clostridioides difficile* infection (CDI) is a leading cause of nosocomial antibiotic-related diarrhea. Fidaxomicin (FDX) is recommended as the first line therapy for severe CDI. FDX role in fulminant CDI remains unclear. Therefore, we describe the treatment of FDX with vancomycin (VAN) as a continuous irrigation administration for a patient with fulminant CDI to avert total colectomy.

Case: A 63-year-old male with myelodysplastic syndrome presented to the hospital with cough and fever. Patient was initiated on ceftriaxone/azithromycin for community-acquired pneumonia. Patient subsequently developed worsening abdominal pain and mentation with multiple episodes of watery diarrhea. Patient underwent partial ileostomy with mucous fistula. Despite managed with VAN 500 mg PO q6h plus metronidazole 500 mg IV q8h, patient worsened clinically with diffuse wall edema in the remaining colon. To avoid total colectomy, salvage therapy was initiated as an irrigation of a mixture of two-crushed FDX 200 mg tablets plus VAN 1g in 500 mL of 0.9% sodium chloride administered over 24 hours. Upon completion of a ten-day course of FDX-VAN irrigation, patient avoided a total colectomy and was discharged without complications.

Discussion: As fulminant CDI refractory to the standard of therapy is on the rise, early surgical assessment remains a critical part of the treatment decision due to approximately 30% of patients requiring surgery. However, mortality rates following surgery for CDI remain high, ranging between 30-50%. An alternative surgical approach to lower post-surgical complications is a diverting loop ileostomy with antegrade antibiotic colonic lavage. Topical antibiotic application bypasses potential absorption or transit issues with systemic administration. Yet, the selection of antibiotics and timing for irrigation remains inconsistent among other published case reports.

Conclusion: This case adds to the limited body of evidence on the role of alternative administration route of FDX and VAN in fulminant CDI. Further studies are warranted.

Mon PM-74. Mistaken Identity: First *Intestinimonas Butyriciproducens* Bacteremia Case Report.

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Introduction: Advancements in microorganism identification expedite appropriate antibiotic selection and expand clinical encounters with previously unidentified pathogens. Matrix-assisted laser desorption-ionization (MALDI) and rapid blood culture identification assays are sensitive only for identified microorganisms in their database. *Intestinimonas butyriciproducens* is a butyrate-producing bacterium typically found in murine intestine, but data on pathogenicity and misidentification are lacking.

Case: A 29-year-old female with Crohn's disease presented with perforated terminal ileum and ileosigmoid fistula that was managed surgically with sigmoid repair, ileocecectomy, with end-ileostomy creation. She developed septic shock on post-operative day (POD) 3 and cultures were sent with initiation of empiric vancomycin and piperacillin-tazobactam. Blood cultures resulted with beta-lactamase negative, anaerobic gram-negative bacilli on POD 6, but no bacteria were identified by MALDI or rapid molecular testing. Antibiotics were adjusted to cefepime and metronidazole for the unidentified anaerobe. Microbiology results updated to *Fusobacterium nucleatum* on POD 11 based on phenotypic culture growth, which would have been identified through the MALDI and molecular testing database. The mismatch between phenotypic culture growth and rapid identification assays prompted further analysis with DNA sequencing, which identified the organism as *Intestinimonas butyriciproducens* on POD 22. The patient subsequently had a prolonged ICU and hospital stay unattributed to the bacteremia given documented culture clearance.

Discussion: The case demonstrates use of sensitive rapid microbiologic technologies to identify misidentification of *Intestinimonas butyriciproducens* on phenotypic culture, a gram-positive organism that can appear gram negative. This is the first documented identification of *Intestinimonas butyriciproducens* in human blood, likely from gastrointestinal bacterial translocation or a breach of colonic integrity. Antibiotic susceptibility analysis was not available, but bacterial clearance from the blood was achieved quickly after treatment with vancomycin and piperacillin-tazobactam.

Conclusion: Pharmacists should be aware of potential organism mismatch between rapid identification technologies and culture. *Intestinimonas butyriciproducens* pathogenicity and treatment needs further exploration.

Sun-79. Dual therapy with aztreonam & ceftazidime/avibactam against multi-drug resistant *Stenotrophomonas maltophilia* on necrotizing pancreatitis.

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Introduction: *Stenotrophomonas maltophilia* is a Gram-negative, opportunistic pathogen associated with high morbidity and mortality. We report our clinical experience treating an infected pancreatic necrosis by multidrug-resistant (MDR) *S. maltophilia* with a novel drug combination.

Case: A 65-year-old male with history of type II diabetes was admitted with acute pancreatitis, voluminous ascites and signs of sepsis after undergoing an echoendoscopy procedure with pancreas biopsy to investigate a Wirsung duct dilatation. Retroperitoneal fluid culture revealed a *S. maltophilia* resistant to colistin and with intermediate susceptibility to trimethoprim-sulfamethoxazole and levofloxacin. Synergy between aztreonam (ATM) and ceftazidime/avibactam (CZA) was demonstrated using the combined disk pre-diffusion test. The patient presented pancreatic necrosis requiring partial pancreatectomy. He completed 6 weeks of simultaneous administration of ATM 1g every 8h with CZA 2/0.5g every 8h with 2h infusion along with teicoplanin for Gram-positive additional coverage, with clinical recovery and further negative pancreatic drainage culture. He was discharged home in good general conditions.

Discussion: There are sparse data providing guidance on the optimal regimen against MDR *S. maltophilia* infections. Although the surgical excision was essential, combination of ATM and CZA provided effective synergistic antimicrobial treatment with clinical cure of severe acute pancreatitis infected with *S. maltophilia*. The combined disk pre-diffusion test with ATM and CZA requires no special equipment and can be routinely performed in clinical microbiology labs.

Conclusion: Combination of ATM with CZA should be considered for cases of MDR *S. maltophilia* infections with limited treatment options.

Medication Safety

Sat-34. Re-administration of Rituximab in patient with previous history of suspected Rituximab induced PRES: a case report.

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Introduction: Rituximab, a monoclonal antibody, is used to treat non-Hodgkin's lymphoma and other conditions. There have been few case reports where patients developed PRES after receiving rituximab but not much data is there to see if drug can be given again. For e.g., 66-year-old female diagnosed with DLBCL, suffered PRES 10 days post R-CHOP. Later patient was given same chemotherapy but short of Rituximab and remained stable.

In our study, we have discussed if patient with history of rituximab induced PRES could be re-administered with Rituximab safely.

Case: A 10-year-old girl, admitted for workup was diagnosed with Burkitt lymphoma, received cyclophosphamide, vincristine and prednisolone. After 8 days, patient was given R-COPAD (rituximab, vincristine, cyclophosphamide, prednisolone, Adriamycin). LPIT was given in the morning followed by vincristine at evening and then rituximab infusion was started. During infusion, patient developed fits, headache, raised BP. MRI brain done was suggestive of PRES. Patient was bone marrow positive for disease, rituximab had to be given in subsequent cycles as well. After complete resolution of symptoms, she was re-administered with drug in next chemotherapy cycle. Patient was kept on amlodipine and levetiracetam since development of PRES. This time patient remained stable and was given rituximab in next cycles too.

Discussion: In many available literatures, patients are not given Rituximab again and remained stable. We have reintroduced such patient with Rituximab to see the result with every possible precautionary measure, but this should be noted that patient was in AKI (improving) at first administration which has a relation with PRES.

Conclusion: As per our case report, it is safe to use Rituximab again in patients with suspected history of rituximab induced PRES provided that the labs are within normal range and all measures have been taken to prevent symptoms.

Mon AM-88. Capturing Religious Preferences Regarding Pork-Containing Products: A Case Report.

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Introduction: Tenants of Islam and Judaism include abstinence from pork-containing products including medications like enoxaparin and heparin. As health systems increase efforts to provide patient-

centered-care, processes capturing individual religious beliefs should be evaluated.

Case: A 54-year-old male was admitted with polytrauma. Enoxaparin chemoprophylaxis was started on hospital day 3, and the patient transitioned to a regular diet on hospital day 8. The dietician discovered he was Muslim and desired avoidance of pork products. A "Pork/Porcine" allergy with a reaction of "Patient is Muslim" was added. The pharmacist identified the updated allergy and achieved consensus with the team to change chemoprophylaxis to fondaparinux. The patient was administered 11 enoxaparin doses over 6 days. The drug-religion interaction was classified as a National Coordination Council Medication Error Reporting and Prevention category D error as conversations between the patient and medical team occurred to ensure no residual psychological harm.

Discussion: Internal data evaluating inpatients admitted to the health system from July through December 2021 found that 72 patients with religion listed as Muslim received heparin or enoxaparin, highlighting the frequency in which this scenario exists. Religion is included in patient demographics collected during registration, but no automated alert exists for religion-nutrition or religion-drug interactions encountered across the medication use process. Process improvement discussions found EMR limitations precluded implementation of such demographic-based measures. Addition of pork/porcine products allergy was deployed in the case, but this relies on individuals rather than systems. Ultimately, a "Best Practice Advisory" was implemented which triggers at order entry and verification when a patient with a documented Jewish or Muslim religion is ordered a pork-containing product for confirmation of patient-specific beliefs.

Conclusion: An individual's beliefs are highly personal, and the perception of sin can have untoward mental and psychological impact. EMR enhancements should be leveraged to accommodate patient-specific religious preferences.

Nephrology

Mon AM-91. The use of dapagliflozin in patient with type I diabetes mellitus and continuous ambulatory peritoneal dialysis: A case report.

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Introduction: Patients on peritoneal dialysis (PD) are exposed to high concentrations of glucose in the dialysate, and glucose absorption through peritoneum may contribute to hyperglycemia. Expression of sodium-glucose co-transporter 2 (SGLT-2) in human peritoneum had been reported recently. It is unclear that if SGLT-2 inhibitors reduce glucose absorption and delay functional deterioration of the peritoneal membrane in PD patients. We describe a case of continuous ambulatory peritoneal dialysis (CAPD) who received dapagliflozin for refractory hyperglycemia suspected dialysate-related.

Case: A 30-year-old Asian female with type 1 diabetes mellitus and end-stage renal disease (ESRD) was regularly followed in nephrology outpatient department. Pertinent medication included basal/bolus insulin, pioglitazone, bumetanide, indapamide, amiloride-hydrochlorothiazide. The patient's average baseline HbA1C was 7.2 % but rose to 10.3 % after three-month peritoneal dialysis. With glycemic deterioration, dapagliflozin was added to reduce sugar source from dialysate. Meanwhile, diuretic effect of SGLT2i on residual renal function also improved edema. HbA1C was 6.6% followed in three months without other medical interventions.

Discussion: It has been reported that SGLT2 inhibitors exert a glucose-lowering effect in peritoneum exposed to high-glucose concentration dialysate and ameliorate pathological changes in mice peritoneum through reducing the levels of inflammatory cytokines, while it is unclear that this effect could extrapolate to human. We couldn't evaluate pathological changes in peritoneum of our patient in the absence of available specimens, while dapagliflozin still provided synergistic effects on diuresis and glycemic control with existed management. Few studies demonstrated the role of SGLT2 inhibitors in CAPD, our experience may support further investigations.

Conclusion: Sugar from peritoneal dialysate may contribute to complications in PD patients including persistent hyperglycemia. Given the potential benefit on glycemic control, SGLT2 inhibitors could be considered in these patients.

Oncology

Mon AM-42. Pharmacotherapeutic management of pembrolizumab induced acute bilateral hearing loss: A case report.

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Introduction: Pembrolizumab is a programmed death receptor-1 directed immunotherapy agent commonly used in the treatment of metastatic melanoma. Immune related adverse effects (irAE) have been characterized with use, but autoimmune induced audiovestibular complications are not well defined. To date, only three case reports of pembrolizumab induced hearing loss have been published in this patient population, with no defined optimal pharmacotherapeutic treatment strategy.

Case: A 78 year-old male initially diagnosed with melanoma in 2015, was initiated on single agent pembrolizumab after evidence of metastatic disease in 2021 . Partial response by restaging was demonstrated after 4 cycles. When the patient presented for cycle

8, therapy was held for complaint of sudden bilateral hearing loss. Patient had an otolaryngologist referral and was prescribed prednisone 60mg by mouth once daily for ten days, then tapered over one week. Magnetic resonance imaging of the brain ruled out intracranial disease as a cause of his deficits. On repeat visit, he subjectively reported hearing loss resolution post cerumen removal at otolaryngologist office and completion of prednisone. Patient was successfully rechallenged with pembrolizumab 21 days after initial hearing loss without further audiovestibular complications.

Discussion: Corticosteroids remain the primary treatment option for irAE based on immune suppression. While several case reports have highlighted hearing loss as a side effect, steroid management is inconsistent with variability in agent, dosage, and route. Oral prednisone is less invasive compared to intratympanic dexamethasone injections and has produced consistently favorable outcomes based on this case report and one other (*J Otol Rhinol* 2019, 8:1). Proper management of pembrolizumab induced otologic complications should include prompt corticosteroid initiation and otolaryngologist referral.

Conclusion: This paper adds to the limited body of literature documenting pembrolizumab induced otologic complications in metastatic melanoma patients. Additionally, it helps define a successful oral treatment strategy for clinicians with the consideration to rechallenge post irAE resolution.

Pediatrics

Sat-1. Safety and effectiveness of early use of sotrovimab in COVID-19 children: application of a dose adjustment formula in a case series of 7 patients.

Daniele Mengato Sr., Pharm.D.[1], Monica Bettio Sr., Pharm.D.[2], Costanza Di Chiara, MD[3], Marica De Pieri Sr., MD[4], Daniele Donà Sr., MD, PhD[4] and Francesca Venturini Sr., Pharm.D.[1]; [1]Department of Hospital Pharmacy, University Hospital of Padova, Padova, Italy [2]University Hospital of Padova, Padova, Italy [3]Department for Women's and Children's Health, Division of Pediatric Infectious Diseases,, University of Padua, Padova, Italy [4]Department for Women's and Children's Health, Division of Pediatric Infectious Diseases, University of Padua, Padova, Italy

Introduction: The early use of sotrovimab has been approved in patients over 12 years of age and weighting more than 40kg, who are at risk of developing severe COVID-19. Although sotrovimab is the only monoclonal Antibody (mAb) effective against the "Omicron" variant of concern, data on its use in the paediatric population are still scarce. Herein, we present a case series of seven immunocompromised children younger than 12 years old, treated with sotrovimab at the University Hospital of Padua in 2022, proposing a readjusted formula for dosage calculation according to weight.

Case: Two patients recently underwent solid organ transplantation, three had an onco-hematological disease, and two suffered a rare autoimmune disease. Five patients were older than 8 years old, while the remaining were 3 years and 10 months old, respectively. We adapted the Clark's rule by adjusting the original reference weight of 68kg to 40kg. The final formula was: (Patient's weight/40kg) × Adult Dose = Pediatric Dosage. While for four patients weighing approximately 40kg (± 4kg), sotrovimab was given at the standard dosage of 500mg, the others of 16, 13, and 8.5kg received 190mg, 150mg, and 100mg of mAb, respectively.

Discussion: No patients experienced any adverse event and all resolved their SARS-Cov2-symptoms within three days, confirming the safety and effectiveness of the recalculated dosages. For the first time, we report a renewed intuitive model of mAb's dosage calculation, which allows the dose to be tailored to the patient according to weight. We chose to revise Clark's rule rather than other unvalidated methods because of its reliability and ease of use.

Conclusion: Clinical pharmacist's skills are important in the review of off-label therapies, ensuring safe dosing even when evidence is lacking or limited. Although further pharmacokinetic analysis is needed, Clark's pharmacist-revised formula is a quick and safe way to modulate dosing for patients under 40kg.

Transplant/Immunology

Sun-13. Tacrolimus Toxicity Due to Unrecognized Significance of Nirmatrelvir-Ritonavir Interaction in a Case Series of Solid Organ Transplant Recipients.

Lyndsey Bowman, Pharm.D.[1], Angela Logan, Pharm.D., BCPS[2], Amy Rumore, Pharm.D.[2], Allyssa Webb, Pharm.D.[2], Bailey Wise, Pharm.D.[2] and Erin Bilgili, Pharm.D.[2]; [1]Tampa General Hospital, Lithia, FL [2]Tampa General Hospital, Tampa, FL

Introduction: Nirmatrelvir-ritonovir (NIM-RTV) for COVID-19 increases tacrolimus (XR-Tac; IR-Tac) concentrations. Increased availability of NIM-RTV and ongoing COVID-19 infections, poses a significant risk to solid organ transplant (SOT) recipients.

Case: Case 1 describes a 66-year-old (yo) male 1.5 years post-liver transplant on XR-Tac (goal 4-8 ng/mL). After 4 doses of NIM-RTV, XR-Tac was held and NIM-RTV continued. His tacrolimus level was 23.9 ng/mL and SCr 2.4 mg/dL (baseline 1.4 mg/dL) 3 days after holding XR-Tac. Case 2 was a 60 yo male 7 months post-lung transplant that received 2 doses of NIM-RTV + IR-Tac (goal 8-10 ng/mL). He experienced AKI (SCr 1.3 mg/dL, baseline 1.0 mg/dL) with a tacrolimus level >60 ng/mL. Tacrolimus and NIM-RTV were held and phenytoin initiated. The patient's SCr returned to baseline 5 days later. Case 3 includes a 53 yo male 2.5 years post-kidney transplant on XR-Tac (goal 4-6 ng/mL). Following 2 doses of NIM-RTV, he was hospitalized with a tacrolimus level >60 ng/mL, AKI (SCr 2.2 mg/dL, baseline 1.7 mg/dL) and nausea/vomiting. Both medications were held and

phenytoin initiated. Tacrolimus and SCr returned to baseline 6 days later. Case 4 was a 75 yo female 19 years post-heart transplant on IR-Tac (goal 4-6 ng/mL). After 4 doses of NIM-RTV, she required hospital admission for AKI and vision changes. Tacrolimus level was >60 ng/mL. Phenytoin was started as IR-Tac and NIM-RTV were stopped. Tacrolimus, SCr, and vision returned to normal 4 days later.

Discussion: Limited data and knowledge regarding severity of concomitant NIM-RTV/tacrolimus exists. Furthermore, there is no data describing the use of the CYP3A4 inducer phenytoin to reverse tacrolimus toxicity.

Conclusion: Even after only a few doses of concomitant NIM-RTV and tacrolimus, there is a significant risk of tacrolimus toxicity. Phenytoin induction may serve to minimize the toxicities associated with supratherapeutic troughs above the upper limit of detection.

CLINICAL PHARMACY FORUM

Adult Medicine

Tues-56. Pharmacy-led transitions of care service to increase empagliflozin prescribing rates in patients with heart failure and/or ischemic stroke at a public urban teaching hospital.

Shireen Farzadeh, Pharm.D., BCPS, BCGP[1], Tiffany Chen, Pharm.D., BCPS[1], Zoraya Pod, RPh, MPA[1], Susan Law, DO, MPH[2], Inna Bukharovich, MD[3] and Alla Luka, Pharm.D.[1]; [1]Department of Pharmacy, NYC Health + Hospitals/Kings County, Brooklyn, NY [2]Department of Neurology, NYC Health + Hospitals/Kings County, Brooklyn, NY [3]Department of Cardiology, NYC Health + Hospitals/Kings County, Brooklyn, NY

Service or Program: The Transitions of Care service at a 627-bed public urban teaching hospital in Brooklyn, New York sought to increase access to guideline-directed medical therapy (GDMT) upon discharge in patients with ischemic stroke and diabetes, or heart failure (HF) with or without diabetes. An example of GDMT is empagliflozin, a sodium-glucose co-transporter-2 inhibitor (SGLT-2i) on our drug formulary. Two clinical pharmacists determined patient eligibility for empagliflozin, performed medication reconciliation, provided medication and disease state education, obtained prior authorizations, and phoned patients to follow up on day-7 and day-21 post-discharge.

Justification/Documentation: The 2022 American Heart Association and American Diabetes Association both included SGLT-2i as GDMT in patients with HF and cardiovascular disease, respectively. Numerous studies have demonstrated that racial and socioeconomic inequities and biases are associated with underutilization of newer GDMT. Upon review of eligible patients for empagliflozin in 2021, only 18 patients with HF and 5 patients with ischemic stroke were identified. Since the program began from April through May 2022, 53 patients were discharged with empagliflozin, of which 46/53 (87%) identified as Black or African American and 13/53 (25%) were uninsured. Of the insured patients, 20/40 (50%) empagliflozin prescriptions required prior authorizations.

Adaptability: Our novel service consisting of pharmacist-led recommendations for empagliflozin with prior authorizations and post-discharge follow-up calls, can be implemented to other healthcare systems. Collaboration with providers led to the success of this service and increased prescribing rates of empagliflozin in our underserved patient population.

Significance: The piloted program was implemented at a large public urban teaching hospital, primarily consisting of an underserved patient population that is less likely to be prescribed newer GDMT based on previous literature. The roles of the clinical pharmacists have been integral in optimizing use of GDMT in high-risk patients by bridging gaps between the inpatient and outpatient settings.

Ambulatory Care

Tues-11. Clinical pharmacist-led program to improve vascular disease quality measures in a Federally Qualified Health Center.

Caitlin McCarthy, Pharm.D. and M. Thomas Bateman Jr., Pharm.D. ; Ernest Mario School of Pharmacy, Rutgers, the State University of New Jersey & Henry J. Austin Health Center, Trenton, NJ

Service or Program: Henry J. Austin Health Center (HJAHC) is a Federally Qualified Health Center (FQHC) providing care to over 18,000 underserved patients each year. In 2021, clinical pharmacists at HJAHC developed a program to collaborate with pharmacy students to identify and intervene on those patients who were omitted treatment for the following quality measures: 1) use of antithrombotic drugs in patients 18 years or older with ischemic vascular disease (IVD) and/or, 2) use of statins for the prevention of cardiovascular events in patients 21 years or older with, or at risk for developing, cardiovascular disease. Program elements include a dashboard through the electronic health record (EHR) to identify care gaps, documentation of findings and patient interactions within the EHR, and a standing order to permit pharmacists to place prescription orders.

Justification/Documentation: As Health Resources and Services Administration (HRSA) Health Center Program awardees, FQHCs are required to submit data as part of a standardized reporting system known as the Uniform Data System (UDS), which includes both quality measures. From 2020 to 2021, the percentage of patients with IVD and using an antithrombotic increased from 84% (139/166) to 92% (150/164), and the percentage of patients at high risk for cardiovascular events using statins increased from 77% (860/1119) to 86% (1231/1431).

Adaptability: This program may be adopted by other HRSA Health Center Program awardees and similar ambulatory care sites, such as FQHCs and FQHC Look-Alikes. Program success hinges on pharmacists' authority to proactively engage patients and order medications to satisfy quality measures like UDS standards.

Significance: The development of a standing order with prescriptive authority enabled clinical pharmacists and students to improve management of adult patients with, or at risk for developing vascular disease.

Clinical pharmacists may focus their initiatives on improving UDS measures, demonstrating value to their patients and practice sites.

Mon AM-13. Implementation of Professional Continuous Glucose Monitoring for Underinsured Internal Medicine Clinic Patients.

Laura Challen, Pharm.D., MBA, BCPS, BCACP[1], Katherine Garland, MD[2] and Cody Novack, MD[2]; [1]Pharmacy Practice, University of Health Sciences & Pharmacy in St. Louis, St. Louis, MO [2]JFK Clinic, Mercy Hospital St. Louis, St. Louis, MO

Service or Program: The Mercy Hospital John F. Kennedy (JFK) Clinic in St. Louis, Missouri provides medical care to uninsured and underinsured patients. Medical care is provided to these patients via a multidisciplinary team, and in August 2021 a referral based professional continuous glucose monitoring (CGM) program was established. Eligible patients were identified by physician or pharmacist referral and patients agreed to follow up with the clinical pharmacist two weeks after sensor placement. At the subsequent follow up appointments, the CGM profile was downloaded and reviewed. In conjunction with the treating physician, the clinical pharmacy team adjusted medication regimens per existing clinical pharmacy protocols and determined if ongoing monitoring was indicated.

Justification/Documentation: The majority of JFK clinic patients are of low socioeconomic status, and therefore are at increased risk for Diabetes and associated complications. As CGM technology continues to improve and becomes more affordable, measuring glucose variability has become more feasible. Low health literacy continues to be a barrier for new technology implementation and remote connecting to data. A professional CGM service helps to limit technology barriers by having the provider own the CGM and download all readings.

Adaptability: Our process allowed for easy adaptation to other multidisciplinary ambulatory care models. This service requires the purchase of a professional CGM meter and sensors. CGM sensor data is downloaded with the assistance of free manufacturer software and copied into electronic medical records. Grant funding was received the assist with the cost of sensors for our uninsured population.

Significance: As patient interest for CGM and its utilization has become more feasible, a significant opportunity presents itself to improve outcomes while following current best practice guidelines.

Cardiovascular

Sat-6. Implementation and Evaluation of a Telehealth Clinical Pharmacy Warfarin Service for Left Ventricular Assist Device Patients.

April Britt, Pharm.D., BCPS and Jordan Wilkie, Pharm.D., BCPS ; Wellstar Center for Cardiovascular Care/Advanced Heart Failure at Kennestone, Marietta, GA

Service or Program: Board certified clinical pharmacists at a high-volume advanced heart failure clinic dose warfarin for patients with left ventricular assist devices (LVAD). Pharmacists receive international normalized ratio (INR) results remotely, develop a care plan, and provide education telephonically. Pharmacists manage warfarin independently within a scope defined through collaboration with physicians.

Justification/Documentation: LVAD patients are at an increased risk of bleeding and thrombotic complications and are more challenging to maintain in goal INR range (36-57% time in therapeutic range (TTR)) compared to patients with atrial fibrillation (65% TTR). Evidence shows pharmacists achieve better TTR for indications other than LVAD, but they are not routinely utilized for the LVAD population. Two ambulatory pharmacists in a heart failure clinic expanded services to dose LVAD warfarin when the center began implanting in 2017. Pharmacists manage an average of 40-45 patients mostly independently, contacting physicians only for certain pre-defined scenarios where decisions involving reversal agents or heparin bridging are needed. Most patients qualify for home INR monitors (~67%) with the remainder obtaining INRs at clinic appointments or outside labs. Multidisciplinary collaboration is mediated through attendance of weekly LVAD selection meetings and participation on a secure shared online messaging application. In 2021, the center's TTR was above 70% each month. Additionally, rates of stroke, early and late bleeding, and late pump malfunction/thrombus were consistently better than the national average.

Adaptability: Remote LVAD warfarin management is highly adaptable to inpatient and ambulatory pharmacist settings, providing an opportunity to expand clinical pharmacy services at institutions that implant LVADs. The 2022 American College of Cardiology/American Heart Association heart failure guidelines list LVAD as a Class I indication for advanced heart failure patients, so it is anticipated this population will continue to grow.

Significance: Pharmacist management of LVAD warfarin maintained TTR above 70% for a year.

Clinical Administration

Sun-29. Pharmacists as solutions to the Nursing shortage on inpatient medical-surgical units.

Joshana Goga, Pharm.D. MBA[1], Theresa Glessner, DNP, RN, ACNP, BC, CCRN, NEA, BC[2], William Carroll, Pharm.D.[3], Casey Wilbert, Pharm.D. MBA[3], Eboney Hadnott, Pharm.D. MBA[3] and Elizabeth Sutton Burke, Pharm.D.[3]; [1]Pharmacy Services, Rochester Regional Health, Rochester, NY [2]Rochester Regional Health, Rochester, NY [3]Pharmacy, Rochester Regional Health, Rochester, NY

Service or Program: Rochester Regional Health transformed the existing patient care delivery model for medical-surgical units by redefining the role of the registered nurse as coordinator of care and expanding the scope of practice for our multidisciplinary team members including

pharmacists. The pilot program launched on one unit with two new Transitions of Care pharmacists completing medication history, patient education throughout the length of stay, bedside discharge prescription coordination, and all discharge counseling while entering documentation in the electronic medical record. Pharmacists covered both day and evening shifts 7 days a week.

Justification/Documentation: This model supports nursing workload while improving both employee satisfaction and quality of care. Three-month pilot data highlights 44% of nurses reported workload improved after implementation of care model pilot.

Adaptability: The staffing model and workflows are replicable in most hospital inpatient service lines across the country. The multidisciplinary approach and collaboration with the clinical pharmacist facilitated a shift in the nurse's workload and provided greater support in caring for patients with multiple medical comorbidities. **Significance:** Finding solutions to nursing shortages has grabbed the attention of healthcare administrators across the country over the last several years. Studies project shortfalls of well over 500,000 registered nurses by 2030. Many healthcare systems expect continued nursing shortages in the upcoming fiscal years and the utilization of agency staff poses significant financial burden. Deploying a care model as the one we developed can help fill the gap, better align roles and responsibilities across the patient care team, and improve patient outcomes.

Community Pharmacy Practice

Mon AM-40. Improving Outcomes for People Living With HIV Through Partnerships with Community Pharmacies.

David Hachey, Pharm.D.[1] and Anushka Burde, Pharm.D.[2]; [1]Family Medicine, Idaho State University, Pocatello, ID [2]Idaho State University, POCATELLO, ID

Service or Program: The Patient Centered Pharmacy Program (PCPP) at Idaho State University is a community pharmacy-based service for patients living with HIV (PLWH) to improve access to medications, maximize adherence, and drive viral load suppression (VLS). The PCPP was established in 2015 to address gaps for marginalized populations including rural isolation, lack of access to pharmacy services, patients with mental health and substance use disorders. Pharmacists at the PCPP attend HIV clinic regularly to support providers and patients at the point of care, coordinate medication access, and reduce barriers.

Justification/Documentation: PCPP has grown annually providing antiretroviral therapy (ART) and vaccine services to 60 patients monthly, one-third of all the PLWH seen at the clinic. PLWH referred to the PCPP frequently have comorbid conditions impairing adherence including mental health disease (66%) substance use disorder (73%), or both (57%). These patients are often marginalized, struggle with adherence, have housing instability, transportation barriers, polypharmacy, and drug interactions. PLWH engaged in the PCPP also have higher rates of VLS (<200 copies/ml) when compared to national data from HRSA (97% vs 88%).

Adaptability: The PCPP is a model that is reproducible by establishing partnerships between community pharmacies and outpatient HIV clinics and can be modified based on provider/patient needs, pharmacy workflow, and patient location (rural/urban).

Significance: The PCPP has created a resource for providers and patients to reduce barriers to care and improve outcomes. Providers have real-time information at clinic regarding non-adherence, side effects, and medication access challenges by having a community pharmacist present. Patients have access to medications for rapid starts, in-depth counseling, and vaccine administration. Finally, the financial benefit of the PCPP is realized at the pharmacy level through increased volume whereas the benefit at the clinic level is seen through 340B revenue, improved retention, and clinical outcomes.

Sun-31. *Addressing Underutilization of Referral-Based Diabetes Care Program by a New York Community Pharmacy Network.*

Christopher J. Daly, Pharm.D., MBA, BCACP[1], Richard Leong, Pharm. D.[1], Amanda A. Foster, Pharm.D.[1], Francesco LoPizzo, Pharm.D. Candidate Class of 2023[1], Jaeho Moh, Pharm.D. Candidate Class of 2023[2] and David M. Jacobs, Pharm.D., PhD[1]; [1]Department of Pharmacy Practice, University at Buffalo School of Pharmacy and Pharmaceutical Sciences, Buffalo, NY [2]Leslie Dan Faculty of Pharmacy, University of Toronto Pharmacy Building, Toronto, ON, Canada

Service or Program: A cohort of 56 New York community pharmacies screened and referred patients with diabetes to accredited diabetes self-management education and support (DSMES) services. DSMES provide evidence-based patient education that leads to reduction in A1c, inpatient visits, and improved patient outcomes. In coordination with New York State Department of Health (via CDC-1815 grant) the Community Pharmacy Enhanced Services Network of New York (CPESN NY) project team worked collaboratively with participating pharmacies to develop a clinical process utilizing existing staff. Additionally, a select number of pharmacies sought DSMES accreditation through Association of Diabetes Care and Education Specialists (ADCES).

Justification/Documentation: DSMES is greatly underutilized (<6.8% [privately insured]; <5% [Medicare]; <4.85% [NYS Medicaid]). A clinical workflow process was designed to identify, screen, and refer patients with diabetes to accredited DSMES centers. Point-of-care testing to obtain A1c at community pharmacies was overseen by a medical director. Between 06/2021-05/2022, 1,033 screenings and 383 referrals (37.1% rate) were made. Eight in-network pharmacies became ADCES-accredited DSMES sites during the process allowing for internal referrals. Goals for successful sustainment and program evaluation (i.e. – medical billing, patient referral metrics) of community pharmacy DSMES delivered services are actively being pursued.

Adaptability: Where DSMES is a nationally accredited educational standard delivered by many health care professions, the approach was adapted to a NY setting due a range of environmental factors.

Importing knowledge from national collaborators on barriers to establishing the service have been successfully implemented. This service is targeted towards high healthcare utilizers who can benefit from participating in DSMES. Increasing DSMES accessibility across NY will benefit high-risk individuals and reduce burden on the healthcare system.

Significance: Community pharmacies are well positioned to increase utilization of DSMES programs. The integrated clinical processes demonstrated increases in screenings and referrals to accredited DSMES centers.

Drug Information

Mon PM-44. Implementation of Protect from Light List Across a Large, Integrated Health System.

Sarah Yost, Pharm.D., BCPS, BCACP[1], Whitney Mortensen, Pharm.D., MBA, BCPS[1] and Elizabeth Sebranek Evans, Pharm.D., BCPS, BCGP[2]; [1]Pharmacy Services, Intermountain Healthcare, Taylorsville, UT [2]Department of Pharmacy, Intermountain Healthcare, Salt Lake City, UT

Service or Program: Intermountain Healthcare did not have a System-Wide Standard List of Medication requiring protection light. Drug Information team established and implemented a standardization process in developing a list and a process to store medications that require protection from light across all facilities to improve quality, decrease drug waste, and provide clear expectations for caregivers.

Justification/Documentation: System-wide implementation of a protect-from-light initiative for medications has not occurred. This is secondary to limited published data, varying opinions, and operational difficulties regarding methods for protection from light. United States Pharmacopeia (USP) states approximately 25% of medications have a light-resistant packaging requirement. Light can change the properties of medications including stability and degradation.[1,2]

Establishing and implementing a standardized process to store medications that require protection from light may help decrease drug waste and provide more clear expectations for caregivers.

There is limited consensus regarding when to protect medications from light at various phases of a medication's lifespan (ie, limited to storage only or at reconstitution, dilution, or administration). For example, there are several chemotherapy agents that require protection from light until the time of use, whereas other medications may only need to be protected during storage.[4]

Site-specific lists were compiled in addition to a historical list developed in 2015.[4] Lexicomp® was utilized to perform an advanced search for the word "light" found in the text located in the Lexi-Drugs Database.[5] This resulted in a total of 1,616 medications to cross check with the complied list. Once a medication was identified in Lexicomp®, the information was crosschecked in 5 other drug information resources.

Adaptability: Hospitals and health systems may benefit from a standardized approach to light protection of medications.

Significance: As pharmacotherapy experts, pharmacists are likely to be consulted for guidance on light protection in various parts of the medication lifespan.

Education/Training

Sun-69. "Pharmacy is More than Just Lick, Stick, and Pour"- Exposing Undergraduate and First-Year Pharmacy Students to Pharmacy Practice Opportunities through an Elective Seminar Course and Mentorship Program.

Junlone Moy, Pharm.D. Candidate 2024[1], Gervacio Y. Cabel IV, Pharm. D.[2] and Juliana Chan, Pharm.D.[3]; [1]College of Pharmacy, University of Illinois at Chicago, Chicago, IL [2]University of Illinois at Chicago College of Pharmacy, Chicago, IL [3]University of Illinois at Chicago, Colleges of Pharmacy and Medicine, Chicago, IL

Service or Program: This 17-week pharmacy practice elective held at the University of Illinois at Chicago's College of Pharmacy (COP) offers undergraduate honor students an experience of various areas of pharmacy practice through weekly guest speakers and projects. In-class activities and projects include non-sterile compounding, mock diabetes injectables training, and performing a drug information presentation on an assigned mystery medication. Students build transferable skills such as creative problem solving or public speaking, which they can employ anywhere. The course emphasizes individual growth and self-learning through a mentorship system between first-year pharmacy (P1) and undergraduate students.

Justification/Documentation: There is a lack of public awareness and understanding regarding the responsibilities and career opportunities available to pharmacists beyond stereotypical assumptions. After conducting a pre and post class survey, all students enrolled reported that they appreciated the ability to learn about multiple areas of pharmacy within one course, and learning the unique perspectives presented by each guest speaker.

Adaptability: This course was an effective, educational, and entertaining method for P1 and undergraduate students to learn more about pharmacy practice. This type of course can be adapted by any COP that is part of a larger academic institution where undergraduates can easily traverse campuses to attend. Additionally, this course provides P1 students supplemental pharmacy information they may not receive from their initial introductory pharmacy practice experiences.

Significance: Most students enrolled are sophomores or juniors, many of whom are either pre-pharmacy or exploring avenues of post-undergraduate education. By offering a similar elective, this can increase an institution's retention of students into its own COP, demonstrated by former pre-pharmacy students matriculating to our own COP post-graduation. However, the course's goal is to help students be more exposed to pharmacy as a profession, determine whether pharmacy is the right profession for them, and develop skills for success regardless of whatever they are pursuing.

Mon PM-53. Development and implementation of an international tele-education program with Namibia.

David Hachey, Pharm.D.; Family Medicine, Idaho State University, Pocatello, ID

Service or Program: Starting in December 2021, a pilot project to deliver educational content for pharmacists across Namibia via video platform (Zoom) was initiated. This project, called OPEN (Ongoing Pharmacy Education in Namibia), is a partnership between the University of Namibia (UNAM), Idaho State University (ISU), and University of Pittsburgh (Pitt) which uses Zoom to deliver traditional didactic content and a discussion forum for patient cases from participants to support and foster educational gaps of Namibian pharmacists. Pharmacists were identified from UNAM rosters in the Masters of Clinical Pharmacy program and invited to participate in this monthly session. Requests for pharmacists to present cases were made twice per month so that peer to peer learning could take place.

Justification/Documentation: Thirty-four pharmacists were invited to participate every month. The sessions were led by a US based pharmacist with a faculty appointment at UNAM and attended by an average of 10 pharmacists per session. Didactic topics varied from non-communicable disease topics (i.e. GERD) to country specific issues such as vaccine hesitancy in Namibia and antiretroviral therapy concerns.

Adaptability: The expansion and access to programs such as Zoom is making it easier for those in low-resource settings to access educational content on a global level. However, exploring different methods which are regionally, culturally, and educationally appropriate need to continue to be explored. This mixed content method of supporting educational needs of pharmacists in Namibia is easily exportable to other countries where pharmacist roles are expanding, isolation is experienced and access to educational resources is limited or cost-prohibitive.

Significance: Although international tele-health programs exist for medical providers, there is a gap in opportunities for pharmacists in resource limited settings. This program explores the feasibility and acceptance of delivering ongoing education to pharmacists in a country where the practice of pharmacy is expanding.

Family Medicine

Tues-52. Pharmacist Impact in Family Medicine Diabetes Clinic.

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[2]Department of Pharmacy, Baptist Memorial Hospital, Memphis, TN

Service or Program: Studies have demonstrated pharmacist involvement with diabetes management leads to better control of diabetes.[1] Church Health is a non-profit healthcare center for underserved communities in Memphis, TN. Their goal is to improve patient's quality of life by providing accessible healthcare. In April 2021, pharmacists established a consult service in the family medicine clinic to aid in the outpatient management of diabetes. Patients who are followed by a family medicine resident who either have an A1c of >9%, are managing four or more medications, are titrating insulin, or who express confusion or complication with adherence are identified and referred to pharmacy by the patient's primary care physician. Pharmacists counsel patients on medication, adherence, discuss complications, and provide medication adjustments as needed through coordination with Church Health providers.

Justification/Documentation: Pharmacists were incorporated into the established clinic at Church Health in August 2020 two half days a week as mostly a drug resource. The providers and pharmacists identified an opportunity to collaborate in the treatment of the clinic's uncontrolled diabetic patients and initiated the diabetes consult service in April 2021. Through the development of this pharmacy service, pharmacists were consulted on a total of 28 patients during the first six months of the program. The initial average A1c for patients referred for pharmacist intervention was 11.3%. The average drop in A1c for patients with pharmacist intervention was 3.13% for the 12 patients with follow-up A1cs during those first six months.

Adaptability: Church Health serves uninsured and underinsured patients; this model is adaptable to other clinic type settings where pharmacists can work collaboratively with physicians.

Significance: The clinic demonstrates the value of a pharmacist led assessment and titration of drug therapy through collaboration with physicians. Through this clinic, pharmacists work as a team with medical residents to improve patient care and clinical outcomes to an underserved population.

Infectious Diseases

Mon AM-78. Tracking Outpatient Antimicrobial Stewardship Interventions Using the Collaboration to Harmonize Antimicrobial Registry Measures (CHARM) Dashboards.

Erin Grubbs, Pharm.D., BCIDP[1], Benjamin Pontefract, Pharm.D., BCPS[2], Minji Sohn, PhD, MPP, MS[2], Joshua Ford, Pharm.D., BCACP, AAHIVP[1] and Michael Klepser, Pharm.D., FCCP, FIDP[2]; [1]Spectrum Health Lakeland Medical Center, St. Joseph, MI [2]College of Pharmacy, Ferris State University, Big Rapids, MI

Service or Program: The Collaboration to Harmonize Antimicrobial Registry Measures (CHARM) project is a tool used to track and evaluate antibiotic prescriptions in the outpatient setting. Through CHARM, information from a health system's electronic medical record (EMR) is used to create an interactive dashboard, which is accessible through any web browser. The dashboard displays the rate, dose, and duration of prescriptions by specific antibiotic and disease state. In this report, we describe how a clinical antimicrobial stewardship (AMS) pharmacist in a single health system utilized a CHARM dashboard to identify AMS interventions and track the impact of initiatives from 2019-2020.

Justification/Documentation: The Joint Commission requires health systems have an outpatient AMS program. Part of this requirement is the tracking and reporting of AMS data. Using CHARM, the AMS pharmacist described here noted two things. First, 62% of antibiotic prescriptions were not associated with a diagnosis. Second, the average duration of therapy (DoT) of ciprofloxacin for the treatment of cystitis was greater than recommended by guidelines, at 9.4 days. After interventions, the rate of antibiotic prescriptions without diagnosis codes dropped to 17%, but there was no change in ciprofloxacin DoT. Subsequently, additional interventions were implemented targeting ciprofloxacin DoT, which resulted in a decrease to 5.9 days.

Adaptability: The CHARM project is managed by faculty at Ferris State University, and it can be utilized by any outpatient clinic with an EMR. CHARM has been adopted by 7 health systems. Any clinician with AMS training can effectively utilize CHARM dashboards due to their intuitive design.

Significance: This implementation shows that CHARM dashboards are effective tools for overseeing an outpatient AMS program. Dashboards allow for identifying problematic prescribing practices and tracking the impact of AMS interventions in a timely manner.

Mon PM-68. Frontline Pharmacist Criteria-Based Review of Piperacillin-Tazobactam Orders.

Jaime Borkowski, Pharm.D.[1], *Radhika Polisetty, Pharm.D.*[2], Jay Liu, MD, PhD[3] and Luis Manrique, MD[4]; [1]Pharmacy Department, Northwestern Medicine Delnor Hospital, Geneva, IL [2]Department of Pharmacy Practice, Midwestern University Chicago College of Pharmacy, Downers Grove, IL [3]RMG Infectious Disease, Northwestern Medicine Delnor Hospital, Geneva, IL [4]CDPG Infectious Disease, Northwestern Memorial HealthCare, Winfield, IL

Service or Program: A protocol was developed specifying likely appropriate, possibly appropriate, and likely inappropriate indications for empiric piperacillin-tazobactam (TZP) use and alternative empiric treatment options based on our Empiric Antibiotic Guideline. A formal process was developed for the pharmacists to review all TZP orders at the time of order verification. If the order was considered possibly inappropriate or likely inappropriate, the pharmacist contacted the prescriber to discuss and offer alternative antibiotic options.

Justification/Documentation: Broad-spectrum antibiotics are often selected empirically for infections such as intra-abdominal infections, complicated urinary tract infections, and pneumonias that would formerly have been considered healthcare-associated. This program addressed the inappropriate prescribing of TZP at our institutions.

The primary success measure of days of therapy per 1000 patient days (DOT) for TZP decreased from 1725 in 2019 to 1463 in 2021 (p=0.001). The main secondary measure of Standardized Antibiotic Administration Ratio (SAAR) for broad spectrum antibiotics per the National Health Safety Network Antibiotic Use and Resistance Option database decreased from 1.12 to 0.976 from the pre- to post-intervention period, respectively, for hospital 1 ($p = 0.02$), and from 1.15 to 1.03 for hospital 2 ($p = 0.08$).

Adaptability: This service was driven by our decentralized clinical staff pharmacists on all shifts. It was rolled out with education of the pharmacists on the protocol and the process of intervention by local antimicrobial stewardship pharmacists. This format could be applied in many different clinical settings, and would work for many different types of medications to help guide appropriate use, especially implementation of antimicrobial stewardship in resource-limited settings.

Significance: Broad-spectrum antibiotic use has many potential negative impacts, including *Clostridioides difficile* superinfection. This program has helped guide physicians to select less broad-spectrum antibiotics for many common infections and has successfully decreased our overall broad-spectrum antibiotic use.

Mon PM-52. Development, implementation, and impact of pharmacist interventions on antibiotic usage in a Namibian hospital.

Taimi Iipinge, BPharm[1] and *David Hachey, Pharm.D.*[2]; [1]Windhoek Central Hospital, Windhoek, Namibia [2]Family Medicine, Idaho State University, Pocatello, ID

Service or Program: Antimicrobial stewardship (AMS) programmes can optimise antimicrobial use and decrease growing global resistance. Successful AMS programmes have not consistently been implemented in low-middle income countries (LMICs) due to pharmacist knowledge, roles, and hospital infrastructure despite data supporting pharmacists can improve outcomes and reduces costs. Pharmacists at the in-patient department of Windhoek Central Hospital, Namibia have taken steps to support physicians and improve patient outcomes by suggesting appropriate changes in antibiotic therapy and documenting outcomes of interventions. This pilot program aimed to create a proactive antimicrobial review system and document the variety and acceptance of suggestions by pharmacists.

Justification/Documentation: The clinical roles of pharmacists are still evolving in LMICs and in Namibia there is lack of clinical pharmacy leadership in hospitals preventing real-time interventions of antibiotics. This project was carried out in Namibia, Windhoek Central Hospital in-patient department by a pharmacist during July 2021. Twenty-two (22) patients prescribed an antibiotic were reviewed for appropriate use. Of the 78 medicines prescribed, 42 (54%) were antibiotics. Thirty interventions were made to providers and 28 were accepted, an acceptance rate of (93%). Most common drug related problems were (1) product not available followed and (2) inappropriate frequency and (3) dose too high/low.

Adaptability: The roles of pharmacists are expanding in LMICs and projects like this demonstrate that pharmacists can use their knowledge in supporting appropriate antimicrobial use. Projects like this can be adapted to other LMICs as education and roles expands.

Significance: Pharmacists in LMICs can be leaders in AMS programmes by taking small steps to change systems, identify misuse, and make interventions. This programme demonstrated pharmacists

were able to identify problems, make interventions, and have those accepted at high rates.

Other

Mon AM-10. Pharmacists' Roles in Establishing a Dispensary within a Coordinated Emergency Response to Support Afghanistan Evacuees in Philadelphia.

Neela Bhajandas, Pharm.D.., BCPS, BCCCP[1], Dan Tran, Pharm.D.[1], Van Hellerslia, Pharm.D., BCPS[1] and Elizabeth Tencza, Pharm.D., BCPS, BCCCP[2]; [1]Department of Pharmacy Practice, Temple University School of Pharmacy, Philadelphia, PA [2]Department of Pharmacy, Temple University Hospital, Philadelphia, PA

Service or Program: Operation Allies Welcome was a unified national humanitarian mission to support Afghanistan evacuees in the United States. The City of Philadelphia, Pennsylvania welcomed approximately 25,000 evacuees from Afghanistan between August and November 2021. This effort included a broad range of medical services including COVID-19 testing, vaccinations, and setting up a medication dispensary. Our pharmacy team was tasked with establishing and operating a dispensary to dispense limited supply of medications to patients for non-life-threatening conditions as they were bridged to definitive care. The objective of this abstract is to describe the pharmacists' role within this coordinated emergency response.

Justification/Documentation: This emergency response required that our pharmacy dispensary was adequately staffed and stocked with common medications for the target population. Our roles focused on establishment of standard operating procedures for the dispensary, dispensing medications, creation of a securely shared electronic inventory, creation of standardized staffing process, participation in vaccination efforts, and provision of drug-information.

Overall, 1363 prescriptions, for both over the counter (OTC) and prescription medications, were dispensed. The dispensary stocked 82 different medications. Antipyretics, analgesics, antihistamines, prenatal vitamins, proton-pump inhibitors, and topical antibiotics were the most commonly dispensed OTC products. Frequently dispensed prescription medication classes included antibiotics, steroids, antiemetics, anti-diabetic and antihypertensives agents. We successfully leveraged the support of 66 volunteer pharmacists from 9 organizations around Philadelphia, including academic, hospital, non-profit, and pharmaceutical industry institutions.

Adaptability: This program has a high level of adaptability for future emergency preparedness efforts. It serves as a playbook to guide pharmacists to respond to future emergencies.

Significance: Our service provided much needed pharmacy support for Afghan evacuees. Our practical experiences demonstrated that pharmacists can effectively create and implement a dispensary during emergent crises. Findings from our operation add to the limited literature supporting the importance of pharmacists in these coordinated emergency responses.

Pharmacogenomics/Pharmacogenetics

Mon AM-105. A system wide approach to optimize the pharmacogenomics care process at the point of results return.

Samantha Socco, Pharm.D.[1], Dyson Wake, Pharm.D., BCPS[2] and *Henry Dunnenberger, Pharm.D., BCPS*[3]; [1]NorthShore University HealthSystem, Evanston, IL [2]Center for Personalized Medicine, NorthShore University HealthSystem, Evanston, IL [3]Center for Personalized Medicine, Northshore University HealthSystem, Evanston, IL

Service or Program: An automated daily report was generated for patients with pharmacogenomics (PGx) results posted in the previous 24 hours and had active orders for medications with potential clinical actionability. The PGx pharmacist reviewed this report for gene-drug interactions of clinical significance and, for each of these interactions, reviewed the patient's chart to determine if an intervention was warranted. If the patient had been experiencing issues with the medication in question, or if there was a strong probability of the medication causing issues in the future, the pharmacist contacted the provider that prescribed the medication in question via EHR direct message.

Justification/Documentation: A critical period exists in the PGx care process when there are active medications at the time PGx results become available. Approaches to this critical period include PGx clinic visits or manual patient-by-patient chart review; however, these are not practical at a system-wide level. Another approach is to use an automated report to flag all possible gene-drug interactions from a patient's medication list in the EHR. While scalable, this is relatively broad and may over-warn the pharmacist about less meaningful gene-drug interactions, potentially leading to alert fatigue.

Adaptability: An automated daily report allows for this additional review process to be scalable and feasible for a pharmacist led PGx program to employ. Pharmacist review time will vary by institution; for our practice, following revisions made to the report, this time was cut from ~3 hours/day to ~20-30 minutes per day. The report is modifiable as needed at each institution.

Significance: Over a period of five months, our automated report identified 507 gene-drug interactions in 356 unique patients. The reviewing pharmacist identified 65 (13%) gene-drug interactions with potential clinical significance; upon further review and discussion with providers, there were a total of 20 interventions made.

Sun-103. Implementation of a Pharmacogenomic Service in a Community Hospital Affiliated Health System.

Jennifer Wick, Pharm.D., MPH[1], Burns Blaxall, PhD[2], Kendra Grande, RPh[3] and Kristine Ashcraft, MS, MBA[3]; [1]The Christ Hospital Health Network, Cincinnati, OH [2]Precision Medicine, The Christ Hospital Health Network, Cincinnati, OH [3]Invitae, San Francisco, CA

Service or Program: The Christ Hospital Health Network recently began implementation of an integrated pharmacogenomics service. The service consists of a ~25 gene panel supported by embedded ambulatory care pharmacists trained in pharmacogenomics and a clinical decision support tool (CDST) fully integrated in the electronic medical record (EMR). Patients are identified based on the probability that pharmacogenomic interactions will be found, given population prevalence and patient's current medications. Pharmacists pend the order for a buccal swab test to the primary care provider. Results are returned directly into the EMR in approximately two weeks and are sent to a pharmacist for interpretation. Following analysis, recommendations are discussed as a team (patient, pharmacist, and prescriber) to optimize the patient's medications.

Justification/Documentation: There are >100 drugs with FDA labeling and CPIC guidelines for pharmacogenomics. Despite this, pharmacogenomic testing is relatively uncommon. Tests are generally relegated to therapeutic silos (e.g. psychotropic medications). Successful implementation relies on making testing comprehensive and easily understandable for prescribers. As medication experts with a strong pharmacokinetic background, ambulatory care pharmacists are in an ideal position to help. To date, using our comprehensive panel, 230 patients had drug interactions assessed, and 131 of those had pharmacogenomic interactions. 82% of interactions warranted a change in therapy per the clinical pharmacists' recommendations.

Adaptability: This implementation of pharmacogenomics utilized existing clinic space, workflows, and staff. The implementation of the CDST and EMR order/result components of our program have greatly increased utility. Integration of pharmacogenomic results into standard comprehensive medication reviews can be implemented at most sites that currently offer pharmacist medication therapy management services.

Significance: Integration of pharmacogenomics into primary care expanded identification and resolution of adverse drug-gene interactions during comprehensive medication review. To our knowledge, this is the first implementation of a comprehensive pharmacogenomic service in a community hospital affiliated health system.

Pulmonary

Tues-100. Implementing Asthma SMART Therapy in a Family Medicine Clinic.

Ila Harris, Pharm.D., BCPS, FCCP[1], Ann Philbrick, Pharm.D., BCPS, BCACP[2] and Riley Larson, Pharm.D., BCPS, FCCP[2]; [1]Department of Family Medicine and Community Health, University of Minnesota Medical School, Minneapolis, MN [2]Department of Pharmaceutical Care and Health Systems, University of Minnesota College of Pharmacy, Minneapolis, MN

Service or Program: Single maintenance and reliever therapy (SMART) with inhaled budesonide/formoterol for the treatment of asthma is the preferred treatment per the GINA and NHLBI guidelines. These recommendations have been slow to implement routinely into clinical practice due to lack of FDA approval for this dosing, uncertainty about insurance coverage, patient resistance to change, and/or provider unfamiliarity. We developed a program at a family medicine residency clinic to improve prescribing of SMART. First, a clinical pharmacist provided a didactic lecture. Tip sheets with graphics were posted in the clinic for easy point-of-care reference. Next, dot phrases in the EPIC electronic medical record were created to assist providers in prescribing SMART. Clinical pharmacists created a process to identify patients with asthma already scheduled with physicians and either see them or discuss SMART therapy with their physician. All PA requests or rejections were forwarded to the clinical pharmacists for further evaluation.

Justification/Documentation: The measure for SMART was having a diagnosis of asthma and budesonide/formoterol but not albuterol on their medication list. Baseline and 8-month follow-up data were collected. Results showed the number of patients on SMART at baseline and follow-up were 28 and 111, respectively, a 4-fold increase. This describes the effectiveness of our SMART therapy program. Data will be continued to be collected and further analysis will be done, including a comparison of ACT values and statistical analysis.

Adaptability: This service could easily be implemented in other ambulatory care settings. Once physicians are educated and given the tools to prescribe budesonide/formoterol inhaled SMART therapy, with pharmacists available for guidance, prescribing SMART can improve.

Significance: The improved prescribing of SMART for asthma is significant, as this guideline-directed therapy has been slow to implement in the United States. This data shows that a pharmacist-initiated and managed program can be successful in improving SMART prescribing.

Substance Abuse/Toxicology

Tues-78. Quick, to the BupMobile: Describing an Interprofessional Primary Care Mobile Unit for Substance Use Disorder Treatment in Underserved Populations.

Jennie Jarrett, Pharm.D., BCPS, MMedEd, FCCP[1], Eden Keller, Pharm. D.[2], Abigail Elmes, Pharm.D., BCPS[1], Stockton Mayer, DO[3], Antonio Jimenez, PhD[4] and Sarah Messmer, MD[4]; [1]College of Pharmacy; Department of Pharmacy Practice, University of Illinois at Chicago, Chicago, IL [2]Pharmacy Practice, University of Illinois at Chicago College of Pharmacy, Chicago, IL [3]University of Illinois Chicago College of Medicine, Chicago, IL [4]University of Illinois Chicago, Chicago, IL

Service or Program: The Community Outreach Intervention Projects (COIP) Mobile Unit is a unique collaboration between a community harm reduction program, an opioid treatment program, and mobile medical unit organization. The goal is to provide medication-assisted recovery (MAR) via low-threshold buprenorphine initiation, methadone referral, and primary care with harm reduction services to reach people who use drugs, are at risk for overdose, and/or could benefit

from medical care in Chicago. The interprofessional team consists of physicians, clinical pharmacists, peer recovery specialists, and outreach workers. Clinical pharmacists are integral to this operation by providing COVID vaccinations, testing, medication inductions and counseling, and wound care.

Justification/Documentation: A chart review was conducted for patients seen by the COIP Mobile Unit between June 1, 2021 and January 31, 2022 to describe services provided. A total of 398 unique patients were seen across 565 visits. Of the visits, 70% (n=398) and 30% (n=167) were initial and follow-up visits, respectively. Most visits provided one service (84%, n=477) versus two or more (16%, n=88). The typical patient was Black (65%), male (66%), and 46 years old (mean). The most common service provided was COVID-19 vaccination (43%, n=244) followed by MAR (25%, n=143), COVID-19 testing (14%, n=81), wound care (11%, n=63), medication refill (7%, n=41), and vitals assessment (2%, n=13).

Adaptability: The unit adjusts its service location based on monthly overdose data from the Chicago Department of Public Health to meet the patients where they are. The outreach model employed is an Indigenous Leader Outreach Model that hires from the target population for shared experience and enhanced value. This model can be adopted by other street medicine teams to further integrate into high need areas.

Significance: The COIP Mobile Unit is an innovative, interprofessional harm reduction program increasing access to MAR and primary care in a street medicine environment with integrated clinical pharmacy services.

Transplant/Immunology

Sun-113. Comprehensive Medication Management in a Cardiothoracic Transplant Clinic.

Christina Doligalski, Pharm.D., BCPS, CPP[1], Kayla Waldron, Pharm.D., MS, BCPS[2], Chloe Richard, MS[3], Zack Deyo, Pharm.D.[4], Carrie Blanchard, Pharm.D., MPH[5] and Melanie Livet, PhD[6]; [1]Department of Pharmacy, University of North Carolina Health, Chapel Hill, NC [2]Department of Pharmacy, University of North Carolina Medical Center, Chapel Hill, NC [3]UNC Eshelman School of Pharmacy, Chapel Hill, NC [4]University of North Carolina Health System, Chapel Hill, NC [5]Center for Medication Optimization, UNC Eshelman School of Pharmacy, Chapel Hill, NC [6]Eshelman School of Pharmacy, University of North Carolina-Chapel Hill, Chapel Hill, NC

Service or Program: The description of comprehensive medication management (CMM) in specialty clinics is limited. Given an established collaborative practice agreement (CPA) and a total-care approach that transplant programs take in post-transplant management, the patient care process for CMM was piloted in conjunction with routine post-transplant multidisciplinary face-to-face visits in a cardiothoracic transplant clinic from 7/1/2020-5/1/2021 by a PGY2 transplant-trained clinical pharmacist practitioner (CPP). All CPP visits (monthly for patients within a year of transplant, yearly for those beyond one year) were conducted as CMM visits during the pilot. Given patient complexity, CMM visits were templated for 60 minutes.

Justification/Documentation: 186 face-to-face CMM visits were conducted. A majority (66.6%) of CMM visits took place within a year of transplant. Median time post-transplant was 4.4±4.8 years for visits conducted beyond the first post-transplant year.

519 MTPs were identified; 512 (98.7%) were resolved within the CMM visit. 96.8% of CMM visits identified at least one MTP. There were no differences in the number of MTPs identified per CMM visit for CMM visits occurring within or beyond a year post-transplant (2.9 vs. 3.1, p=0.23). MTPs were identified across a number of disease states, including immunosuppression (n=67), infection prophylaxis/treatment (n=47), diabetes (n=47), and hypertension (n=43). The most common categories of MTPs included need for additional therapy (n=128), unnecessary medications (n=90), and dose too low (n=87) or too high (n=77).

Adaptability: CMM appears to be feasible and successful when integrated within ambulatory transplant clinics where clinical pharmacists with transplant expertise have established relationships. CMM visits were useful both early and late post-transplant.

Significance: These findings underscore the breadth of MTPs identifiable with CMM implementation in ambulatory transplant clinics regardless of time post-transplant, and highlight the efficiency of resolving MTPs when CMM is provided in a practice with established CPAs.

ENCORE PRESENTATIONS

ADR/Drug Interactions

Sun-8. Ethanol Inhibits the Metabolism of the Multiple Sclerosis Drug Dimethyl Fumarate to its Active Metabolite and Decreases Brain Exposure.

Robert Parker, Pharm.D., Bing Yang, Ph.D. and Casey Laizure, Pharm.D.; Department of Clinical Pharmacy and Translational Science, University of Tennessee College of Pharmacy, Memphis, TN Published in FASEB J 2022; 36(S1):R2772.

Cardiovascular

Mon PM-23. The Journey to Diagnosis of ATTR Amyloidosis: Burden of Early Disease.

Chafic Karam, MD[1], *Madeline Merkel, Pharm.D., MS*[2], Catherine Summers, MS, PhD[2], Colleen Moffitt, Pharm.D., MS[2], Fran Kochman, RPh[2], Mathilde Puls, MPH[3], Marieke Schurer, MSc[4], Nicola Mason, BSPhil, MSPP[5], Muriel Finkel, N/A[6], Paula Schmitt, N/A[7] and Mazen Hanna, MD[8]; [1]University of Pennsylvania, Philadelphia, PA [2]Alnylam

Pharmaceuticals, Cambridge, MA [3]Lumanity, London, United Kingdom [4]Lumanity, Utrecht, Netherlands [5]Lumanity, Manchester, United Kingdom [6]Amyloidosis Support Groups Inc., Wood Dale, IL [7]Amyloidosis Support Groups Inc., Poulan, GA [8]Cleveland Clinic, Cleveland, OH

Presented at the International Symposium on Amyloidosis (ISA) 2022, International Society of Amyloidosis, Heidelberg, Germany, 4–8 September 2022.

Sun-24. Developing a multi-disciplinary program for routine acetylcholine vasoreactivity testing in the cardiac catheterization laboratory.

Lydia Tran, Pharm.D., BCPS[1], *Sister Michaela Serpa, Pharm.D., BCPS*[2], Megan Tuite, BSN[3], Steffne Kunnirickal, MD[4], Teresa Esposito, BSN[3], Steven Pfau, MD[5] and Samit Shah, MD, PhD, FACC, FSCAI[5]; [1]Department of Pharmacy, Yale New Haven Hospital, New Haven, CT [2]Fred Wilson School of Pharmacy, High Point University, High Point, NC [3]Department of Nursing, Yale New Haven Hospital, New Haven, CT [4]Department of Internal Medicine, Yale New Haven Hospital, New Haven, CT [5]Department of Interventional Cardiology, Yale New Haven Hospital, New Haven, CT

Published in European Heart Journal. Oct 2021;42(S1). Presented at the International ESC Congress of the European Society of Cardiology Congress, Virtual, Aug 27-30, 2021.

Dermatology

Mon AM-53. Spesolimab safety in generalized pustular psoriasis, palmoplantar pustulosis and atopic dermatitis.

Maja Mockenhaupt, M.D., Ph.D.[1], Denis Jullien, M.D., Ph.D.[2], *Evelyn Yap, M.B.B.S., M.R.C.P., Adv M Dermatology*[3], Boni Elewski, M.D.[4], Jianzhong Zhang, M.D.[5], Ling Li, M.D.[6], Jason Guercio, M.D., M.B.A.[7] and Akimichi Morita, M.D., Ph.D.[8]; [1]University of Freiburg Medical Center, Freiburg, Germany [2]Department of Dermatology, Pavillon R Hôpital Edouard Herrio, Isere, France [3]Hospital Pakar Sultanah Fatimah, Johor, Malaysia [4]University of Alabama at Birmingham, Birmingham, AL [5]Department of Dermatology, Peking University People's Hospital, Beijing, China [6]Boehringer Ingelheim Corporation, Shanghai, China [7]Boehringer Ingelheim Corporation, Ridgefiled, CT [8]Department of Geriatric and Environmental Dermatology, Nagoya City University, Nagoya, Japan

Presented at the 31st EADV Congress, Milan, Italy, September 7-10, 2022.

Drug Information

Mon AM-55. Knowledge Management of Clinical Pharmacogenetic Information – Complexities and Challenges.

Christine Cheng, Pharm.D.[1], Brad Green, BS[2] and Jeff Bubp, Pharm.D.[3]; [1]Disease Decision Support Group, First Databank, Inc, South San Francisco, CA [2]Software Development, First Databank, Inc., Indianapolis, IN [3]Clinical Editorial, Disease Decision Support Group, First Databank, Inc., South San Francisco, CA

Presented at the Clinical Pharmacogenetics Implementation Consortium-Pharmacogenomics Global Research Network (CPIC-PGRN) meeting, Aurora, CO, May 10-12, 2022.

Education/Training

Tues-37. Tweet it and they will come: Dissemination of an educational hashtag for reflection and learning.

Brandon Dionne, Pharm.D., BCPS-AQ ID, BCIDP, AAHIVP[1], Stephanie Brix, Pharm.D.[1], Stephanie L. Sibicky, Pharm.D., BCGP, BCPS[2] and Alexa A Carlson, Pharm.D., MEd, BCPS[2]; [1]Northeastern University, Boston, MA [2]Department of Pharmacy and Health Systems Sciences, Northeastern University, Boston, MA

Presented at AACP Pharmacy Education, Dallas, TX, July 23-27, 2022.

Sun-47. Impact of Just-in-Time TeamSTEPPS® Training on Team Performance in a Pediatric Escape Room Simulation.

Navjot Kaur, Pharm.D. Candidate[1], Deepti Vyas, Pharm.D.[2], Tracey DelNero, DMSc, PA-C[3] and Veronica T. Bandy, Pharm.D., MS[1]; [1]University of the Pacific, Stockton, CA [2]University of the Pacific, elk grove, CA [3]University of the Pacific, Sacramento, CA

Presented at 2022 ACCP Virtual Poster Symposium.

Mon AM-8. A Mindfulness Practice Elective for Reducing Stress and Promoting Quality of Life Among Pharmacy Students.

Brianna M. McQuade, Pharm.D., BCACP, MHPE[1] and Jennie Jarrett, Pharm.D., BCPS, MMedEd, FCCP[2]; [1]Pharmacy Practice, University of Illinois at Chicago College of Pharmacy, Chicago, IL [2]College of Pharmacy; Department of Pharmacy Practice, University of Illinois at Chicago, Chicago, IL

Presented at the American Association of Colleges of Pharmacy Meeting, Grapevine TX, July 23-27, 2022.

Mon AM-16. *Pedagogical Tools and Strategies to Develop Cultural Intelligence in Pharmacy Students and Faculty*.

Aimee Ho, BS[1] and *Jacqueline McLaughlin, PhD*[2]; [1]UNC Eshelman School of Pharmacy, University of North Carolina - Chapel Hill, Chapel Hill, NC [2]UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill, Chapel Hill, NC

Presented at Pharmacy Education 2022 of the American Association of Colleges of Pharmacy, Grapevine, TX, July 23-27, 2022.

Emergency Medicine

Sat-42. Andexanet alfa is associated with a significant reduction in in-hospital mortality compared to 4F-PCC in a real-world analysis.

Paul Dobesh, Pharm.D., FACC, FAHA, FCCP, BCPS, BCCP[1], Craig Coleman, Pharm.D.[2], Julie Ulloa, PhD[3], Belinda Lovelace, Pharm.D.[4], Theresa Dettling, BSN, JD, MPH[5], Bruce Koch, Pharm.D.[6] and Gregory Fermann, M.D.[7]; [1]University of Nebraska Medical Center College of Pharmacy, Omaha, NE [2]Department of Pharmacy Practice, University of Connecticut School of Pharmacy and Medicine, Storrs, CT [3]Outcomes Insights, Westlake Village, CA [4]Alexion, AstraZeneca Rare Disease, Boston, MA [5]US HEOR, Global Medical Affairs, Alexion Pharmaceuticals, Boston, MA (6)4Alexion, AstraZeneca Rare Disease, Boston, MA [7]Department of Emergency Medicine, University of Cincinnati, Cincinnati, OH

Presented as a platform presentation at the annual Congress of the International Society of Haemostasis and Hemostasis, London, England, July 12, 2022.

Mon PM-60. Real World Utilization of Andexanet Alfa in the Management of Oral Factor Xa Inhibitor-Associated Gastrointestinal Bleeding.

Caitlin Brown, Pharm.D., BCCCP[1], Alicia Mattson, Pharm.D., BCCCP[2], Daniel Cabrera, MD[3], Nayantara Coelho-Prabhu, MD[4], Rabinstein Alejandro, MD[5], *Theresa Dettling, BSN, JD, MPH*[6], Robert McBane, MD[7] and Fernanda Bellolio, MD, MS[3]; [1]Department of Pharmacy, Mayo Clinic Rochester, Rochester, MN [2]Department of Pharmacy, Mayo Clinic- Rochester, Rochester, MN [3]Department of Emergency Medicine, Mayo Clinic, Rochester, MN [4]Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, MN [5]Department of Neurology, Mayo Clinic Hospital, Rochester, MN [6]US HEOR, Global Medical Affairs, Alexion Pharmaceuticals, Boston, MA [7]Division of Vascular Medicine,, Mayo Clinic, Rochester, MN

Presented at Emergencies in Medicine Conference, Salt Lake City, UT, February 27-March 4, 2022.

Hematology/Anticoagulation

Sat-30. A Review on the Efficacy and Safety of SB1518, a JAK2 Inhibitor in the Management of Myelofibrosis.

Ollie Anum, B.S., Pharm.D.; Benv Health Ministry Center & Research, Tampa, FL

Presented at FLASCO 2022 Business of Oncology Summit & Spring Session

Infectious Diseases

Mon PM-10. Efficacy and Safety of SER-109, an Investigational Microbiome Therapeutic for the Treatment of Recurrent *Clostridioides difficile* Infection (rCDI): A Phase 3 Double-Blind, Randomized Trial (ECOSPOR III).

Sara Alosaimy, Pharm.D.[1], Barbara McGovern, MD[1], Elaine Wang, MD[1], Charles Berenson, MD[2], Stuart Cohen, MD[3] and Lisa von Moltke, MD[1]; [1]Seres Therapeutics, Cambridge, MA [2]University at Buffalo, VA Western New York Healthcare System, Buffalo, NY [3]University of California Davis Health, Davis, CA

Presented at: DDW 2021; Society of General Internal Medicine 2022; and MAD-ID 2022.

Medication Safety

Sun-86. Relationship of Medication Regimen Complexity to Medication Errors in Critically Ill Patients.

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Presented at ACCP Virtual Poster Symposium, American College of Clinical Pharmacy, Virtual, May 24-25, 2022.

Neurology

Tues-75. A Systematized Review of 'Opportunistic, Fringe, Rogue, or even Predatory Journals' in the Neuropharmacology & Epilepsy Space: What Clinician-Researchers, -Authors & -Readers Need to Know..

Ronald Reed, BS Pharm, Pharm.D., FCCP, FAES[1], Anna Crawford, MLIS[2] and Dorothee Kasteleijn- Nolst Trenite, MD, PhD, MPH[3]; [1]Department of Clinical Pharmacy, School of Pharmacy, West Virginia University, Morgantown, WV [2]Health Science Center-North, Library, West Virginia University, Morgantown, WV [3]Faculty of Medicine & Psychology, University of Rome "Sapienza" II, Roma, Italy

Presented at the American Epilepsy Society Annual Meeting, Chicago, IL, December 3rd–7th, 2021.

Pain Management/Analgesia

Tues-88. An Ex-vivo Assessment of the Effects of Meloxicam IV on Platelet Function.

Angela Haynes, Pharm.D., MBA-HA[1], Jonathan Jahr, MD[2], Sean Searle, MD[3], Stewart Mccallum, MD[4], Kim Minger, RN[4], *Alex Fryer, Pharm.D.*[5] and Wei Du, PhD[6]; [1]Department of Medical Affairs, Baudax Bio, Saint Petersburg, FL [2]Department of Anesthesiology, Los Angeles, CA [3]Department of Early Phase, Raleigh, NC [4]Department of Medical Affairs, Baudax Bio, Malvern, PA [5]Department of Development and Clinical, Baudax Bio, Malvern, PA [6]Department of Clinical Statistics Consulting, Baudax Bio, Malvern, PA

Presented at the NYSSA Postgraduate Assembly in Anesthesiology 2018.

Pharmacogenomics/Pharmacogenetics

Mon PM-92. Evaluating the impact of the ABCD-GENE score on antiplatelet therapy outcomes following percutaneous coronary intervention in a real-world clinical setting.

Marshall Winget, Pharm.D. Candidate[1], Ian Mulrenin, Pharm.D.[1], Megan Gower, Pharm.D.[1], Natasha Kulick, MD Candidate[1], Cameron D. Thomas, Pharm.D.[2], Larisa H. Cavallari, Pharm.D., BCPS, FCCP[2], Karen E. Weck, MD[3], Joseph Rossi, MD[4], George A. Stouffer, MD[4] and Craig R. Lee, Pharm.D., PhD[1]; [1]Division of Pharmacotherapy and Experimental Therapeutics, UNC Eshelman School of Pharmacy, Chapel Hill, NC [2]Department of Pharmacotherapy and Translational Research, University of Florida, Gainesville, FL [3]Department of Pathology and Laboratory Medicine, UNC School of Medicine, Chapel Hill, NC [4]Department of Medicine, Division of Cardiology, UNC School of Medicine, UNC Medical Center, Chapel Hill, NC

Presented at the 2022 American Society for Clinical Pharmacology and Therapeutics Annual Meeting, [Online], March 16-19, 2022.

Tues-42. Analysis of Clinical Actions Attributed to Pharmacogenomic Clinical Decision Support following Preemptive Return of Results from a Health System Research Biobank.

James Martin, Pharm.D.[1], Elise Shalowitz, MS[2], Mario Careaga, Pharm.D.[1], Sonali Patel, Pharm.D.[1], David Kao, MD[2], Katy Trinkley, Pharm.D., PhD[3] and Christina L. Aquilante, Pharm.D, FCCP[4]; [1]Department of Pharmaceutical Sciences, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora, CO [2]Department of Medicine, University of Colorado School of Medicine, Aurora, CO [3]University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora, CO [4]Department of Pharmaceutical Sciences, University of Colorado, Aurora, CO

Transplant/Immunology

Mon AM-111. Evaluation Of Hepatitis C Positive Donor To Hepatitis C Negative Recipient Kidney Transplant In A Highly Sensitized Patient Population.

Aoife Iaria, Pharm.D.[1], Michelle T. Martin, Pharm.D.[2], Allison Hietpas, BS[2], Ignatius Tang, Pharm.D., MD[3], Sean Koppe, MD[4], Ivo Tzvetanov, MD[5], Enrico Benedetti, MD[6] and Cassie Muran, Pharm.D.[7]; [1]College of Pharmacy, University of Illinois Chicago, Chicago, IL [2]College of Pharmacy, University of Illinois at Chicago, Chicago, IL [3]Department of Medicine, Nephrology, University of Illinois Hospital and Health Sciences System, Chicago, IL [4]Division of Gastroenterology, University of Illinois Chicago, Chicago, IL [5]University of Illinois at Chicago, Chicago, IL [6]Department of Surgery, University of Illinois at Chicago, Chicago, IL [7]University of Illinois at Chicago, Department of Surgery, Division of Transplant, University of Illinois at Chicago College of Pharmacy, Chicago, IL

Presented at the American Transplant Congress, Boston, MA, June 4-8, 2022.

Sun-14. Reduced Dose Mycophenolate Does Not Increase the Risk of Rejection Following Renal Transplantation.

Lyndsey Bowman, Pharm.D.; Tampa General Hospital, Lithia, FL

Presented at the American Transplant Congress of the American Society of Transplantation, Boston, MA, June 4-8, 2022.

LATE BREAKING ORIGINAL RESEARCH

ADR/Drug Interactions

Mon PM-2. Development and Validation of Explainable Machine Learning Models to Predict Liver Injury in Amiodarone and Dronedarone.

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Introduction: Liver injury is common for oral amiodarone and dronedarone users, with crucial risk factors of the liver injury remain unavailable.
Research Question or Hypothesis: The aims of this study were to develop and validate explainable machine learning prediction model to improve surveillance and identify amiodarone and dronedarone users at high risk of liver injury.
Study Design: Different machine learning algorithms and resampling methods were applied to optimize the prediction of amiodarone and dronedarone induced liver injury.
Methods: This retrospective study employed the data from Taipei Medical University Clinical Research Database. Patients treated with amiodarone and dronedarone at Taipei Medical University Hospital and Wan-Fang Hospital were used as the training set through 5-fold cross validation, while those at Shuang-Ho Hospital served as the testing set for external validation. Recursive feature selection was applied to find optimal feature sets for three machine learning algorithms: random forest, extreme gradient boosting, and adaptive boosting. Resampling methods (oversampling, undersjampling, and their hybrid approach) and decision threshold-tuning were applied to enhance model performances. SHapley Additive exPlanations (SHAP) was utilized to explain predictions of the machine learning model.
Results: There were 6,566 eligible amiodarone and dronedarone users identified from the database, led to 13.07% of liver injury during therapy. The random forest with random oversampling model using 42 predictive features achieved a highest AUROC of 0.795 (95%CI 0.771-0.819) and an AUPRC of 0.346 (95%CI 0.305-0.406). Under the optimal threshold, the sensitivity, specificity, positive and negative predictive value reached 0.767, 0.684, 0.246, 0.956. Global feature importance and local explanation summary of the random forest with random oversampling model were determined using SHAP, and the risks of liver injury were well-distinguished through log-rank test ($p<0.001$).
Conclusion: The machine learning prediction model helps clinicians identify high risk patients, served as preliminary surveillance tool to avoid liver injury and cirrhosis caused by amiodarone and dronedarone.

Tues-5. Evaluation of Antipsychotic Monitoring in a Community Health Center during the COVID-19 Pandemic.

Jesse Madore, Pharmacy Student[1], Kaylie Lemere, Pharmacy Student[1] and Richard Silvia, Pharm.D., BCPP[2]; [1]MCPHS University Boston, Boston, MA [2]School of Pharmacy, MCPHS University - Boston, Boston, MA

Introduction: The COVID-19 pandemic complicated providers' ability to appropriately monitor patients on antipsychotic medications, as visits moved to telehealth. Adverse metabolic and movement effects can be hard to assess virtually, reducing adherence to national antipsychotic guidelines.
Research Question or Hypothesis: Patients on antipsychotics received less frequent metabolic and movement disorder monitoring than recommended from both mental health (MH) and primary care (PC) providers during the pandemic.
Study Design: This was a retrospective chart review of patients receiving antipsychotics from MH and PC providers. Providers prescribing antipsychotics to at least five patients between June 2021-2022 were included. Random samples of the greater of five total or 10% of each provider's patients were reviewed.
Methods: A list of providers and patients utilizing antipsychotics over the previous year was reviewed for inclusion. Sample patients were reviewed for relevant data including: demographics, antipsychotic(s) prescribed, glucose, hemoglobin A1c, total cholesterol, LDL, HDL, triglycerides, weight/BMI, waist circumference, Abnormal Involuntary Movement Scale (AIMS), and other movement disorder assessments. Monitoring rates were compared to national antipsychotic guidelines. Adherence rates were calculated for each monitoring parameter from the data collected. Comparisons between MH and PC, age under 40 vs over 40, and gender, were performed using t-tests to determine statistically significant differences ($p<.05$).
Results: Eighteen providers met inclusion criteria, 6 MH and 12 PC, and 97 patients were reviewed. Metabolic parameters were measured in 61.9-91.8% of patients, but were slightly higher in MH (75.9-94.6%). They were less likely in younger patients (53.1-90.6%) and males (53.3-84.4%). Movement disorders were monitored less frequently, with AIMS at 11.3% (PC=0), and other EPS monitoring in 17.5% (MH=40.5%). Younger patients (6.3%) and males (8.9%) displayed lower rates of AIMS monitoring.
Conclusion: Decreased metabolic and movement disorder monitoring rates were anticipated during the pandemic, but still are surprising. The lower rates among younger and male patients are concerning, and should be addressed through provider education.

Mon PM-3. Clinically Applicable Machine Learning Techniques To Predict Amiodarone-Induced Thyroid Dysfunction Risk With Explainable Artificial Intelligence.

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Introduction: Machine learning offers a new solution to predicting life-threatening, unpredictable amiodarone-induced thyroid dysfunction. Traditional regression approaches without time-series consideration of features yielded suboptimal prediction.

Research Question or Hypothesis: To forecast and optimize the individualized amiodarone-induced thyroid dysfunction risk with the machine learning-based risk stratification scheme.

Study Design: Multi-center retrospective cohort study of adult patients receiving amiodarone in the Clinical Research Database (CRD) of the Taipei Medical University from January 2013 to December 2017.

Methods: The training set was composed of patients from Taipei Medical University Hospital and Wan Fang Hospital while data from Taipei Medical University Shuang Ho Hospital was the external testing set. This study constructed 16 machine learning models, using eXtreme Gradient Boosting, AdaBoost, K-Nearest Neighbor, and logistic regression models along with the original and three resampling methods, oversampling with Borderline- Synthesized Minority Oversampling Technique, undersampling edited nearest neighbor, and the over-and undersampling hybrid methods. The model performance was compared with accuracy, precision, recall, F1 score, Geometric Mean, area under the curve of the Receiver Operating Characteristic, and the area under the precision-recall curve. After determining the best model, the decision threshold was readjusted to decide the best cutoff.

Results: The training set contained 4,075 patients from TMUH and WFH, while the external testing set was 2,422 patients from SHH, with 583 (14.3%) developing amiodarone-induced thyroid dysfunction. Within the external testing set, 275 (11.4%) were case group. The eXtreme Gradient Boosting oversampling machine learning model demonstrated the best predictive outcomes among all 16 models. The accuracy, precision, recall, F1 score, G-mean, AUPRC and AUROC were 0.923, 0.632, 0.756, 0.688, 0.845, 0.751, and 0.934, respectively. After readjusting the cutoff to the best cutoff, the F1 score could achieve 0.699.

Conclusion: The machine learning model combined with resampling methods can predict amiodarone-induced thyroid dysfunction and serve as a supportive tool for individualized risk prediction and clinical decision support tools.

Mon PM-1. Machine Learning Algorithms to predict Colistin-induced Nephrotoxicity in Multi-drug Resistant Gram-negative Infection Patients From Imbalanced Clinical Research Database.

Ling-Wan Chiu, M.S.[1], Horng-Jiun Chao, B.B.A.[1], San-Yuan Wang, Ph. D.[1] and *Hsiang-Yin Chen*, *Pharm.D*, *M.S.*[2]; [1]Department of Clinical Pharmacy, School of Pharmacy, Taipei Medical University, Taipei, Taiwan [2]Department of Clinical Pharmacy, College of Pharmacy, Taipei Medical University, Taipei, Taiwan

Introduction: Colistin-induced nephrotoxicity is a prevalent but unpredictable adverse effect. Early prediction and intervention of this side effects can delay progression of renal dysfunction and increase patient survival.

Research Question or Hypothesis: The study aims to construct an explainable model by machine learning algorithms to early predict colistin-induced nephrotoxicity in multiple-drug resistant gram negative infection patients.

Study Design: Patients received colistin from Taipei Medical University affiliated hospitals were included to divide into a derivation cohort (2003-2017) and a temporal validation cohort (2018-2020).

Methods: Fifteen machine learning models were constructed and compared by using the original data and the ones with 4 different resampling strategies in catboost, light gradient boosting machine and random forest. Grid search was applied to construct the fine-tune model with the optimal combination of hyperparameters. Classifier performance was measured and compared in terms of sensitivity, F1 score, Matthews correlation coefficient, area under receiver operating characteristic curve and precision-recall area under the curve.

Results: In total, 1392 patients were recruited in this study with 360 (36.4%) and 165(40.9%) experienced acute nephrotoxicity in derivation and temporal validation cohorts, respectively. Machine learning models established with resampling strategies outperformed than those without. Moreover, Catboost coupled with support vector machine synthesized minority oversampling technique achieved the highest performance among 15 machine learning models with sensitivity of 0.861, F1 score of 0.742, Matthews correlation coefficient of 0.534, area under receiver operating characteristic curve of 0.823 and area under precision-recall curve of 0.738.

Conclusion: Machine learning techniques could become a preliminary screen tool and provide therapeutic direction for clinical professionals in tailoring regimen to prevent colistin-induced nephrotoxicity.

Critical Care

Sun-38. Evaluation of scheduled diazepam timing in critically ill patients presenting with alcohol withdrawal syndrome.

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Introduction: Symptom-triggered benzodiazepine (BDZ) use has demonstrated reduced dosing and exposure when used for alcohol withdrawal syndrome (AWS) treatment. Optimal timing of scheduled BDZ therapy in critically ill patients with AWS is unknown.

Research Question or Hypothesis: Does scheduling diazepam within the first 24 hours of admission improve percent-time in goal sedation range among critically ill patients with AWS?

Study Design: Retrospective, cohort study at an academic medical center.

Methods: Critically ill patients admitted directly from the ED to an ICU with AWS were identified over a 5-year period. The primary outcome evaluated the difference in the percent-time in goal Richmond Agitation Sedation Scale (RASS) range between early scheduled diazepam (ESD; initiation ≤24 hours of admission) and late scheduled diazepam (LSD; initiation >24 hours of admission). Secondary outcomes included hospital and ICU length of stay (LOS), proportion mechanically ventilated (MV), percent delirium-free days, adjunctive non-BDZ agents required, total daily dose of symptom-triggered BDZ, and incidence of seizure secondary to AWS.

Results: A total of 113 patients (ESD 59; LSD 54) were included. The ESD cohort had a higher median percent-time in goal RASS range (78.3 [37.3-100] vs 57.2 [33.5-78.5]%, p=0.048). The ESD cohort had shorter median hospital LOS (8.7 [4.9-18.2] vs 14.0 [10.6-19.2] days, p=0.004), ICU LOS (4.1 [2.0-7.6] vs 8.6 [5.7-12.9] days, p<0.001), lower proportion MV (22 [37.3%] vs 38 [70.4%], p<0.001), and increased percent delirium-free days (40 [0-100] vs 20 [0-40]%, p=0.02). The LSD cohort received haloperidol, propofol, dexmedetomidine, and ketamine for longer durations. No other differences were observed.

Conclusion: Critically ill patients presenting with AWS initiated on ESD displayed significant improvement in percent-time in goal RASS range. Significant reductions in hospital and ICU LOS, proportion MV, and duration of delirium were also observed with ESD. Early scheduled diazepam should be considered in patients presenting to the ED or ICU with AWS.

Sat-12. Critical Care Pharmacy Practice Advancement Recommendations on Direct Patient Care Activities: A Delphi Study.

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Introduction: The 2020 position paper on critical care pharmacy services provides contemporary recommendations including direct patient care. Development and implementation of new clinical pharmacy services and programs are recommended without providing specific strategies for practice advancement.

Research Question or Hypothesis: The purpose of this study is to provide consensus recommendations aimed at direct patient care activities for the advancement of critical care pharmacy practice.

Study Design: Electronic Delphi surveys of panel members consisting of pharmacists, physicians, and nurses to achieve consensus of practice advancement recommendations between March and May 2022.

Methods: Practice advancement recommendations were developed by the study panel critical care pharmacists. Proposed recommendations were to provide specific actionable clinical activities related to the initiation, modification, or discontinuation of medications as well as laboratory tests within assigned pharmacologic-therapeutic classes. The Delphi panel were invited to anonymously vote on their respective level of agreement for each pharmacy practice advancement recommendation using a 5-point Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree). Consensus was defined as achieving ≥70% of votes ("strongly agree" or "agree") on individual recommendations. Statements not achieving consensus were revised for subsequent voting up to 2 rounds.

Results: A total of 61 practice advancement recommendations achieved consensus. In first round voting, 88.5% (n=54) statements achieved consensus with 16.4% (n=10) and 21.3% (n=13) recommendations resulting in 100% and >90% consensus rates. One recommendation not achieving consensus was excluded from additional voting due to impracticality of statement revision. Second round voting of 6 revised statements resulted in 50% (n=3) achieving consensus. Overall, 93.4% (n=57) recommendations achieved consensus.

Conclusion: This Delphi survey identified interprofessional consensus on several pragmatic recommendations on advancing critical care pharmacy practice. Recommendations provide an implementation framework for critical care pharmacist prescriptive authority through institutional protocol involving initiation, modification, and discontinuation over several therapeutic drug classes.

Mon PM-43. Quetiapine once daily versus twice daily for treatment of icu delirium.

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Introduction: Although guidelines recommend twice daily (BID) dosing of quetiapine for treatment of intensive care unit (ICU) delirium in most patients, once daily dosing at bedtime (HS) is commonly prescribed to reduce daytime somnolence. No studies have evaluated differences in outcomes.

Research Question or Hypothesis: To determine if BID dosing of quetiapine reduces duration of delirium versus HS dosing for treatment of ICU delirium.

Study Design: Retrospective analysis of ICU patients treated with BID versus HS dosing of quetiapine for ICU delirium.

Methods: Electronic health records were analyzed between January 1, 2017 and December 31, 2021 for patients prescribed quetiapine for ICU delirium. Patients were excluded for alcohol withdrawal, history of psychiatric conditions, receipt of <24 hours of therapy, alternative dosing variations, and death or transfer from the ICU <24 hours after beginning quetiapine. The primary outcome was recovery of delirium per Confusion Assessment Method (CAM-ICU) evaluated with Mann-Whitney U. Secondary outcomes included lengths of stay, mechanical ventilation duration, in-hospital death, and QTc prolongation. Unpaired t-test, chi-square with yates' correction, and Fisher's exact test were performed as appropriate using Graph-Pad Prism.

Results: Baseline characteristics differed for sex in BID (38.9% female, n=23) versus HS (61.1% female, n=18) dosing and admission diagnosis (38.9% vs 17.4% COVID-19, respectively). No differences in time to delirium recovery [3 days (interquartile range [IQR], 2-5) vs 2.5 days (IQR, 1-5; p=0.6651)], ICU length of stay [16.9 days (standard deviation [SD], 9) versus 18.5 days (SD=13); p=0.6651)], duration of mechanical ventilation [9.6 (SD=8) vs 13.9 days (SD=12); p=0.2587)], or in-hospital death (60.9% vs 50%; p=0.7047) existed in the BID versus HS dosing group, respectively. Incidence of QTc prolongation was also similar between groups.

Conclusion: Twice daily versus bedtime dosing of quetiapine did not significantly alter outcomes. These findings suggest similar efficacy without increased adverse events.

Education/Training

Tues-44. Utilization of Entrustable Professional Activities in a Skills-Based Course to Develop Reflective Learning Skills: A 3-Year Analysis.

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Introduction: Introduction to Patient Care is a skills-based laboratory course within the second-year pharmacy curriculum that utilizes simulation to cultivate written and verbal communication for pharmacotherapeutic recommendations. The first five entrustable professional activities (EPAs) described by the American Association of Colleges of Pharmacy are integrated into the course to build and test reflective skills for professional identity development.

Research Question or Hypothesis: How does integrating EPAs into a skills-based simulation course build professional identity and reflective learning techniques?

Study Design: Quantitative, sequential survey-based cohort study

Methods: After each simulation, students reported via Qualtrics® their reflections on which EPAs were performed, their efficiency (in minutes), and their perceived level on a 5-level entrustment-supervision (ES) scale. The primary outcome was change in self-reported ES level and efficiency in performing each EPA from baseline to final evaluation. The secondary outcome was the ability to identify the pharmacist's role. Paired t-tests determined the change in ES level and descriptive statistics described activity efficiency across the curriculum.

Results: Five-hundred fifty-six students completed the course across three classes (2019-2021). From baseline to final evaluation, the average ES level increased 3.49 to 4.17 (n=519, p<0.01), 2.79 to 4.03 (n=514, p<0.01), 2.66 to 3.91 (n=514, p<0.01), 2.66 to 3.81 (n=516, p<0.01), and 3.01 to 3.75 (n=516, p<0.01) for EPAs 1-5, respectively. Student efficiency improved about 11 minutes for EPA1 (n=502) and 20 minutes for EPA2 (n=502) (p<0.01). However, student efficiency decreased by about 5 minutes for EPA3 (n=497) and EPA5 (n=495), and 6 minutes for EPA4 (n=494) (p<0.01). Student identification of EPA performed (n=500) changed from 96% to 94% for EPA1 (p=0.08), 96% to 98% for EPA2 (p=0.06), 68% to 98% for EPA3 (p<0.01), 52% to 88% for EPA4 (p<0.01), and 36% to 73% for EPA5 (p<0.01).

Conclusion: Over time, students better identified the pharmacists' role and self-reported improvement in ES level for all EPAs.

Tues-43. Evaluation of an APPE Well-being Promotion (WelPro™) Program.

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Introduction: A Well-being Promotion (WelPro™) Program was developed at the University of California, San Francisco (UCSF) School of Pharmacy due to increasing concerns surrounding student pharmacist wellness and mental health issues.

Research Question or Hypothesis: Successful implementation of WelPro™ will reduce APPE student burnout and improve Conference Leaders' (CLs) self-efficacy to assist students in distress.

Study Design: A longitudinal cohort study evaluating the impact of WelPro™, comprised of individual-and organizational-level interventions, was conducted in Class 2021PT (Pathway: 4-year traditional curriculum; Transformation: a 3-year curriculum) students.

Methods: The primary aim was to evaluate the change in emotional exhaustion (EE) scores of Class 2021PT from beginning of year (BOY) to end of year (EOY) using Maslach Burnout Inventory-Human Services Survey for Medical Personnel [MBI-HSS (MP)]. The secondary aims were to compare EE scores between Class 2021P and Class 2020P (control group) students using MBI-HSS (MP) and assess CLs' attitudes about burnout and self-efficacy in Assisting Students in Distress (ASD) via a 20-item survey. Independent and paired t-tests were used to evaluate MBI scores. Descriptive statistics were used to characterize attitudes and self-efficacy; Wilcoxon signed-rank and Mann-Whitney U tests were used for non-parametric ordinal data.

Results: No differences in EE scores were observed for paired Class 2021PT from BOY to EOY and between Class 2021P and Class 2020P. All CLs believed burnout within the pharmacy profession could be avoidable. After completing the WelPro™ training program, confidence levels of CLs significantly improved in the identification of students in distress (p=.004), identification of resources for students (p=.016), and recognition of when and how to refer students in distress (p=.008 and p=.004).

Conclusion: WelPro™ did not affect students' EE scores. Results from the WelPro™ training program for CLs, however, appear promising. It can serve as a model for similar wellness training programs that directors and preceptors in experiential education can implement at their institutions.

Mon PM-57. Building blocks for implementing a multi-site resident research certificate program: a pilot study.

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Introduction: Pharmacy residency accreditation standards require a longitudinal research component for successful program completion; however, there is no mention on methods toward ensuring research enrichment among residents. Implementation of a formalized resident research certificate program (RRCP) may help ensure high-impact resident research projects are continuously developed.

Research Question or Hypothesis: Implementing a formalized, multi-site RRCP can be achieved utilizing existing site preceptors and affiliations with colleges of pharmacy.

Study Design: Multicenter cohort study of a pilot RRCP.

Methods: Applications-based content was delivered by 3 hospital residency preceptors/directors and 2 faculty from affiliated colleges of pharmacy and combined didactic lectures with workshops tailored to each resident's project. Sessions focused on the sequential process in developing a pharmacy outcomes project. Timelines were aligned with specific residency calendars. RRCP faculty also conducted quarterly meetings with each resident/mentor team to ensure adequate progression. Post-session feedback surveys using Likert-type scales were issued to residents for quality improvement. Descriptive statistics (medians with interquartile ranges) were used to assess overall perceptions and Wilcoxon ranked sum tests were used to assess resident pre-/post-session perceptions on each content area.

Results: This pilot RRCP was implemented across 3 hospitals in a health-system, and 10 residents (6 PGY1, 4 PGY2) successfully completed the program. Fifteen sessions were delivered over the course of the pilot year. There was 100% response rate for all post-session surveys. The primary analysis revealed p<0.005 for perceived post-session comprehension/confidence for all sessions. All residents completed a final manuscript suitable for publication.

Conclusion: A formalized RRCP was successfully piloted across multiple sites within a single health-system using existing resources/relationships, including current preceptors and affiliated college of pharmacy faculty. The RRCP is currently in its second year, and it was expanded to include an additional 2 hospital sites, 6 residents (4 PGY1, 2 PGY2), and 1 faculty. Two non-traditional PGY1 residents will complete the RRCP in this second year.

Oncology

Sun-93. Brain-derived neurotrophic factor and self-perceived cognitive function in adolescent and young adult cancer and non-cancer populations.

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Introduction: Brain-derived neurotrophic factor (BDNF) may prevent cancer-related cognitive impairment (CRCI) through mediating neurogenesis and neuroplasticity to combat neuronal stress induced by anticancer therapies.

Research Question or Hypothesis: Higher BDNF levels are protective against self-perceived CRCI among adolescent and young adult cancer patients (AYAC, 15-39 years old).

Study Design: Prospective cohort study.

Methods: Newly diagnosed AYAC and age-matched non-cancer community controls (NC) were recruited between 2018-2022. Participants completed questionnaires and blood draws at baseline (T1) and six (T3) months later. AYAC were additionally followed up three (T2) months after T1. Self-perceived cognition was assessed using FACT-Cog v3 whereby higher scores indicated better cognition. FACT-Cog at T2/T3 was modelled using linear mixed model with random intercepts for individuals to evaluate the marginal difference between AYAC and NC after adjusting for confounders. BDNF levels (ng/mL) were quantified using an enzyme-linked immunosorbent assay. The primary outcomes are BDNF-FACT-Cog correlations in each group, obtained using linear combinations, after adding BDNF and BDNF-cancer interaction variables into the model. Analyses were two-sided, tested at 5% significance level and performed with Stata v16.1.

Results: We recruited 74 AYAC and 118 NC, with more Malay and fewer Indian participants, more married individuals, and fewer college graduates in AYAC. AYAC were mostly breast (24%) or head/neck (22%) cancer patients, and majority received chemotherapy (89%). Sixty-two (84%) and 58 (78%) AYAC completed T2 and T3, while 111 (94%) NC returned for T3. After confounder adjustment, the average change in FACT-Cog from T1 was 9.4 points lower among AYAC than NC (P=0.032). Median BDNF levels in AYAC (T1=10.7, T2=9.4, T3=8.2) were consistently lower than NC (T1=21.6, T3=15.3). Higher BDNF levels was significantly associated with higher FACT-Cog scores at T2/T3 in AYAC (β=0.34, P=0.03) but not NC (β=-0.18, P=0.01).

Conclusion: Augmenting BDNF levels during anticancer treatment may prevent CRCI in AYAC and should be validated with preclinical and larger clinical studies.

Mon PM-85. Changes in G-CSF Biosimilar and Originator Use over Time.

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Introduction: FDA's biosimilar pathway was established to increase treatment options, biologic access, and decrease costs. It is important to analyze how biosimilars influence prescribing patterns. The BBCIC DRN is a unique database that allows for pharmacoepidemiologic studies of biologic and biosimilars.

Research Question or Hypothesis: Has G-CSF product use and switching between products changed with biosimilar availability?

Study Design: Retrospective study of prophylactic G-CSF administration.

Methods: Administrative claims from patients 20 years and older receiving any G-CSF product for febrile neutropenia (FN) prophylaxis during first cycle chemotherapy from 2015-2019 were included from research partners participating in the Biologics and Biosimilars Collective Intelligence Consortium's Distributed Research Network.

Results: Of 17,006 patients receiving GCSF prophylaxis, the most prominent cancer diagnoses were: breast (69%), non-Hodgkin Lymphoma (15%), and lung (5%). FN risk by chemotherapy regimen was 80.3% high, 17.4% intermediate, and 2.4% low. First-cycle G-CSF receipt included: 15,496 (91%) pegfilgrastim, 507 (3%) pegfilgrastim-cbqv, 351 (2%) pegfilgrastim-jmdb, 303 (2%) filgrastim, 209 (1%) filgrastim-sndz, 87(<1%) tbo-filgrastim, 37 (<1%) pegfilgrastim/filgrastim combination, and 16 (<1%) filgrastim combination. Filgrastim use decreased from 66% to 24% from 2016 to 2019. During the same period, the filgrastim biosimilar use increased from 34% to 76%. First-cycle pegfilgrastim use was 2,604 (76%) pegfilgrastim, 503 (15%) pegfilgrastim-cbqv, and 319 (9%) pegfilgrastim-jmdb in 2019. Of 615 subjects receiving first cycle filgrastim products, 56 (9%) did not receive a second chemotherapy cycle, and 125 (20%) of those receiving a 2nd cycle received a pegfilgrastim product. Of 16,354 subjects receiving first cycle pegfilgrastim products, 795 (5%) did not receive additional chemotherapy; 15,466 of the 15,559 remaining patients (99%) received pegfilgrastim products in cycle 2.

Conclusion: Filgrastim biosimilar use increased over time. Switching G-CSF products from first to second cycle was more common in patients initially receiving filgrastim.

Sun-92. Brain-derived neurotrophic factor augmentation with riluzole reverses doxorubicin-induced cognitive impairment.

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Introduction: Chemotherapy-induced cognitive impairment (CRCI) affects quality of life of many cancer survivors. Riluzole (RZ) has been shown to improve cognitive function in patients with neuropsychiatric illnesses through increasing brain derived neurotropic factor (BDNF). It is unknown, however, whether RZ is effective in mitigating CRCI.

Research Question or Hypothesis: (1) We hypothesize that doxorubicin (DOX)-exposed mice receiving RZ experience less CRCI compared to vehicle-treated controls; (2) We hypothesize that DOX-exposed mice receiving RZ show restoration of brain BDNF levels compared to vehicle-treated controls.

Study Design: Pre-clinical, animal study.

Methods: 64 Adult WT female mice (4-6 months old, C57Bl/6J) received DOX (2 mg/kg) or saline (CON), once weekly for four consecutive weeks. Twenty-four hours after the last dose of DOX, mice receiving RZ (13 mg/kg) or placebo (Veh) daily in drinking water for 1-month. Mice were then divided into following groups (2×2 design): CON±RZ, DOX±RZ (N=16 mice/group). Mice were administered cognitive tests including novel place recognition (NPR) and fear extinction (FE) memory consolidation task. Discriminatory index was utilized to quantify hippocampus-dependent cognitive function with NPR, and freezing index was utilized for FE. Quantification of BDNF in brain specimens was performed using ELISA kits. Comparisons between groups were conducted with two-way ANOVA. Pearson correlation coefficient was calculated for the relationship between BDNF and cognition.

Results: Improved cognition was observed in the DOX+RZ group compared to the DOX+Veh group ($P<0.01$). DOX led to a 45% decrease in the BDNF levels compared with either CON+Veh or CON+RZ groups ($P<0.001$), whereas RZ significantly restored BDNF levels in mice receiving DOX ($P<0.001$). BDNF levels showed a positive correlation with discriminatory index ($r=0.52$). Similarly, a strong correlation was found between BDNF and lower freezing index, suggesting better memory consolidation with higher BDNF levels ($r=-0.67$).

Conclusion: Our results provide pre-clinical evidence for a translationally feasible pharmacological approach to augment BDNF in vivo to mitigate CRCI.

Peri-Operative Care

Tues-66. Liposomal bupivacaine outcomes characterized using a multicenter clinical database.

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Introduction: Liposomal bupivacaine is a long-acting injectable local anesthetic used in a variety of procedures. The side effect profile is favorable to bupivacaine; however, widespread use may have financial implications for institutions.

Research Question or Hypothesis: Does liposomal bupivacaine reduce hospital length of stay and total direct cost?

Study Design: Multicenter retrospective database evaluation

Methods: The Vizient clinical database was queried from July 2020 through July 2021 for all diagnosis related groups (DRG) for adult patients. To allow for meaningful analysis, DRGs were condensed into 7 surgical categories. DRGs without any liposomal bupivacaine use were excluded. Each category was stratified into 2 groups for comparison: cases that received liposomal bupivacaine (LB) and those that did not (no-LB). The primary outcome was hospital length of stay (LOS). Secondary outcomes included total direct cost per case (TDC), mortality, and naloxone use. Statistical analysis was performed using the least squares means approach.

Results: Data from 117 health systems were included representing 185,019 LB cases from 183,161 unique patients compared to 2,795,568 cases from 2,757,588 unique patients in the no-LB group representing 399 surgical DRGs. The LOS was lower in the LB group by 0.114 days ($p < 0.001$) compared to the no-LB group. The LB group had an average TDC of $7,456 per case (95% CI $7,392 - $7,520) while the no-LB group had an average TDC of $5,606 per case (95% CI $5,550 - $5,662). Percentage of all cause mortality incidents from the number of unique patients were 0.70% and 2.19% for LB and non-LB groups respectively. 1.27% of total LB cases had naloxone utilized, compared to 1.48% of total cases in the no-LB group.

Conclusion: Liposomal bupivacaine was associated with a reduction in LOS and an additional $1850 in cost per case compared to cases without liposomal bupivacaine, though differences varied by DRG.

Pharmacoeconomics/Outcomes

Sun-101. Economic burden of advanced ovarian cancer (AOC) in a Brazilian public hospital.

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Introduction: In Brazil, maintenance therapy for AOC is not widely available, increasing the risk of disease progression and mortality. Morbidity due to the use of cytotoxic chemotherapies in subsequent treatment lines after disease progression is associated with high economic impact. This study aimed to quantify the cost of newly AOC diagnosed patient in a public hospital in Brazil.

Research Question or Hypothesis: What is the cost of treating a newly diagnosed AOC patient in a public hospital in Brazil, where there is low access to maintenance therapies?

Study Design: Retrospective cohort study of newly diagnosed AOC patients between 2017 and 2018 and followed for up to 5 years.

Methods: A bottom-up micro costing approach examining medical-related health care resource use, such as laboratory exams, imaging tests, medications (from chemotherapies to supportive care drugs), hospital-related facilities (daily costs for hospital stay) and healthcare professionals' salaries. Costs were reported as BRL (Brazilian Reais) and grouped in four categories: drug-related costs, inpatients costs, outpatient monitoring and surgery-related costs.

Results: Ten OC patients (mean age 62), 75% presenting with stage IV disease and 75% with epithelial (serous adenocarcinoma) histology were included. Median overall survival was 31 months (5-year survival was 30%). The mean cost of AOC was BRL 153,372(±39,481) and the median costs was BRL 122,000. The mean cost per month survived was BRL 6,017(±3,713). The highest (70%) cost component was inpatient costs [BRL 107,495(±120,304)], followed by drug-related costs [BRL 19,461(±12,984)], surgery-related costs [BRL 15,436(±15,700)] and outpatient monitoring [BRL 10,980 (±8,935)].

Conclusion: Inpatient costs, associated with disease and treatment related complications, including disease progression and subsequent hospital treatment was the substantial cost driver. In addition to improving patient outcomes, maintenance therapies have the potential to reduce or delay these inpatient costs, providing cost offsets for the Brazilian public healthcare system.

Pharmacogenomics/Pharmacogenetics

Mon PM-94. Association of Pharmacogenomic (PGx) Variation with Sedation Outcomes During Early Intensive Care Unit (ICU) Admission.

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Introduction: Pharmacogenomic (PGx) guided care in the ICU may improve outcomes and reduce costs. Sedatives and analgesics are used in critically ill patients for anxiety and facilitate mechanical ventilation (MV). Unpredicted responses are common and may be attributed to genetic variations/phenotypes.

Research Question or Hypothesis: Determine the association between the number of altered phenotypes in sedatives/analgesics pharmacokinetic and pharmacodynamic genes and achieving ≥60% and 70% of time within target Richmond Agitation-Sedation Scale (RASS, a validated scale) range in the first 24 and 48 hours of MV.

Study Design: Prospective, observational PGx association study conducted from 2018-2021.

Methods: Adults providing informed consent (n=81) were enrolled if admitted to the ICU, receiving acute MV and administered sedatives and/or analgesics. Patients with substance abuse disorder, liver disease/transplantation, severe head injury or seizures were excluded. A comprehensive PGx panel was obtained in participants and the number of altered phenotypes was calculated for CYP2D6, CYP3A4/5, COMT, OPRM1, CYP2B6 and SLC6A4 genes relevant to fentanyl, propofol, midazolam, morphine, ketamine, and haldol. RASS score was measured every 2-4 hours. Multivariate logistic regression was used to associate the primary endpoint of achieving ≥60% and 70% of time within target RASS range with the number of altered phenotypes.

Results: Three or more altered phenotypes were present in 42 (51.9%) and 41 (50.6%) participants in the first 24 and 48 hours, respectively. In participants with ≥3 altered phenotypes, the odds of achieving ≥60% of time within target RASS in the first 24 hours decreased by 85% (adjusted odds ratio (aOR)=0.15, 95%CI=0.03-0.66, p-value=0.02) and the odds of achieving ≥70% of time within target RASS in the first 48 hours decreased by 88% (aOR=0.12, 95%CI=0.02-0.56, p-value=0.01) compared to those with <3 altered phenotypes.

Conclusion: Participants with ≥3 altered phenotypes had less time within target RASS range during MV. PGx may be a useful tool in improving management of the critically ill.

Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

Mon PM-102. Vancomycin target attainment in critically ill oncologic patients.

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Introduction: Vancomycin is largely prescribed to treat Gram-positive bacterial infections in oncologic patients. Pharmacokinetic changes can impact the drug effectiveness and safety.

Research Question or Hypothesis: Would vancomycin target attainment after empirical dose regimen be impacted by pharmacokinetic changes in critically ill oncologic patients?

Study Design: Single center, prospective and longitudinal study.

Methods: Septic adult patients (≥18 years) with cancer and preserved renal function were considered. Vancomycin therapy started with 15 mg/kg q12h, 1.5-hour infusion. Two steady-state blood samples were collected at the 3rd and 11th hour of the start of the infusion. The vancomycin serum levels were measured by immunoassay. A noncompartimental analysis was performed to described the pharmacokinetic parameters using PK Solutions software. Therapeutic target was defined as vancomycin 24-hour area under the curve/minimum inhibitory concentration ($AUC^{ss}_{0\text{-}24}$/MIC) ≥400 and <600. The data are presented as median and interquartile range (IQR). The study was approved by the local ethics committee.

Results: In total, 39 patients were enrolled in this study. The patients had 62 (47 - 69) years, 63.2 (57 - 72.5) kg, creatinine clearance 93 (77 - 110) mL/min. The found vancomycin clearance, volume of distribution and half-life values presented high interindividual variability: 2.4 (2 - 3.4) L/h, 21 (14-34) L and 5.5 (4.5 - 7.8) hours, respectively. The therapeutic target was initially achieved in 10 (26%) patients considering MIC 1 mg/L; 28 patients (71%) had supratherapeutic AUC. Trough levels and AUC showed low correlation value ($R^2 = 0.24$).

Conclusion: The vancomycin target attainment in critically ill oncologic patients is poor after the empirical dose regimen due to high pharmacokinetics variability. It reinforces the need of real time therapeutic drug monitoring to maximize efficacy and reduce nephrotoxicity risk. It is prudent to monitor vancomycin exposure directly by the $AUC^{ss}_{0\text{-}24}$/MIC ratio due to its low correlation with trough levels.

Mon PM-101. Comparison of Pharmacokinetics of Vardenafil Administered Using an Intranasal Spray Formulation Vs. Single 10 mg Oral Tablet.

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Introduction: Oral vardenafil (VDF) tablet is effective for erectile dysfunction, however it has relatively poor solubility and bioavailability. Its peak plasma concentration (Tmax) is about 60 min with typical onset of action delayed by about 30 min following ingestion. Intranasal administration is convenient and can potentially offer faster onset of action and better bioavailability. To achieve such advantage, a special organic-aqueous formulation (SDS089) with enhanced solubility for nasal spray administration has been newly developed.

Research Question or Hypothesis: 1. Can intranasal VDF formulation (SDS089) result in faster Tmax and higher bioavailability compared to the oral tablet administration? 2. Is there a difference in tolerable and serious adverse events in subjects receiving these two formulations.

Study Design: This was a single dose, randomized, cross-over study

Methods: In 12 healthy young volunteers receiving either VDF 10 mg as oral tablet or 3.38mg as intranasal spray, multiple plasma concentrations were obtained for VDF concentration determination using an LCMSMS assay. Non-compartmental pharmacokinetic parameters determined following each treatment were compared and analyzed using ANOVA, and adverse events using Chi-Square test.

Results: Although similar mean λz, T1/2, Cmax and $AUC_{0\text{-}inf}$ were observed from intranasal and oral administration, the median Tmax from intranasal was much shorter (10 min versus 58 min oral, $p<0.05$). The relative bioavailability of intranasal to oral was 1.67. Intranasal VDF caused higher incidence (50%, $p<0.05$ compared to oral tablet) of transient but tolerable local nasal reactions. No serious adverse event occurred in either group.

Conclusion: The present VDF intranasal formulation can achieve a more rapid but similar plasma concentration with only about 1/3 dose when compared to that of oral administration. Intranasal VDF can potentially offer a more timely and lower dose for the treatment of erectile dysfunction in patients who can tolerate the transient local adverse reactions.

Sun-108. Characterization of Animal ABC transporters, P-gp and BCRP, for Veterinary Drug Development.

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Introduction: Veterinary drug development is on the rise and veterinary pharmacy represents an important subspecialty of pharmacy. Unfortunately, the tools to support veterinary drug development lag behind those used in human drug development. To predict oral absorption, candidate drugs are routinely tested as substrates of P-

glycoprotein (P-gp) and breast cancer resistance protein (BCRP), intestinal pumps that limit the bioavailability of many drugs. Although P-gp and BCRP have been well-studied in humans, little is known about the substrate specificities of many species orthologs.

Research Question or Hypothesis: Do species differences exist in P-gp and BCRP function between human and domestic animals (sheep, pig, dog, and cat)?

Study Design: Quantitative *invitro* analysis of transporter function.

Methods: HEK293 cells stably expressing GFP-tagged human, ovine, porcine, canine, and feline P-gp or BCRP and empty vector (EV) were established. Isotopic efflux (expressed as fold over EV) and cytotoxicity studies were performed.

Results: Confocal microscopy revealed that GFP-tagged P-gp and BCRP orthologs are all expressed on the plasma membrane. When compared to human-P-gp, sheep-P-gp had significantly less digoxin efflux (2.3-fold ± 0.04 versus 1.8-fold ± 0.03, p<0.0001) and all species orthologs of P-gp had significantly less quinidine efflux compared with human-P-gp (p<0.05). In comparison to human-BCRP, dog-BCRP had significantly lower efflux of glibenclamide (2.1-fold ± 0.05 versus 1.7-fold ± 0.13, p<0.001) and prazosin (1.8-fold ± 0.03 versus 1.4-fold ± 0.08, p<0.0001). P-gp and BCRP protected against paclitaxel- and mitoxantrone-induced toxicity, respectively, with sheep-P-gp and dog-BCRP being significantly less protective than other species orthologs.

Conclusion: Significant differences in the efflux kinetics of various drugs in cells expressing species orthologs of P-gp and BCRP were observed. These results suggest that species differences in intestinal transporter function exist and that the appropriate species ortholog of P-gp and BCRP should be evaluated during veterinary drug development.

Sun-107. Predicting transporter-mediated drug interactions of eltrombopag using real-world data.

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Introduction: Eltrombopag is an oral thrombopoietin receptor agonist indicated for treatment of thrombocytopenia. Administration of eltrombopag increases rosuvastatin levels, presumably by inhibiting Breast Cancer Resistance Protein (BCRP), an intestinal efflux transporter, and Organic Anion-Transporting Polypeptide 1B1 (OATP1B1), a hepatic uptake transporter. Therefore, the product label suggests caution with co-administration of any BCRP or OATP1B1 substrate drugs. To date, it is not known whether in fact eltrombopag is a general inhibitor of the two transporters. Uric acid (UA) and bilirubin (BIL) are endogenous substrates of BCRP and OATP1B1, respectively, and can serve as potential biomarkers for assessing activity of the two transporters clinically.

Research Question or Hypothesis: We hypothesized that eltrombopag inhibits BCRP and OATP1B1 and increases UA and BIL levels.

Study Design: Retrospective cohort study using UCSF Electronic Health Record (EHR) data.

Methods: We identified patients with UA and BIL levels collected both before and after initiating eltrombopag. The primary outcome was difference between UA and BIL levels before and after starting the medication. Continuous data were analyzed using paired t-tests.

Results: 335 patients prescribed eltrombopag had reported UA or BIL levels. Among them, 64 and 247 had UA or BIL levels both before and after starting eltrombopag. UA levels were significantly elevated in patients after starting eltrombopag compared to baseline (5.84 mg/dL ± 2.67 and 4.56 mg/dL ± 1.70, p < 0.0001). Similarly, BIL levels were elevated in patients after starting eltrombopag (2.18 mg/dL ± 3.02 vs 0.99 mg/dL ± 1.82, p < 0.0001).

Conclusion: UA and BIL levels were significantly elevated after starting eltrombopag, suggesting it is a general inhibitor of BCRP and OATP1B1. Limitations included small sample size and no exclusions of other factors potentially affecting UA and BIL. Further investigation in controlled trials is needed to validate results, however this proof-of-concept study shows real-world data can be used to identify drugs as potential inhibitors of transporters.

Substance Abuse/Toxicology

Tues-79. Implementation of a Pharmacist-driven Opioid Use Disorder Medication Assisted Recpvery (OUD MAR) Inpatient Consult Service.

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Introduction: Opioid overdoses killed nearly 2,000 people last year in Illinois, with limited access to treatment in the area. At the University of Illinois Hospital & Health Sciences System (UI Health), an innovative pharmacist-driven, interprofessional opioid use disorder medication-assisted recovery (OUD MAR) consult team was developed and implemented to provide access to comprehensive medication management for OUD and linkage to ongoing treatment upon discharge.

Research Question or Hypothesis: What is the initial landscape and impact of a pharmacist-driven inpatient OUD consult service within an academic medical center.

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

Methods: Patients were included if they received an OUD MAR service consultation from July 7 to August 3,2022 and excluded if no OUD MAR service received. The primary outcome included comprehensive medication management recommendations, and secondary

outcomes included service utilization, time to consult, opioid withdrawal status upon consult, and history of opioid use disorder treatment collected per patient report and available in the medical record. Descriptive statics were used for data analysis.

Results: Twenty-five patients received an OUD MAR consultation, two did not have OUD and 2 refused consult. The average patient was 47 (±14 SD) years old and male (60%). A minority of patients (32%) were on medication for OUD (MOUD) prior to admission for an average length of 4.7 (±5.6 SD) months. Eleven (44%) patients had previously used MOUD or had unknown MOUD history. Pharmacists initiated MOUD for 17 patients [9 (36%) methadone & 8 (32%) buprenorphine/naloxone], and held MOUD for 4 (16%) patients for further evaluation. On average, consults were initiated 2 (±3 SD) days following admission, predominantly by the general medicine (48%), neurological services (20%), and cardiology service (16%). At the time of consult, patient COWS scores were 5.1 (±4.8 SD) indicating mild withdrawal.

Conclusion: The pharmacist-driven OUD MAR consultation service provided access and comprehensive medication management for a vulnerable patient population.

Women's Health

Tues-106. Evaluation of Magnesium Sulfate Protocols for Pre-eclampsia and Eclampsia in Low-Middle Income Countries.

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Introduction: Preeclampsia is a leading cause of morbidity and mortality in pregnant women globally and a major contributor to health disparities between low-middle income countries (LMICs) and wealthy nations.

Research Question or Hypothesis: Magnesium is the mainstay of treatment for both pre-eclampsia and eclampsia but is underutilized in the very places it is needed most. This study aimed to analyze magnesium protocols used in LMICs and describe the covariates within the protocols that may impede the use of this life saving drug as it relates to use and administration.

Study Design: This IRB exempt retrospective study involved a systematic search for official magnesium protocols for pre-eclampsia and eclampsia used in LMICs.

Methods: Protocols published in English from January 2011 to December 2021 were obtained through networks involving the University of California San Francisco Global Health Clinical Scholars, the BetterBirth Trial, Ariadne Labs, and published web accessible protocols and clinical guidelines found through Ministries of Health. Two investigators independently reviewed all protocols. Each protocol was analyzed for indication for use, formulation, loading dose (LD) and maintenance dose (MD), administration, preparation, and toxicity parameters.

Results: Fourteen protocols representing 13 countries were obtained. Sub-Saharan Africa was the most common geographic location (12/14, 86%), followed by India. Protocols were primarily published by Ministries of Health (10/14, 71.4%). All listed eclampsia and most (64%) listed severe eclampsia. The Pritchard method of administration was common (13/14, 93%) and requires a 50% stock solution and dilution to 20% for intravenous use. Protocols often lacked dilution instructions (7/14, 50%), diluent type (5/14, 36%), a concentration for IV LD (5/14, 36%) and IM MD (8/13, 62%). Variations in LD and MD drug dosing and toxicity parameters were also present.

Conclusion: Underutilization of magnesium may persist unless greater clarity in magnesium dosing and administration protocols occurs.

ORIGINAL RESEARCH

ADR/Drug Interactions

Mon AM-1. Investigation of Potential Clinically Relevant Metabolic Interactions Between Isomers of THC and Warfarin.

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Introduction: Medical marijuana has been growing in popularity ever since 1996 when California became the first state to legalize medical marijuana. In the 25 years since the passage of this landmark legislation, 37 states, four territories and the District of Columbia now allow the medical use of cannabis products. Although delta-9 THC is the most commonly known isomer of THC, delta-8 THC and delta-10 THC are two other isomers of THC that are growing in popularity. Despite this increasing popularity of THC, little is known about the impact these three isomers have on drug metabolism. With the increased access to isomeric THC containing products, it is important to evaluate potential clinically significant interactions, especially with narrow therapeutic index drugs.

Research Question or Hypothesis: Is there a potential clinically significant drug interaction between the different isomers of THC and Warfarin?

Study Design: In vitro DDI study

Methods: A LC-MS/MS method was developed to measure warfarin and its metabolites in vitro. Warfarin metabolism was characterized using human liver microsomes (HLMs).

Results: 6-hydroxywarfarin, 10-hydroxywarfarin, and 7-hydroxywarfarin were identified as the metabolites of focus. Formation of warfarin metabolites was markedly inhibited by delta-9 THC (6-hydroxywarfarin by over 75%, 10-hydroxywarfarin by over 60%, and 7-hydroxywarfarin by over 80%). The formation of warfarin metabolites was inhibited less in comparison by delta-8 THC (6-hydroxywarfarin by over 40%, 10-hydroxywarfarin around 15%, and 7-hydroxywarfarin by over 50%). The formation of warfarin metabolites was inhibited the least by delta-10 THC (6-hydroxywarfarin by almost 20%, 10-hydroxywarfarin over 10%, and 7-hydroxywarfarin by over 15%).

Conclusion: This method has shown that the various THC isomers act as an inhibitor of warfarin in varying degrees of severity. Clinically, this could result in supra-therapeutic levels of warfarin in systemic circulation causing a measured elevation in INR.

Sun-7. Incidence and risk factors of opioid use disorder in Korea: Analysis of a national claims database .

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Introduction: Although the use of opioid analgesics is lower than in other developed countries in Korea, several recent studies reported an increase in opioid prescriptions in Korea. However, limited studies investigated the incidence of opioid use disorder (OUD) and associated factors in Korea.

Research Question or Hypothesis: We aimed to identify the incidence and associated factors of OUD in Korea.

Study Design: A nested case-control study.

Methods: We analyzed the national claim database from 2016 to 2018. The adult population who initiated non-injectable opioid analgesics (NIOA) in 2017 was included in this study. Among them, we defined the patients who developed the OUD event as a case group, and a control group was selected using the exact-match method (1:4 matching).

Baseline patient characteristics, NIOA use pattern, and other medication use were described. Multivariable logistic analysis was performed to assess the risk of variables to OUD onset.

Results: Only 108 patients (0.006%) developed OUD among adults who initiated NIOA, and 537 patients were included in the final analysis. The mean age was 57.35±17.72, and approximately half of the patients (52.70%) were male. Medicaid or national meritorious service (adjusted odds ratio[aOR] 2.25, 95% confidence interval[95% CI]; 1.05-4.85), benzodiazepine use (aOR 3.12, 95% CI; 1.71-5.68), the use of more than 2 of long-acting NIOA(aOR 3.50, 95% CI;1.80-6.79), the number of NIOA prescription, and daily morphine milligram equivalent dose(≥ 50/day, aOR 5.04, 95% CI; 1.92-13.25) were identified significant factors to increase the risk of OUD.

Conclusion: Among NIOA users, it is necessary to monitor patients with risk factors such as benzodiazepine use or frequent NIOA prescription, high dose, and multiple regular NIOA use to prevent and intervene in OUD early.

Mon AM-2. DRUG-RELATED PROBLEMS AMONG INVASIVE FUNGAL INFECTIONS TREATMENT IN HEMATOLOGIC MALIGNANCY PATIENTS RECEIVING CHEMOTHERAPY OR HEMATOPOIETIC STEM CELL TRANSPLANT IN THAILAND.

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Introduction: Treatment of invasive fungal infections (IFIs) is challenging. Hematologic malignancy patients (HM) are at high risk for drug-related problems (DRPs) from antifungal therapy. However, data about DRPs in this group of patients were limited and risk factors related DRPs are still questionable.

Research Question or Hypothesis: What are the DRPs and factors associated with DRPs in HM receiving chemotherapy or hematopoietic stem cell transplant (HSCT) patients receiving IFIs treatment?

Study Design: A retrospective cohort study was conducted at King Chulalongkorn Memorial Hospital, Thailand.

Methods: The inclusion criteria were HM with IFIs receiving chemotherapy or HSCT patients aged over 15 years and hospitalized between 1 January 2016 and 30 June 2021. Criteria used to diagnose IFIs were based on EORTC/MSG 2020 guideline. DRPs were categorized according to Cipolle/Strand classification system. Risk factors of DRPs were assessed by logistic regression analysis.

Results: Of 92 patients with 107 episodes of IFIs were enrolled during the study period. Aspergillosis was the leading IFIs (70.1%), followed by candidiasis (11.2%) and *Pneumocystis jirovecii* pneumonia (8.4%). DRPs were detected in 58 episodes of IFIs (54.2%). The leading DRPs were adverse drug reactions (ADRs) (33.6%), followed by subtherapeutic doses (18.7%) and drug interaction (16.8%). The common ADRs were visual hallucination from voriconazole (25%), followed by acute kidney injury from amphotericin B (16.7%), and electrolyte imbalance from amphotericin B (13.9%). Factors associated with DRPs were age over 45 years (OR=2.55; CI 1.08, 6.05) and underlying liver disease (OR=5.69; CI 1.69, 19.13) by multivariate analysis.

Conclusion: The percentage of DRPs in HM patients with IFIs receiving chemotherapy or HSCT patients was high. Close monitoring DRPs

in patients over 45 years old or who have underlying liver disease. Emphasizing the pharmacist's role in the patient's care team would benefit from enhancing the appropriateness of therapy with patient safety and better clinical outcome.

Adult Medicine

Tues-7. Evaluation of prior authorization approval and patient assistance program acceptance between pharmacy trainees and clinical pharmacy specialists.

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Introduction: There are few publications describing the use of pharmacy students and pharmacy residents (trainees) in ensuring patients can afford and fill their medications at hospital discharge.
Research Question or Hypothesis: The approval of prior authorizations (PA) and patient assistance programs (PAP) for discharge prescriptions is similar between clinical specialists and pharmacy trainees.
Study Design: Single center, retrospective medical record review of adult patients from July 1, 2019-September 20, 2021.
Methods: We identified interventions by reviewing patients who had a transitions of care (TOC) pharmacy note. We intervened to complete PAs, enroll patients in PAPs, substitute for preferred medications based on the insurance formulary, or provide a medication coupon. The primary outcome was the percentage of PAs and PAPs approved in the clinical specialist group compared with the pharmacy trainee group. Select secondary outcomes include: overall time spent, type of interventions, classes of medications, cost savings, hospital length of stay (LOS), and 30-day readmissions. Nominal data was analyzed by chi-square test, and continuous data was analyzed by Student t-test or Mann Whitney U.
Results: We included 353 TOC interventions in the clinical specialist group and 137 in the pharmacy trainee group. Of these, we completed 84 PAs and 51 PAP enrollments. The clinical specialists had 88.3% of their requests approved, and the pharmacy trainees had 94.8% of their requests approved ($p=0.188$). The median overall time spent on interventions was shorter in the clinical specialist group than the pharmacy trainee group (30 minutes vs. 42.5 minutes, $p<0.001$). Anticoagulants were the most common medication class requiring intervention (40%), and verifying insurance coverage of a medication was the most common intervention (44.3%). There was no difference in cost savings, hospital LOS, or 30-day readmissions between the groups.
Conclusion: The approval of PAs and PAPs was similar between clinical specialists and pharmacy trainees, with no differences in clinical outcomes.

Mon AM-76. Impact of Rounding Clinical Pharmacists on Inpatient Blood Glucose and Blood Pressure Control.

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Introduction: The continued global expansion of clinical pharmacy necessitates ongoing documentation of rounding clinical pharmacist benefits. An assessment was undertaken to determine impact of rounding clinical pharmacists on control of blood glucose and blood pressure in hospitalized patients.
Research Question or Hypothesis: Services with a rounding clinical pharmacist will increase appropriate inpatient blood pressure and blood glucose control compared to one without a rounding clinical pharmacist.
Study Design: This was a prospective cohort-based evaluation.
Methods: All patients admitted on three services over four weeks during July-August 2021 (academic medicine, hospitalist with rounding pharmacist, hospitalist without rounding pharmacist) were included in data collection and analysis for this IRB-approved study. Patients without hypertension or diabetes were excluded. After discharge from the hospital, blood pressure and blood glucose levels were collected from 0800 Monday morning to 0800 Saturday morning during the study period since these levels could be directly impacted by a rounding clinical pharmacist. Each level was classified as "ideal," "acceptable," "low," or "high;" appropriate control was defined as ≥ 80% of total blood glucose/blood pressure levels in ideal or acceptable range. The co-primary outcomes of percentage of patients with appropriate control of blood glucose or blood pressure were analyzed using Chi-square tests (GraphPad Prism, version 9.3.1). Statistical significance was set at a p-value of <0.05.
Results: A total of 62/271 and 189/271 patients met inclusion criteria for the blood glucose and blood pressure control evaluations, respectively. No significant differences were found when comparing appropriate control of blood glucose (53.3% vs. 47.1% vs. 53.3%; $p=0.91$) or blood pressure (67.2% vs. 73.9% vs. 62.5%; $p=0.39$) between the academic medicine, hospitalist with clinical pharmacist, and hospitalist without clinical pharmacist services, respectively.
Conclusion: Rounding clinical pharmacists did not significantly impact inpatient blood glucose or blood pressure control compared to a service without a rounding clinical pharmacist during this evaluation.

Mon PM-7. Nationwide evaluation of the clinical impact of internal medicine pharmacists across hospital settings.

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Introduction: The impact of pharmacists has been described for many practice areas including critical care, emergency medicine, and transitions of care. Data are limited describing the extensive role of adult medicine clinical pharmacists in the inpatient setting.
Research Question or Hypothesis: Which clinical activities do Adult Medicine (AMED) Practice and Research Network (PRN) pharmacists conduct in the inpatient setting?
Study Design: A multicenter, prospective, observational study
Methods: A 65-item electronic survey was developed using REDCap survey software and distributed to members of the ACCP AMED PRN listserv. AMED PRN members who spend more than 50% of their time practicing in the acute care setting were included. Trainees were excluded. The survey collected demographics, clinical interventions, rates of intervention acceptance, and the significance of those interventions, where applicable. Respondents were asked to report all interventions made over any one-week period between 24 April 2022 to 10 June 2022 while providing direct patient care. Descriptive statistics were used to summarize data.
Results: Overall, 20 pharmacists from the AMED PRN (3%) completed the survey representing approximately 565.5 hours of direct patient care activities. Patient care activities included daily rounding with prescribers (100%), profile review (95%), patient education (70%), and order entry or verification (50%). During the study period, 2761 interventions were documented. The most common interventions and activities documented were optimization of therapy (674, 24%), initiation of therapy (392, 14%), and response to drug information questions from providers (207, 7%). The top three therapeutic classes with interventions were infectious diseases (262, 25%), cardiology (145, 14%), and antithrombotics (113, 11%). Of applicable interventions, 1558 (89%) were accepted, 1470 (84%) were pharmacist-initiated, and 162 (9%) were classified as serious or very/extremely significant interventions.
Conclusion: Adult Medicine pharmacists in inpatient settings have frequent care team and patient interactions resulting in diverse pharmacotherapy interventions.

Sun-10. Evaluating the impact of concomitant medications on inpatient potassium supplementation.

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Introduction: Hospitalized patients commonly receive potassium supplementation for hypokalemia, with clinicians anticipating a rise in potassium of 0.1 mmol/L per every 10 mEq delivered. However, patients often take concomitant medications that can alter potassium levels, and there is limited data to help clinicians understand their effect on potassium supplementation and resulting levels.
Research Question or Hypothesis: What is the real-world impact of concomitant medications on serum potassium levels among hospitalized patients receiving supplementation?
Study Design: Single-center retrospective cohort study (2021-2022)
Methods: A random sample of hospitalized (non-intensive care) adult patients receiving at least one dose of oral/intravenous potassium were included. Serum potassium, magnesium, and creatinine levels, doses of oral/intravenous/home potassium, selected potassium-altering medications (insulin, magnesium, diuretics, renin-angiotensin-aldosterone system inhibitors), and comorbid conditions were extracted from the medical chart. Patients who were pregnant, incarcerated, or on hemodialysis were excluded. The primary outcome was the impact of concomitant medication use on change in serum potassium, normalized per 10 mEq of potassium administered. Data was analyzed using descriptive statistics and t-tests via Microsoft Excel (Redmond, WA) and IBM SPSS Statistics (Armonk, NY).
Results: A total of 985 patients were included. The cohort was 47% men, 78% Caucasian with a mean age (± standard deviation) of 65 ±17 years. Potassium-altering medications were given in 797/1291 (61.7%) instances of potassium supplementation, with insulin, magnesium, and loop diuretics most commonly administered. Administration of loop diuretics resulted in a potassium change of 0.036 mmol/L per 10 mEq compared to a change of 0.067 mmol/L in all patients (95% CI: 0.014-0.049, $p<0.05$). Other medications analyzed did not significantly impact the change in potassium per 10 mEq.
Conclusion: Among several concomitant medications known to impact potassium, this analysis identified only loop diuretics significantly changed serum potassium levels among hospitalized patients. Future prospective controlled studies are warranted to verify the effects of potassium-altering medications on potassium supplementation and serum potassium levels.

Mon PM-45. NPH insulin versus insulin glargine for the treatment of dexamethasone-induced hyperglycemia in patients with COVID-19.

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Introduction: Dexamethasone use in patients hospitalized with COVID-19 significantly reduces mortality; however, commonly results in hyperglycemia. Optimal treatment of dexamethasone-induced hyperglycemia is not well established.

Research Question or Hypothesis: What is the difference in point of care (POC) blood glucose (BG) control between insulin glargine, Neutral Protamine Hagedorn (NPH) insulin, and insulin glargine plus NPH insulin for dexamethasone-induced hyperglycemia in patients with type 2 diabetes (T2DM) and COVID-19 infection.

Study Design: Retrospective cohort study

Methods: This study was conducted in adult inpatients with T2DM and COVID-19 infection who received dexamethasone 6 mg once daily and insulin during the 5-day study period. The primary outcome was the difference in mean POC BG levels between study insulins. Secondary outcomes included the difference between mean daily inpatient and home basal insulin doses, incidence of hyperglycemia and hypoglycemia, and length of stay. Nominal data were analyzed using Chi-square test of association, and continuous data were analyzed using Kruskal Wallis or analysis of variance (ANOVA) test, as appropriate. All tests of significance were two-tailed with an a priori significance level of $p < 0.05$.

Results: Ninety-six patients were included in the analysis (67 insulin glargine, 10 NPH insulin, 19 insulin glargine plus NPH insulin). The difference in mean POC BG was not different among groups (254.2 ± 59.8 mg/dL vs 234.4 ± 39.1 mg/dL vs 250.4 ± 50.7 mg/dL, respectively; p=0.548). The median difference between average daily home and inpatient basal insulin doses was different among groups [-5 units (-17.2, 7) vs. -6.5 units (-10.7, 30.5) vs. -20.2 units (-26.6, -7.2); p=0.049] with higher insulin doses administered inpatient. There were no significant differences in the other secondary outcomes.

Conclusion: No difference in mean POC BG was observed between groups. This study demonstrated that dexamethasone-induced hyperglycemia was poorly controlled in patients with T2DM and COVID-19 infection.

Mon PM-6. Implementation of a pharmacist-driven protocol to optimize diagnosis and treatment of iron deficiency in admitted patients with chronic kidney disease.

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Introduction: The 2012 KDIGO Guideline recommends intravenous (IV) iron repletion in patients with chronic kidney disease (CKD) only if transferrin saturation (TSAT) is ≤ 30% and ferritin is ≤ 500 ng/mL, while the 2013 KDOQI commentary and subsequent studies note repletion can be considered even if ferritin is > 500 ng/mL, resulting in increased variability of practice. We previously identified low screening rates, and undertreatment of iron deficiency in those screened, in admitted patients with CKD at The Johns Hopkins Hospital.

Research Question or Hypothesis: What is the benefit of a pharmacist-led protocol to optimize the identification and treatment of iron deficiency?

Study Design: Non-randomized, prospective, case-control study at a large academic medical center

Methods: A protocol for inclusion, screening, and treatment was developed and subsequently provided to pharmacists with educational sessions. Iron deficiency was defined in accordance with the 2012 KDIGO Guideline. Data collected via REDCap and medical record included demographics; CKD stage including dialysis dependence; characterization of iron studies and repletion; acceptance of pharmacist recommendations; and length of time to complete intervention. Objectives included comparing the frequency of screening and treatment pre- and post-intervention. Data analysis was conducted using Stata Statistical Software v.17.

Results: Over the 2-month study period, 315 patients were included. Average age of patients was 64.1 years old and 53.7% were female. About 26.4% of admissions were CKD Stage 5 requiring dialysis. After intervention, admissions were 2.3 times more likely to be screened and deficient patients 2.1 times more likely to be treated with iron. Of those treated, most received IV iron therapy (73.4%). Median total elemental iron dose administered was 1000 mg.

Conclusion: Compared to pre-intervention, the frequency of patients screened and treated with IV iron increased after implementation of the pharmacist-driven protocol. This study underlines the need for a more systematic approach to identification and treatment of iron deficiency in the study population.

Tues-6. Predictors of INR response following vitamin K administration for non-anticoagulant-related INR elevation: A retrospective chart review.

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Introduction: Vitamin K is involved in the synthesis of coagulation factors in the liver and is commonly used as a reversal agent for vitamin K antagonists (VKA), resulting in international normalized ratio (INR) reduction. Non-anticoagulant-related INR elevation may occur in patients for a variety of reasons and vitamin K's impact on lowering INR in those populations is not well-described in literature.

Research Question or Hypothesis: What factors impact INR responsiveness to vitamin K in the setting of elevated INR not associated with anticoagulants?

Study Design: Single-institution, retrospective chart review analyzed data from Spectrum Health Butterworth and Blodgett Hospitals in Grand Rapids, Michigan.

Methods: Inclusion of adult patients with non-anticoagulant-related INR elevation that received vitamin K between June 1, 2019 and August 31, 2021. Primary outcome was INR responsiveness, which

was defined as: (1) decrease of ≥ 20%; or (2) absolute reduction to ≤ 1.5 within 48 hours following vitamin K administration.

Results: A total of 721 patients with elevated INR that received vitamin K were screened in this study. Among these, 250 patients with non-anticoagulant-related INR elevation were selected with a 48:52 split in INR responders (n = 120) and INR non-responders (n = 130). INR responsiveness was significant with the following factors: age on admission (OR = 1.02 [95% CI 1.00 – 1.04], p = 0.053), no known liver disease (**Acute liver disease:** OR = 0.18 [95% CI 0.077 – 0.44], p = 0.0001); **Chronic liver disease:** OR = 0.36 [95% CI 0.18 – 0.70], p = 0.0001), baseline INR (OR = 1.76 [95% CI 1.25 – 2.44], p = 0.0014), and intravenous vitamin K (OR = 0.33 [95% CI 0.17 – 0.61], p = 0.0006).

Conclusion: Patient and treatment characteristics that predicted INR response for non-anticoagulant-related INR elevation include use of intravenous vitamin K, having a higher baseline INR, and patients with no known liver disease.

Ambulatory Care

Sun-17. Title: Assessment of the relationship between language preference and diabetes distress among Hispanic patients.

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Introduction: Diabetes distress (DD) involves the worries, concerns, and fears among individuals as they manage their diabetes. There is a clinically significant relationship between DD and disease management, medication adherence, glycemic control, and quality of life. There is scant data on DD in Hispanic patients.

Research Question or Hypothesis: In Hispanic patients, does preferred language impact DD?

Study Design: Pharmacist-led IRB-approved, single center cross-sectional study at a federally qualified health center.

Methods: Adult Hispanic patients with diabetes could take the Diabetes Distress Scale-17 (DDS-17) survey (English or Spanish) from October 2021 – May 2022. The DDS-17 provides a total DD score and subdomains of emotional burden (EB), physician-related distress (PD), regimen-related distress (RD), and interpersonal distress (ID). Charts were reviewed to collect clinical and demographic data. Descriptive statistics and hypothesis testing were performed using SAS 9.4 to evaluate if self-reported language preference had an impact on DDS-17.

Results: Ninety-nine patients were surveyed. Sixty patients (61%) preferred their care in Spanish. The Chi-Square test of proportions was performed. There was no statistically significant difference in the distribution of the DDS-17 levels (mild/none, moderate, or severe) between patients who preferred their care in English versus Spanish for the total DD score or any subdomain with p-values 0.58, 0.62, 0.23, 0.30, and 0.79 respectively.

DDS-17 score by language

	Prefers English (n=39)	Prefers Spanish (n=60)
Total DD	2.18	1.94
EB	2.51	2.28
PD	1.58	1.32
RD	2.55	2.12
ID	1.81	1.87

Conclusion: Clinically, Hispanic patients who preferred English reported increased levels of DD compared to patients who prefer to receive their care in Spanish. However, there was no statistically significant difference between the distribution of the DDS-17 levels for overall DD or the specific domains. Spanish-speaking patients may have scored lower in the DDS-17 due to increased acquiescence, stronger familism, or providing socially desirable answers.

Tues-10. Assessment of Vitamin B12 Monitoring for Patients with Type 2 Diabetes Mellitus on Metformin .

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Introduction: Vitamin B12 (VB12) deficiency may cause symptoms associated with diabetic peripheral neuropathy (DPN) and is a potential effect of chronic metformin therapy. In 2017 the American Diabetes Association (ADA) Guidelines added a recommendation to consider VB12 measurement in patients on chronic metformin pharmacotherapy. Prior versions recommended VB12 measurement in patients with DPN.

Research Question or Hypothesis: Without intervention, what are VB12 monitoring rates among patients with type 2 diabetes mellitus (T2DM) on metformin and receiving potential therapy for DPN.

Study Design: Retrospective chart review

Methods: Patients seen at two primary care clinics with clinical pharmacy teams from May 1st to July 31st, 2021 with diagnosed T2DM and a prescription for metformin were screened for inclusion. Patients were then included if aged 18 years or older and prescribed a therapy known for managing DPN, defined by American Academy of Neurology guidelines for painful DPN. Charts were reviewed for

demographic data, neuropathy diagnosis, VB12 lab orders, and medication histories. Descriptive data was compiled. Comparisons were made using SPSS software.

Results: 1,527 patients were screened with 221 patients included. Mean length of metformin therapy was 49.5 months. Gabapentin was the most frequently prescribed therapy for DPN, n=157 (71%). 49 patients (22.2%) had a VB12 lab ordered. 72 patients had a documented neuropathy diagnosis, with 18 (25%) of those having a VB12 order. Among all patients and those with a neuropathy diagnosis, VB12 order rates were significantly higher at one clinic, 46.4% vs 11.2% and 62.5% vs 14.3% respectively (both p<0.001).

Conclusion: Despite ADA recommendations, VB12 assessment remains low in patients taking metformin, even amongst those with documented neuropathy. VB12 monitoring rates may have been higher at one clinic due to VB12 lab inclusion in a peripheral neuropathy order set and a greater percentage of patients with T2DM being seen by clinical pharmacists.

Mon PM-22. Impact of pharmacist's intervention in veterans with COPD on inhaled corticosteroid de-escalation at single center veteran hospital.

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Introduction: Current evidence shows that patients with eosinophil counts less than 300 cell per microliter without concomitant asthma have low likelihood of benefitting from use of inhaled corticosteroids (ICS). Clinic vigilance to reduce ICS related side effects such as pneumonia is necessary.

Research Question or Hypothesis: We aim to evaluate the impact of pharmacist intervention on ICS de-escalation

Study Design: Retrospective chart review

Methods: Patients without asthma diagnosis and an exacerbation in past 2 years identified for ICS de-escalation from national dashboard were included. Patient charts were manually reviewed to determine whether an ICS is needed as part of their medication regimen for correct diagnosis, eosinophil count>=300 cell/microliter, outside ER/hospital visit not initially identified, side-effects or previous failure of alternative therapies, pulmonary specialty care, non-VA care and adherence. The primary objective was evaluating the impact of pharmacist's intervention on ICS de-escalation. We also evaluated the impact on rescue inhaler use 30-days before and after intervention. Descriptive statistics and McNemer test were used to report these.

Results: A total of 69 patients out of 179 were eligible for de-escalation for whom chart review notes were entered and providers were alerted to the recommendations over a period of 3 months from March 2022 through May 2022. Average age in this cohort was 72 years with 66.7% rurality and majority white male population (89.5%). Of the 69 patients: 10 (14.5%) had their ICS dose de-escalated, 15 (21.7%) discontinued, while 1 (1.4%) had dose increase at the end of the study period. Of these 43 (62.3%) had no change in their regimen. No difference in the use of rescue inhaler was found after the intervention (p=0.774).

Conclusion: Pharmacist intervention led ICS de-escalation in 36.2% patients without any impact on the use of rescue inhaler. Future studies should evaluate impact of these interventions on incidence of COPD exacerbation and pneumonia.

Mon PM-17. Impact of Interprofessional Quality Improvement on Naloxone Co-Prescribing for Patients on Opioids in a Primary Care Clinic.

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Introduction: Opioid overdose deaths continue to increase, with over 100,000 deaths in the 12-months ending in April 2021 in the United States. Naloxone is a life-saving opioid reversal agent, yet co-prescription with opioids is low. Additional research efforts are needed to identify best practices for improving naloxone co-prescription by pharmacists practicing in interprofessional teams.

Research Question or Hypothesis: What is the impact of a quality improvement (QI) initiative on naloxone co-prescribing for patients on opioids in an internal medicine clinic with an embedded ambulatory care pharmacist?

Study Design: Retrospective observational study

Methods: Adult patients on chronic or as-needed opioid therapy who were not prescribed naloxone were included. Data collection occurred over two "Plan-Do-Check-Act" cycles: baseline (5/1-5/25/2021), cycle 1 (6/1-6/25/2021), and cycle 2 (8/10-9/30/2021). Pharmacist interventions included a survey to identify barriers to co-prescribing naloxone, a didactic session to prescribers, and an electronic medical record prompt for prescribing. The primary outcome was the change in proportion of patients on opioids with a co-prescription for naloxone. Odds ratio was used for analysis with p value <0.05 for significance (MedCalc®).

Results: A total of 112 patients were included (25 patients at baseline and 87 post-intervention). Type of opioid medication and percentage of patients on concomitant benzodiazepines was similar pre- and post-intervention. Prior to QI initiatives, 8% of eligible patients had

naloxone co-prescribed. After cycle 1, 7% of patients had naloxone co-prescribed, which increased to 41% of patients after cycle 2 (OR 5, 95% CI 1 to 24, p=0.04 vs pre-intervention). The pre-intervention survey indicated that 12.7% of 31 prescriber respondents reported "no barriers to prescribing", which increased to 35% in the post-intervention survey (38 respondents).

Conclusion: The odds of naloxone co-prescription after QI interventions were five times higher after the second PDSA cycle, demonstrating the benefit of an interprofessional approach with a clinic pharmacist. Additional interventions are necessary to improve naloxone co-prescription.

Mon PM-14. Medication Adherence.

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Introduction: Studies have shown that decreasing patient share of medication costs can lead to an increase in adherence and improved clinical outcomes. Our institution has implemented a medication access coordination service system-wide to link patients to a variety of medication assistance programs with an aim of improving adherence and avoiding poor outcomes.

Research Question or Hypothesis: Quantify the association between medication adherence in patients' antidiabetic therapy and utilizing a health system funded medication assistance program, called ReassureRx.

Study Design: Retrospective cohort analysis.

Methods: This study included patients with diabetes who initiated ReassureRx assistance between July 1, 2018 and June 30, 2020. Using pharmacy claims and clinical electronic health record data, this study assessed adherence using a modified medication possession ratio (mMPR) for 6-months after initiating ReassureRx. Pre-post adherence analyses were conducted in those with antidiabetic medication fills during the prior 6-months. Changes in glycemic control, weight, and healthcare utilization were assessed in those with baseline and follow-up data.

Results: The study included 656 patients, 71% with prescription insurance; 182 patients had prescription fills in the baseline period. Mean (sd) adherence to non-insulin antidiabetic medications in the follow-up period was 0.80 (0.25) with 63% adherent per mMPR ≥0.80. In the pre-post analysis, mMPR was significantly higher during the follow-up period at 0.83 (0.23) than during the pre-index period at 0.34 (0.17), as was the proportion who were adherent (66% versus 2%) (p<0.001). Hemoglobin A1c decreased from 8.8% to 8.0% in the overall cohort (p<0.001, n=377) and from 9.3% to 8.5% in the pre-post cohort (p<0.001, n=182). Minimal change in weight was observed, but both the overall and pre-post cohorts showed a significant decrease in ED visits (p<0.01).

Conclusion: This study observed an improvement in adherence and A1c with fewer ED visits in patients with diabetes that received medication financial assistance through a health system.

Mon AM-14. Evaluation of the utilization of bisphosphonates in patients with osteoporosis in the primary care setting.

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Introduction: The 2020 update to the AACE/ACE Clinical Practice Guidelines for the Diagnosis and Treatment of Postmenopausal Osteoporosis (PMPO) recommends risk stratifying patients into high or very-high risk categories. Although oral bisphosphonates (OBPs) remain an alternate option, injectable therapies are preferred for very-high-risk patients. Prescribers should consider a bisphosphonate drug holiday (BDH) based on patient response and duration of treatment. The purpose of this study was to evaluate prescribing of OBP therapy for PMPO in two primary care clinics. Results can provide insight into adherence to guideline recommendations and inform pharmacist-driven quality improvement (QI) initiatives.

Research Question or Hypothesis: Are OBPs appropriately prescribed for PMPO?

Study Design: Retrospective, QI project

Methods: Women with a diagnosis of PMPO currently prescribed alendronate or risedronate between 1/1/2019 and 2/11/2022 were identified. The primary endpoint was the proportion of patients appropriately prescribed OBPs according to risk stratification - appropriate for high-risk, suboptimal for very-high-risk. Very-high-risk was defined as a T-score <-3.0, long-term glucocorticoid use, history of or high risk for injurious falls, or significant fracture history; patients not meeting criteria were considered high-risk. The secondary endpoint was appropriate duration of therapy. High and very-high-risk patients were considered candidates for a BDH if continuously prescribed an OBPs for 5 or 6-10 years, respectively. Descriptive statistics were used.

Results: Of 271 patients, 183 (67.5%) were appropriately prescribed OBPs. Eighty-eight very-high-risk patients (32.5%) were prescribed suboptimal therapy with 47 (53.4%) started on oral therapy after the 2020 guideline recommendations for injectable therapy. Thirty-eight (14%) patients were identified as BDH candidates based on guideline-directed eligibility criteria.

Conclusion: With the addition of patient risk stratification to osteoporosis clinical practice guidelines, there is opportunity for provider education to guide appropriate prescribing of drug therapy. Patient eligibility for BDH was low, suggesting that duration of bisphosphonate therapy is appropriate for the majority of the studied population.

Mon PM-16. Pharmacist impact on diabetes care in a resident-run primary care clinic.

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Introduction: Pharmacist participation in diabetes management has been associated with improvements in medication adherence and outcomes. However, variation in practice model and setting may affect outcomes, and few evaluations of ambulatory pharmacist services have been documented in Louisiana.

Research Question or Hypothesis: What is the impact of clinical pharmacist services on diabetes control compared with usual medical care?

Study Design: Retrospective observational study with historical control

Methods: In August 2020, our resident-run primary care clinic began to offer medication management services focused primarily on diabetes management, which were delivered by a clinical pharmacist with pharmacy students and residents. All patients with ≥1 documented pharmacist visit between August 2020 and January 2022 were included in this study. The primary outcome was the change in A1c during the pharmacist follow-up period compared with a historical "usual care" control period of equal duration. Secondary outcomes included emergency room utilization and pharmacist interventions. The Wilcoxon signed-rank test was used for comparisons (SPSS 28).

Results: During the study period, the clinical pharmacist saw a total of 205 patients with a median of 2 visits per patient. The reduction in A1c was greater during the pharmacist follow-up period compared with the historical control period (-1.0 versus +0.3, $P < 0.001$). There were fewer emergency room visits ($P < 0.001$) during the pharmacist follow-up period. The pharmacist completed a total of 919 interventions, of which the most common were resolving cost or prescription-filling issues (29%), requesting a refill from the physician (18%), increasing a medication dose (16%), adding a medication (9%), or decreasing a medication dose (8%). The most common medications added or increased were basal insulins (24%), GLP-1 agonists (23%), and metformin (19%).

Conclusion: Adding pharmacist services within a resident-run primary care practice can be an effective approach to improve diabetes control.

Sun-115. Evaluation of the relationship between diabetes distress levels and social determinants of health among Hispanic patients with diabetes.

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Introduction: There is a gap in evaluating diabetes distress (DD) in Hispanic patients. DD refers to the worries, concerns, and fears among individuals with diabetes. Social determinants of health (SDOH) contribute to disparities and barriers to attaining health. Addressing a patient's SDOH needs can positively affect their diabetes outcomes.

Research Question or Hypothesis: Evaluate if there is an association between DD levels and SDOH needs that led to a social work (SW) referral among adult Hispanic patients with diabetes.

Study Design: Pharmacist-led IRB-approved, single-center, cross sectional study at a federally qualified health center.

Methods: The Diabetes Distress Scale–17 (DDS-17) and an adapted Protocol for Responding to Assessing Patients' Assets, Risks, and Experiences (PRAPARE) surveys were administered (English and Spanish) to adult Hispanic patients at the clinic. The DDS-17 assesses total DD and subdomains of emotional burden, physician-related, regimen-related, and interpersonal distress. The PRAPARE survey assesses needs (transportation, food, housing, education, wellness, etc.). Those who marked a SDOH need on the PRAPARE survey were referred to SW.

Results: Ninety-nine patients were surveyed. One patient was excluded from analysis since they did not complete the PRAPARE survey. Of those who completed both surveys, 42 patients (42.8%) scored moderate to severe levels in DD and 40 (40.8%) were referred to SW. The chi-squared analysis showed a statistically significant difference in the distribution of patients and whether they had a SDOH need based on their DD score severity (p-value = 0.029).

Conclusion: Patients who reported moderate or severe DD had more referrals to SW to address SDOH compared to those who had mild DD. It is crucial to address DD and SDOH needs to improve health outcomes.

DD severity and SDOH (n=98)

	No SDOH (n=58)	SDOH (n=40)
Mild / no DD	39	17
Moderate DD	13	12
Severe DD	6	11

Sun-51. A national survey of pharmacists providing HCV care in the US.

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Introduction: Since approval of the direct-acting antivirals, more pharmacists are actively engaged in hepatitis C virus (HCV) treatment efforts. The roles in HCV management vary by state and institution. This study aims to characterize the involvement of United States (US) pharmacists in HCV management.

Research Question or Hypothesis: Who are the pharmacists managing HCV in the US?

Study Design: Cross-sectional survey study

Methods: Investigators developed a Qualtrics survey, sent links to 20 listservs of US pharmacy and HCV organizations in May 2022, and allotted 28 days for survey completion. The survey was limited to licensed pharmacists with direct patient care. Close-ended questions assessed setting, basic demographics, education, HCV training, licensure, and HCV management.

Results: We received 209 survey responses across 45 states as of 5/29/2022.

Of 174 respondents with post-graduate training, 57% completed a PGY1 residency, 37% PGY2, and 9% fellowship. The majority received HCV training after completing pharmacy school (67%, 113/169); 85 reported on-the-job HCV training. Few (17%, 31/178) have advanced licensure: of those 31 pharmacists, 52% are clinical pharmacist practitioners, 29% are advanced practice practitioners, and 19% are pharmacist clinicians.

Most respondents (75%, 128/170) identify as female, 74% were white, and 88% were non-Hispanic. The most common practice sites included academic medical centers (28%, 53/187), followed by Indian Health Services/Tribal/Urban Health (17%, 32/187), 27 specialty pharmacy (14%, 27/187), Federally Qualified Health Centers (13.7%, 25/187), community hospital (13%, 24/187), Veterans' Affairs Medical Center (4%, 7/187), correctional facility (1%, 2/187), and other (7%, 14/187).

The majority (67%, 120/178) of pharmacists practice under a collaborative practice and most (70%, 119/171) are unable to bill for their services.

Conclusion: Pharmacists provide direct HCV patient care, mostly under collaborative practice agreements, in a variety of roles after receiving post-graduate HCV training. A small proportion of pharmacists have advanced licensure and billing for services is limited.

Mon PM-115. Impact of clinical pharmacy expansion within a rural Federally Qualified Health Center through implementation of pharmacy-led Medicare Annual Wellness Visits.

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Introduction: Medicare Annual Wellness Visits (MAWVs) are annual appointments with the primary care team to prepare personalized prevention plans, allowing time to focus on gaps in care. MAWVs are more time-intensive than regular follow-up visits, which leads to difficulty in incorporating visits on providers' schedules. This study assesses the value of newly implemented clinical pharmacist-led MAWVs at a Federally Qualified Health Center (FQHC) in a rural setting.

Research Question or Hypothesis: Does incorporation of pharmacy-led MAWVs positively impact patients and the practice site?

Study Design: Retrospective cohort study

Methods: Patients were included if they completed a MAWV between October 1, 2021, and February 14, 2022, at the FQHC (study site). The primary objective was to compare the per clinician rate of completed MAWVs between pharmacists and providers. The secondary objectives were to evaluate the economic and clinical value of pharmacist led MAWVs by determining revenue generated, length of visits, and interventions recommended and completed. Patient satisfaction was also determined by survey via telephone calls. Student *t*-test or chi-square tests were used to compare outcomes between groups.

Results: Within the specified period of conducting MAWVs, nine providers completed 139 visits and two pharmacists completed 116 visits. Providers generated $31,682.27 in revenue and pharmacists generated $26,439.88. Majority of patients in both groups were African American, female, and between 65 and 70 years of age. Of those eligible, providers ordered 61.3% of screenings and 37.6% of vaccines compared to pharmacists at 66.2% and 37.8%, respectively. Providers spent an average time of 42 ± 13.5 minutes with patients and pharmacists spent an average of 36 ± 15.3 minutes with patients. Patient satisfaction was overall positive with no difference between groups.

Conclusion: Pharmacists increased completion of MAWVs by 83% over a 20-week study period. Pharmacists increased revenue while providing comparable care to providers, resulting in similar patient satisfaction.

Mon PM-41. Impact of Pharmacist-Led Clinic in Black Adults.

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Introduction: Longstanding hypertension disparities have resulted in higher rates of mortality among non-Hispanic Black patients compared to non-Hispanic White adults.1 Non-traditional models of care can effectively lower BP in Black patients 1 The impact of pharmacist-led multidisciplinary telehealth services for the management of HTN and mental health have not been evaluated in Black adults.

Research Question or Hypothesis: Among Black patients enrolled in a pharmacist-led collaborative care model, what is the average time to blood pressure goal, the average change in mean blood pressure, and percentage meeting blood pressure goal?

Study Design: This study was a retrospective observational quantitative study of Black patients enrolled at multiple primary care sites within UCSF Health.

Methods: Patients with at least two pharmacist visits between September 1st, 2020 to September 30th, 2021 were included. The primary outcome was time to goal blood pressure (BP). Secondarys outcomes were mean changes in systolic (SBP) and diastolic BP (DBP). A retrospective chart review was conducted to obtain demographic information and BP readings. A Kaplan-Meier survival analysis was conducted to evaluate the percentage of patients meeting goal BP over time. A one-way ANOVA was conducted to evaluate change in BP for patients meeting goal between the initial and final visit within the study period. All statistical analyses were conducted in SPSS.

Results: 56.8% (42/74) patients met BP goal, with an average time to goal of 75.3 days. Average SBP and DBP changes were 15.8mmHg and 8.12mmHg, respectively. Patients who met goal had significant reductions in their SBP (20.2 ± 13.1mmhg, p=0.0001) and DBP (8.93 ± 9.33 mmHg, p=0.0013).

Conclusion: A multidisciplinary pharmacist-led telehealth HTN clinic for Black patients reduced average BP. 56.8% of patients enrolled to goal after an average of 75 days.

Mon PM-15. Impact of PYG2 residency training on pharmacist-led collaborative drug therapy modification (CDTM) implementation in Georgia.

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Introduction: Georgia law allows pharmacists to participate in collaborative drug therapy modification (CDTM) with physicians, allowing them to perform patient assessments, manage pharmacotherapy, and order laboratory tests. CDTM is underutilized, with <1% of Georgia pharmacists holding a CDTM license.

Research Question or Hypothesis: Does PGY2 residency training affect utilization and scope of CDTM practice for Georgia pharmacists?

Study Design: Prospective, cross-sectional, quantitative survey design

Methods: The Georgia Board of Pharmacy provided a list of CDTM licensed pharmacists. Using the Dillman method, pharmacists were invited to complete a 30-minute electronic REDCap survey. Participants received a $50 gift card. Data included demographics, training, services offered, disease states managed, and perceptions regarding CDTM implementation barriers. Descriptive statistics, chi square, and t-tests were conducted using SPSS v28.

Results: Survey invitations were mailed to 134 pharmacists, 36 (27%) responded: 27 (75%) had an active CDTM license and were included in analysis, 9 (25%) had lapsed licenses due to changing jobs, retiring, or lack of time. Most respondents practiced in a clinic (PGY2 100% vs. No PGY2 70.6%, p=0.06) or hospital setting (PGY2 0% vs No PGY2 17.6%, p=0.16). When comparing pharmacists with (n=10) and without (n=17) PGY2 training, those with PGY2 training had fewer years in practice (7.8±4.2 vs. 20.4±10.2 p<0.01). There were no differences in mean number of services offered (3.7±1.7 vs 2.7±2.1, p=0.19), disease states managed (5.6±4.1 vs 4.2±3.8, p=0.38), percentage ordering labs (60.0% vs 82.4%, p=0.20), or billing for services (30.0% vs 52.9%, p=0.25). Pharmacists with PGY2 training were more likely to precept (100% vs 64.7%, p=0.03), and less likely to report CDTM implementation barriers (20.0% vs 58.8%, p=0.05).

Conclusion: Completion of PGY2 training may help prepare pharmacists to develop CDTM services and precept, but this small sample was not associated with differences in billing frequency or types and quantity of services offered.

Tues-2. Risk of Drug-Induced QT-prolongation in the Ambulatory Care Setting.

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Introduction: Most of what is known about drug-induced QT-prolongation is from data among hospitalized patients and it is unclear whether it is appropriate to extrapolate to ambulatory patients.

Research Question or Hypothesis: What is the frequency of QT-prolongation or death in ambulatory care patients prescribed QT-prolonging medications?

Study Design: Observational, retrospective cohort analysis

Methods: An event notification was developed to capture each time a QT-prolonging medication was ordered by a primary care provider between 3/3/2021 and 5/17/2021 for adult patients. The study was conducted at a large health system representing academic, rural, suburban and community settings. QT-prolonging medications commonly prescribed in primary care with known risk were evaluated. Data was collected from the electronic health record and publicly reported death data. The primary outcome was defined as death (all-cause and cardiovascular-related) or QT-prolongation (QTc ≥ 500ms) within 6 months of the prescription. Secondary outcome evaluated whether patient age or gender were associated the composite of death or QT-prolongation. Descriptive statistics were used for the primary outcome. An adjusted model was used to calculate odds of death or QT-prolongation.

Results: A total of 17,946 prescriptions were ordered for 15,612 unique patients. Following a QT-prolonging medication prescription, 249 patients (1.59%) had a documented QTc ≥500ms and

148 (0.95%) died. Across all instances of prescribing a QT-prolonging medication, 284 (1.58%) had a documented QTc ≥500ms following prescription. After adjusting for race and ethnicity, the odds of death or QT-prolongation increased by 5.8% for each additional year of age ($p<0.0001$) and decreased by 25.6% for females ($p=0.0095$).

Conclusion: The frequency of QT-prolongation and mortality was low among primary care patients prescribed a medication associated with QT-prolongation. Further study is needed to evaluate risk factors, including reasons female age was associated with lower risks when prescribed a QT-prolonging medication in ambulatory settings.

Sun-16. Pharmacist Impact on Pre-Exposure Prophylaxis Uptake in High-Risk Populations

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Introduction: Human immunodeficiency virus (HIV) is a viral infection transmitted through sexual contact and injection drug use (IDU). Patients may reduce the risk of HIV infection through pre-exposure prophylaxis (PrEP). Although PrEP is effective for HIV prevention, uptake remains low and data illustrating pharmacist interventions are limited.

Research Question or Hypothesis: Does pharmacist intervention improve PrEP uptake in high-risk populations at University of California Davis Health (UCDH)?

Study Design: Descriptive, quality improvement

Methods: This prospective, descriptive, quality improvement study included patients 18 years and older that met high-risk criteria for HIV infection including men who have sex with men, transgender women, and IDU. The PrEP Uptake Intervention Bundle included pharmacist-driven identification of candidates, education to providers, and referral to the pharmacist-led PrEP clinic. The primary endpoint compared the number of patients prescribed PrEP six months prior to the intervention to those prescribed PrEP six months following the intervention. Secondary endpoints were the number of referrals for the PrEP clinic and the number of the appointments attended.

Results: Of 1232 patients screened, 334 patients met criteria. During the pre-intervention study period, 15 patients were prescribed PrEP compared to 21 patients in the post-intervention period. In the pre-intervention period, 18 patients were referred to the PrEP clinic compared to 34 patients in the post-intervention period. Of the 34 referrals placed to the PrEP clinic in the post-intervention period, 15 patients attended the appointment. Additionally, 24 of the 34 post-intervention referrals included patients not originally identified by pharmacists in the intervention bundle.

Conclusion: The number of PrEP prescriptions and clinic referrals increased following pharmacist intervention. Many referrals were for physician-identified patients indicating a culture shift empowering further identification of high-risk behaviors. Limitations include unclear documentation of high-risk criteria. Data suggests that pharmacist intervention increases PrEP uptake, however additional data is required to assess long-term outcomes.

Tues-1. Evaluating Prescribing Patterns of Medications Associated with QT-prolongation in the Ambulatory Care Setting.

Rachel Lowe, Pharm.D.[1], Garth Wright, MPH[1], Lucas Olivas, Pharm.D. Candidate[1], Candace Teel, Pharm.D. Candidate[1], Laura Macke, MD[2] and Katy Trinkley, Pharm.D., PhD[1]; [1]University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora, CO [2]University of Colorado School of Medicine, Aurora, CO

Introduction: Little is known about the prescribing of medications with potential to cause QT-prolongation in the ambulatory care settings. Understanding real-world prescribing of QT-prolonging medications and actions taken to mitigate risk will help guide strategies to optimize safety and appropriate prescribing among ambulatory patients.

Research Question or Hypothesis: Primary care providers (PCPs) frequently prescribe QT-prolonging medications and measures to mitigate risk are inconsistently taken.

Study Design: Observational, retrospective cohort analysis

Methods: We evaluated a random sample of medications commonly prescribed in primary care with known QT-prolonging risk between 3/3/2021 and 3/5/2021 for adult patients. EHR data was collected to assess patient, PCP, and visit characteristics as well as clinician action to mitigate modifiable risk factors for QT-prolongation at the time of prescribing the medication (laboratory or EKG monitoring, electrolyte supplementation). The goal of this study was to describe current practices; thus, analyses were limited to descriptive statistics.

Results: Of 399 patients prescribed a QT-prolonging medication, 208 (52%) had an unknown QT-prolongation history and 15 (4%) had a known history. The most recent QTc was prolonged in 8 of the 15 patients with known history; of these patients, 2 had an EKG rechecked at baseline and 5 had an EKG ordered for follow-up. Forty-seven patients (12%) had no known potassium, magnesium, or calcium values and 42 patients (11%) had an abnormal value. Calcium was rechecked in one patient with known abnormal values and magnesium supplementation was prescribed for three patients. No other actions were taken to mitigate risk. Across all instances of prescribing, only 2 (0.5%) had an EKG ordered at the time of prescribing the medication and 8 (2%) had an EKG ordered to assess response to the medication.

Conclusion: When prescribing a medication associated with QT-prolongation in the ambulatory care setting, proactive monitoring and risk mitigation is infrequent.

Mon PM-116. Feasibility and Effectiveness of a telepharmacy service in primary care clinics: Final results.

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Introduction: For the millions of Americans currently living with uncontrolled diabetes in rural and underserved areas, limited access to healthcare and medication management services are significant challenges. Use of telepharmacy services has been a growing strategy to address gaps in care for these populations. This study aimed to implement a newly developed Comprehensive Medication Management (CMM) telehealth service within primary care clinics in North Carolina and Arkansas.

Research Question or Hypothesis: The objectives of this study were to (1) assess feasibility of implementation, and (2) evaluate health impact on patients.

Study Design: This effectiveness implementation hybrid Type II study utilized mixed methods data, including surveys, interviews, administrative (e.g., monitoring data), and clinical information (e.g., Medication Therapy Problems (MTPs), A1Cs) to evaluate implementation feasibility and health outcomes. Three pharmacists delivered CMM via telehealth to patients in their homes across eight primary care clinics for a period of 15 months.

Methods: Implementation feasibility was evaluated based on (1) implementation outcomes measured by an acceptability, feasibility, appropriateness, and intent to sustain the service survey administered to the clinics and a patient satisfaction survey; and (2) interviews with clinic representatives. Health outcomes were informed by rates of MTP resolution and changes in patients' A1C levels.

Results: Implementation of the service was highly valued by the clinics and patients, with significant improvements in implementation outcomes and high levels of patient satisfaction. Among the lessons learned were the importance of planning pre-implementation and the need for well-defined patient engagement strategies. The MTP resolution rate averaged 85% with significant differences between NC and AR. A1Cs were significantly reduced from pre- to post-intervention from 10.6 to 9, with significant differences between NC and AR.

Conclusion: Overall, the initial results from this study highlight the value of a telepharmacy service for complex patients with diabetes located in rural and underserved areas.

Cardiovascular

Mon PM-20. A pharmacist-driven population health quality improvement initiative to evaluate and close therapy gaps in anticoagulation among patients with non-valvular atrial fibrillation.

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Introduction: Risk of stroke is five times greater in patients with atrial fibrillation. Anticoagulation is effective at decreasing risk of stroke, yet 40-50% of eligible patients are not prescribed anticoagulation. The reasons for this gap in care are not well described.

Research Question or Hypothesis: Can a pharmacist-driven population health initiative effectively identify and close gaps in anticoagulation for atrial fibrillation?

Study Design: Single-center chart review and quality improvement initiative

Methods: We included adult primary care patients with diagnosis of atrial fibrillation, CHA_2DS_2-VASc scores of at least 2, and no current anticoagulant use. We identified patients with apparent treatment gaps using claims and electronic health record (EHR) data and evaluated explanations through chart review and provider contact. A provider outreach protocol was developed and implemented to address opportunities for anticoagulation. We described the verification of treatment gaps, explanations of treatment gaps, and effectiveness of resolving gaps.

Results: Of 242 patients with an apparent anticoagulation gap, 204 (84%) were verified. Overall, 175 (86%) of the verified treatment gaps were explained by chart documentation or provider response, and thus did not represent lapses in care. Explanations included spontaneous resolution of atrial fibrillation, patient declining treatment, completion of a procedure to correct atrial fibrillation or mitigate stroke risk, and high bleeding risk. Anticoagulation was started in five (2%) patients through usual care or with pharmacist assistance.

Conclusion: A population health approach to closing anticoagulation gaps in atrial fibrillation did not substantially impact anticoagulation use. Most observed anticoagulation treatment gaps were explained through pharmacist chart review and outreach to treating providers. Relying solely on claims- and EHR-based algorithms may substantially overestimate actionable gaps in care.

Mon PM-29. Safety Evaluation of Beta-Blocker Administration after ST-Elevation Myocardial Infarction in Patients with Risk Factors for Cardiogenic Shock.

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Introduction: Management of ST-elevation myocardial infarction (STEMI) includes early beta-blocker initiation. However, guidelines recommend against early administration in patients at increased risk

for cardiogenic shock including those with an age over 70, systolic blood pressure less than 120 mm Hg, and sinus tachycardia or bradycardia.

Research Question or Hypothesis: Do these risk factors truly predispose patients with a STEMI to cardiogenic shock after early beta-blocker administration?

Study Design: Retrospective cohort using electronic health record data from an academic medical center between January 1, 2019 – December 31, 2021.

Methods: Patients aged 18-89 with a STEMI and risk factors for cardiogenic shock were included. The primary outcome was development of cardiogenic shock. Secondarily, cardiogenic shock predictor variables were assessed. Categorical and continuous data were analyzed by Fisher's-exact and Wilcoxon rank-sum tests; respectively, using SAS version 9.4. Institutional review board approval was obtained.

Results: Overall, 299 patients were included. The median (interquartile range, IQR) age was 62 years (53-71), 225 (75.3%) were male, and 54 (18.1%) had a history of coronary disease. The median (IQR) peak troponin was 49.7 (15.9-133.5) and 110 (36.8%) patients had an anterior STEMI. Cardiogenic shock developed in 8 (2.7%) patients. There were no median (IQR) significant differences in those with and without shock in time to beta blocker administration [21.9 hours (10.6-42) vs. 15.6 (6.0-54.8); p=0.6968], age [63 years (60-71) vs. 62 (52-71); p=0.4965], systolic blood pressure [110 mm Hg (105-115) vs. 109 (103-114); p=0.6027] or heart rate [90 bpm (78-104) vs. 76 (64-90); p=0.0697] prior to beta-blocker administration; and the number (%) with anterior location [3 (37.5%) vs. 107 (36.8%) p=1.000]. Patients who developed shock had a higher median (IQR) troponin peak [140 (54-304) vs. 49 (16-132); p=0.0354].

Conclusion: Initiating a beta-blocker in patients with a STEMI with risk factors for cardiogenic shock early in hospitalization appears to be safe in most patients.

Sun-26. Comparison of Aspirin Monotherapy to Dual Antiplatelet Therapy Following Coronary Artery Bypass Surgery.

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Introduction: Dual antiplatelet therapy (DAPT) is recommended in patients following coronary artery bypass grafting (CABG). Evidence supporting this recommendation has primarily described the impact of DAPT on ischemic events, however the safety, especially in the on-pump CABG population, is less well described.

Research Question or Hypothesis: Does risk of bleeding differ among patients discharged or DAPT versus single antiplatelet therapy (SAPT) following on-pump isolated CABG.

Study Design: This was a single-center, retrospective cohort analysis of adult patients following isolated on-pump CABG between January 2012 and December 2019.

Methods: Patients discharged on SAPT were compared to those discharged on DAPT. Patients discharged on oral anticoagulation were excluded. The primary endpoint was occurrence of a composite bleeding event identified by pre-specified International Classification of Diseases (ICD) codes. Secondary endpoints consisted of 30-day and 1-year mortalities along with individual bleeding components.

Results: Of the 2,341 patients included 1,250 patients received SAPT and 1,091 patients received DAPT. The study populations differed by age, prior MI, PAD, and CHF status/stage. Bleeding events occurred in 36 patients (2.9%) receiving SAPT and 34 patients (3.1%) receiving DAPT (p=0.74). Mortality at 30-days (SAPT 0.7% vs. DAPT 0.4%) and 1-year (SAPT 3.3% vs. DAPT 2.3%) did not significantly differ between groups.

Conclusion: In this study, the use of DAPT was not associated with a difference in bleeding rates compared to the use of SAPT. This study could reduce the barrier to prescribing of DAPT given previous ischemic benefit data.

Mon AM-38. Evaluation of Standard Versus Reduced Dose Apixaban for the Treatment of Venous Thromboembolism in Patients with Severe Renal Disease.

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Introduction: There are no clear recommendations for dose adjustments when using apixaban for venous thromboembolism (VTE) treatment in patients with renal dysfunction. Clinical trials for apixaban excluded patients with a creatinine clearance (CrCl) less than 25 mL/min or on dialysis. This study aims to compare bleeding rates in patients with severe renal disease taking standard dose apixaban 5 mg twice daily versus a reduced dose of 2.5 mg twice daily for the treatment of VTE.

Research Question or Hypothesis: For treatment of VTE, apixaban standard dose will have a significantly higher clinically relevant bleeding rate than apixaban reduced dose in patients with severe renal disease.

Study Design: Multicenter, retrospective cohort study at four academic medical centers between January 1, 2013 and August 31, 2021.

Methods: This study included patients 18 years or older prescribed apixaban for VTE treatment with documented renal dysfunction at

apixaban start date using International Classification of Diseases codes (ICD-9-CM and ICD-10-CM). Renal dysfunction was defined by at least one of the following; CrCl < 25 mL/min, serum creatinine > 2.5 mg/dL, CKD stage IV or V, or on renal dialysis. The primary endpoint was the rate of clinically relevant bleeding (as defined by the International Society on Thrombosis and Haemostasis (ISTH) criteria) within six months of starting apixaban, and secondary endpoint was VTE recurrence within six months of starting apixaban.

Results: A total of 203 patients were included in the final analysis (n=125 on 5mg; n=78 on 2.5mg). Clinically relevant bleeding rate was higher in the standard dose group (14.4% vs 3.8%, p=0.018). There was no difference in VTE recurrence rate (6.4% and 7.7%, p=0.21).

Conclusion: Apixaban 2.5mg twice daily may be safer and equally effective for VTE treatment in patients with severe renal disease.

Tues-19. Effect of Sacubitril/Valsartan on Hospital Readmissions in Heart Failure with Reduced Ejection Fraction in Saudi Arabia: A Multicenter Retrospective Cohort Study.

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Introduction: Sacubitril/valsartan is recommended by major guidelines as a first-line treatment for heart failure with reduced ejection fraction (HFrEF). One of the most significant benefits of using sacubitril/valsartan that was observed in clinical trials is its effect in reducing hospital readmissions caused by heart failure (HF). However, there is little evidence to support its effectiveness in practice, especially in Saudi Arabia.

Research Question or Hypothesis: What is the real effect of sacubitril/valsartan on hospital readmissions in patients with history of HFrEF in Saudi Arabia.

Study Design: Multi-center, retrospective review of electronic medical records.

Methods: Eligible patients were adults with a history of HFrEF who discharged on either sacubitril/valsartan or angiotensin-converting enzyme inhibitors (ACEIs) / angiotensin receptor blockers (ARBs) in addition to the other recommended therapy for HFrEF. The primary endpoint is the all-cause 30-day readmission rate. The secondary endpoint is the 30-day HF readmission rate. Data were analyzed using descriptive and inferential statistics.

Results: Among 330 patients included in the final analysis, 165 (50.0%) received sacubitril/valsartan (group 1) and 165 (50.0%) received ACEIs/ARBs (group 2). Baseline characteristics were balanced between the two groups. Our results showed that all-cause 30-day readmissions in group 1 were lower than group 2 (5.5% vs. 23.0%) P<0.001. Additionally, the secondary outcome showed fewer 30-day HF readmissions in group 1 compared to group 2 (4.2% vs 16.9%) P=0.001.

Conclusion: Use of sacubitril/valsartan for the treatment of HFrEF in Saudi Arabia is associated with fewer 30-day readmissions compared to ACEI/ARBs. These findings need to be confirmed by larger studies.

Sun-25. Comparative study of the effects of empagliflozin versus dapagliflozin on cardiovascular disease: A national cohort study in Korea.

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Introduction: The 2018 American Diabetes Association guidelines emphasized the cardiovascular benefits of using sodium-glucose cotransporter-2 inhibitors (SGLT2Is) after metformin. However, the question remains which SGLT2I is most beneficial. This study aimed to compare the risk of cardiovascular disease (CVD) in patients with type 2 diabetes mellitus (T2DM) newly receiving empagliflozin versus dapagliflozin.

Research Question or Hypothesis: In T2DM patients, do empagliflozin and dapagliflozin have a similar preventive effect on CVD?

Study Design: Retrospective cohort study using claims data from the National Health Insurance Service in South Korea

Methods: Patients who newly added empagliflozin or dapagliflozin to metformin treatment between 2014 and 2019 were obtained. The primary outcome was a composite of ischemic CVD, which was defined as hospitalization or an emergency department visit with a primary diagnosis of myocardial infarction, ischemic stroke, or coronary revascularization. Patients were followed from 90 days after the initiation of SGLT2I and until the occurrence of CVDs, death, or December 31, 2019, whichever occurred first. Multivariable Cox proportional hazard modeling, adjusting for patients' age, sex, socioeconomic status, co-morbidities, and concomitant medications, was conducted using SAS software, version 9.4.

Results: A total of 9,109 patients with newly added empagliflozin or dapagliflozin to metformin therapy were included, of whom 38.7% were new empagliflozin users. Compared to dapagliflozin, empagliflozin was found to have lower risks for the primary composite outcome (adjusted HR 0.476, 95% CI 0.232-0.98). Kaplan-Meier survival analysis showed that cumulative incidence of composite outcome was significantly lower in the empagliflozin group than in the dapagliflozin group (p=0.0249). However, there were no significant differences for each component of the primary outcome or for all-cause mortality.

Conclusion: Empagliflozin significantly reduced the risk of composite ischemic CVD compared to dapagliflozin in patients with T2DM, but not in other outcomes. Additional prospective studies are warranted to further clarify the findings.

Mon PM-25. A retrospective comparison of carvedilol vs. metoprolol in post-operative atrial fibrillation rates after off-pump coronary artery bypass grafting surgery.

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Introduction: Post-operative atrial fibrillation (POAF) is a common and debilitating complication of coronary artery bypass graft (CABG) surgery. Previous studies suggest carvedilol is more effective than metoprolol at preventing POAF in on-pump CABG surgeries.

Research Question or Hypothesis: Is carvedilol associated with reduced rates of POAF in off-pump CABG?

Study Design: This study was a single-center, retrospective review of patients receiving either carvedilol or metoprolol for the prevention of POAF after off-pump CABG surgery. The primary endpoint was rate of POAF; safety endpoints included rates of hypotension, bradycardia, dyspnea, and the composite.

Methods: All adult patients who received at least one dose of carvedilol or metoprolol after off-pump CABG surgery and prior to POAF development between Jan 2016 and August 2019 were included. Efficacy and safety endpoints were analyzed with Pearson Chi-squared tests and t-tests as appropriate. Multivariate logistic regression was conducted to identify associations between demographics, potential confounders, and beta blocker dose and POAF. Kaplan-Meier plots and Cox proportional-hazards models examined time-to-event differences for POAF. IBM SPSS Statistics version 28.0.0.0 was used for all statistical analyses.

Results: A total of 134 patients were included (34 carvedilol, 100 metoprolol). The mean age was 63 years and 71% were male. POAF developed in 2 patients (5.8%) in the carvedilol group and 24 patients (24.0%) in the metoprolol group (OR 0.17, 95% CI 0.03-0.83). No significant differences in hypotension, dyspnea, or the composite of safety endpoints occurred between groups, but bradycardia occurred more commonly among metoprolol-treated patients (p=0.040). Time-to-event analysis hazard ratio of 0.22 (95% CI 0.05-0.93) for carvedilol use.

Conclusion: In this single-center, retrospective study of off-pump CABG patients, carvedilol was associated with reduced POAF risk and enhanced safety compared to metoprolol.

Tues-17. Use of guideline-directed medical therapy in patients aged 80 years or older with heart failure with reduced ejection fraction.

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Introduction: Guideline-directed medical therapy (GDMT) is recommended in all patients with heart failure with reduced ejection fraction (HFrEF) regardless of age. Yet, utilization of GDMT in patients aged ≥80 years is controversial due to underrepresentation in clinical trials.

Research Question or Hypothesis: In patients aged ≥80 years with HFrEF, what proportion are on each of the four GDMT, and of those, how many are on the target dose?

Study Design: Quantitative retrospective electronic medical record review at three specialized heart failure clinics in the Fraser Valley, British Columbia, Canada.

Methods: Included were patients aged 80-99 years with a left ventricular ejection fraction (LVEF) ≤40% who were hospitalized for a heart failure exacerbation within 12 months. Data (patients, drug/dose, adverse effects) were collected from September 2019-August 2021.

Results: In total, 332 patients were screened and 91 were included. The most common reason for exclusion was an LVEF >40%. Mean age was 85 years and 60% were male. Mean LVEF was 30%. Use of GDMT at the initial clinic visit and 4-6 months later is included in the table.

The most common reasons for not initiating or up-titrating GDMT were renal dysfunction (48%), hypotension (40%) and hyperkalemia (24%).

Conclusion: There was relatively high utilization of beta-blockers and RAS inhibitors in patients aged ≥80 years with HFrEF. However,

	Proportion of patients on therapy at initial clinic visit (N=91)	Proportion of patients on target dose at initial clinic visit (N=91)	Proportion of patients on therapy at 4-6 months (N=66)	Proportion of patients on target dose at 4-6 months (N=66)
Beta-blocker	92%	19%	91%	23%
Renin-angiotensin system (RAS) inhibitor	69%	11%	79%	17%
Mineralocorticoid receptor antagonist (MRA)	31%	11%	30%	12%
Sodium-glucose cotransporter-2 (SGLT2) inhibitor	0%	0%	3%	3%

<25% of patients achieved target doses. Use of MRAs was low, likely due to renal dysfunction and hyperkalemia. Very few patients were prescribed an SGLT2 inhibitor.

Mon PM-32. Evaluation of Empagliflozin Use in Hospitalized Patients with Heart Failure with Reduced Ejection Fraction.

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Introduction: Sodium-glucose cotransporter 2 (SGLT2) inhibitors have been shown to reduce the risk of hospitalization in patients with heart failure (HF). Beyond the long-term benefits of SGLT2 inhibitors, the safety and efficacy in hospitalized patients with HF with reduced ejection fraction (HFrEF) is lacking in the literature.
Research Question or Hypothesis: Evaluate the safety profile of SGLT2 inhibitor therapy in hospitalized patients with HFrEF.
Study Design: Retrospective review from a single-center, community-based institution from April 2021 to November 2021.
Methods: Patients were included if they had a diagnosis of HFrEF and were 1) newly initiated on a SGLT2 inhibitor during hospitalization (initiation cohort) or 2) continued on SGLT2 inhibitor therapy during admission (continuation cohort). Safety outcomes included documentation of urogenital infection, euglycemic diabetic ketoacidosis (DKA), hypoglycemic events, and development of acute kidney injury (AKI) during the admission. Key secondary endpoints included 30-day and 60-day HF readmission rate, length of hospitalization, and SGLT2 inhibitor discontinuation rate.
Results: A total of 114 patients were identified, 78 of whom met inclusion criteria. Forty-eight patients were in the initiation cohort and 30 patients in the continuation cohort. Three patients across both groups developed an adverse effect while on empagliflozin, all attributed to AKI. No patient developed euglycemic DKA, hypoglycemia, or urogenital infection that was attributed to empagliflozin during the study period. Results showed a 60-day HF-related readmission rate of 10% in the continuation cohort and 4.2% in the initiation cohort. Furthermore, 16.7% of patients had their SGLT2 inhibitor stopped during admission in the continuation cohort versus 23% of patients in the initiation cohort.
Conclusion: Our study found a limited number of safety events with the use of empagliflozin in patients with HFrEF at a community-based institution. A primary reason for discontinuation was due to outpatient cost or provider discretion. Additional prospective studies are warranted to evaluate its use in more diverse, larger populations.

Tues-20. Evaluation the use of beta blockers in patients with acute decompensated heart failure and heart failure with reduced ejection fraction: A single center descriptive study.

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Introduction: Long-term management of heart failure with reduced ejection fraction (HFrEF) includes the use of beta blockers (BBs) to decrease mortality. However, the use of BBs in acute decompensated heart failure (ADHF) is debatable. For patients with severe decompensation and requiring inotropic agents, the use of BBs should be withheld. On the other hand, the use of BBs in mild or moderate decompensation should be continued.
Research Question or Hypothesis: What is the appropriateness rate of prescribing BBs in patients with ADHF and HFrEF.
Study Design: This was a retrospective descriptive study at a large tertiary hospital in Saudi Arabia.
Methods: We included patients with history of HFrEF and on BBs at home who admitted to hospital with ADHF from January 2019 until December 2019, while patients admitted to ICU during admission or stayed at hospital for < 24 hours were excluded. BBs were considered appropriate if patients were hemodynamic stable and did not receive IV inotropes or IV vasodilators after 24 hours of admission. The main outcome was the appropriateness of prescribing BBs. The secondary outcomes were hospital length of stay and in-hospital mortality. Data was assessed using descriptive statistics.
Results: A total of 147 patients included in our analysis. The mean age of included participants was 62.8 ± 13.4 years and most of our patients were male 63.9 %. The use of BBs in ADHF with history of HFrEF was appropriate in 118 (80.2%). The median length of stay was 4 (1-9) days. The in-hospital mortality occurred in 17 (11.6%) patients.
Conclusion: This study highlights the high rate of appropriate BB use in patients with ADHF and HFrEF. More efforts should be done to educate health care providers about the proper use of BBs in ADHF.

Sat-9. Outcomes Before & After UNOS Policy Change in Adult Heart Transplant Recipients Who Received Induction Immunosuppression.

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Introduction: Induction in heart transplant (HT) patients is non-uniform, with center-specific protocols often dictating use and selection of agents according to patient-specific immunologic risk factors. Data regarding the evolution of induction practice patterns after the 2018 allocation system change are not available.
Research Question or Hypothesis: The shift away from durable to percutaneous mechanical circulatory support as a bridge to transplant under the new allocation system will alter induction practice patterns in HT recipients.

Study Design: Retrospective cohort study

Methods: We included adults (18+ years of age) who had undergone HT and received induction immunosuppression and were stratified based on surgery being before (January 1st 2015-October 17th 2018) and after (October 18th, 2018-December 31st, 2021) the UNOS allocation policy change. Outcomes of 30-day mortality, 1-year mortality, and 1-year graft failure were compared between those transplanted before and after the policy change through risk-adjusted Cox proportional hazards models while drug-treated rejection in the first year was compared using multiple logistic regression.

Results: Of the 8,805 HT recipients who received induction therapy, 5,518 (62.7%) were transplanted before and 3,287 (37.3%) after the UNOS policy change. The most used induction agents were basiliximab (56.1%) and thymoglobulin (39.2%), with thymoglobulin used more often in the new (42.9%) than old system (37%; p<0.001). Among adult HT recipients who received induction, risk-adjusted hazards of 30-day mortality (HR 1.00, 95% CI 0.77-1.29), 1-year mortality (HR 1.02, 95% CI 0.87-1.20), and 1-year graft failure (HR 0.82, 95% CI 0.60-1.10) were similar between the old and new systems. Conversely, the adjusted odds of drug-treated rejection in the first year was lower in the new system (OR 0.52, 95% CI 0.38-0.72).

Conclusion: HT recipients in the new allocation system were more likely to receive thymoglobulin induction, which may be associated with a reduced risk of drug-treated rejection.

Mon PM-30. Impact of Pre-Operative P2Y12 Platelet Reactivity Units on Peri- and Post-Operative Bleeding Events in Cardiac Surgery Patients.

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Introduction: Coronary artery disease treatment includes P2Y12 inhibitor therapy which increases bleeding risk during coronary artery bypass (CABG). Evidence surrounding P2Y12 platelet reactivity units (PRU) impact on bleeding outcomes in this population is lacking.

Research Question or Hypothesis: Low preoperative P2Y12 PRU levels do not increase peri- and postoperative bleeding events.

Study Design: Retrospective cohort study.

Methods: Patients on P2Y12 inhibitors who underwent CABG and/or valve replacement surgery with a P2Y12 PRU measured within 48 hours prior to procedure were included. Patients with PRU level ≤237 (low PRU group) or >237 (high PRU group) were compared. The primary outcome assessed the universal definition of perioperative bleeding (UDPB) in adult cardiac surgery and secondary outcomes assessed chest tube output, transfusions, and medications to mitigate bleeding administered between the two groups. Chi-squared, Fisher's exact, and Wilcoxon rank-sum tests were used as appropriate with a significance level of 0.05. Data was analyzed using SAS Version 9.4. Institutional Review Board approval obtained.

Results: From April 2018 to April 2021, 72 patients were included. Of those, 49 were part of the low PRU cohort and 23 in the high cohort. Moderate to severe UDBP bleeding was similar between these cohorts; low PRU (n=6, 12.2%) versus high PRU (n=2, 8.7%; p=0.13). Median (IQR) 12-hour chest tube output was similar between both cohorts (530 mL [420-740] vs 500 mL [340-640]; p=0.36). Blood product administration was also similar, when comparing low to high PRU groups patients received the following: packed red blood cells (21[42.9%] vs 7[30.4%]; p=0.19), fresh frozen plasma (15[30.6%] vs 9 [39.1%]; p=0.38), platelets (25[51.0%] vs 12[52.2%]; p=0.97), and cryoprecipitate (20[40.8%] vs 10[43.5%]; p=0.83). There were no statistically significant differences between groups for intraoperative medications except aminocaproic acid was administered more often in the high PRU arm (29[59.2%] vs 19[82.6%]; p=0.05).

Conclusion: Preoperative levels of P2Y12 PRU do not significantly increase intra- and postoperative bleeding outcomes.

Sun-21. Temporal relation between remdesivir administration and profound bradycardia: a case series.

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Introduction: The clinical benefits of remdesivir in the treatment of coronavirus disease 2019 (COVID-19) are well documented. The safety profile, however, is less characterized with a possible association between remdesivir and bradycardia now emerging.

Research Question or Hypothesis: What is the temporal relation between remdesivir administration and episodes of profound bradycardia in patients with COVID-19?

Study Design: Single-center, retrospective case series.

Methods: We searched our health-system's patient safety alert (PSA) reporting database to identify PSAs involving remdesivir and bradycardia submitted between August 1 and November 31, 2021. Electronic medical records were reviewed to verify remdesivir administration followed by profound bradycardia, defined as a heart rate less than 50 beats per minute, which occurred within 24 hours. Subsequent data collection followed manually.

Results: A total of 15 patients were identified as potentially experiencing remdesivir-induced bradycardia. Patients were a median age of 54 years (interquartile range [IQR], 42 – 63.5 yrs) and mostly female (n=8; 53.3%). Baseline electrocardiograms were collected on 11 patients (73.3%) with no evidence of existing sinus bradycardia. Five patients (33.3%) experienced bradycardia following the first

administration, and prior to the fourth scheduled dose, the majority of patients had experienced at least one instance of profound bradycardia (n=14, 93.3%). Profound bradycardia occurred at a median of 7 hours (IQR, 3.5 – 17 hrs) following the most recent administration. Remdesivir was discontinued before completion of the full 5-day regimen in eight patients; doses were held in another two patients. Two patients died during their hospital course.

Conclusion: Results suggest that bradycardia generally presents early in the remdesivir treatment course and often continues or recurs with subsequent administrations. This bradycardia can be clinically meaningful and interrupt remdesivir therapy. Findings are limited by potential bias in the spontaneous reporting of PSAs. Future research should assess whether these findings are reproducible in a larger cohort.

Mon AM-36. Characterization of Antihypertensive Medication Use During Pregnancy in a Real-World Clinical Setting.

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Introduction: Hypertensive disorders of pregnancy (HDP) are rising in prevalence and associated with adverse maternal and infant health outcomes. However, antihypertensive medication usage and selection practices remain unclear.

Research Question or Hypothesis: What is the frequency of antihypertensive medication use and agent selection across distinct HDP diagnoses in a real-world setting?

Study Design: Retrospective cohort study.

Methods: Women who delivered from 2014-2017 at two academic medical centers with a HDP diagnosis and medication data in the health record were included (N=1,641). Use of any antihypertensive medication (Any AntiHTN, yes/no) and the agent selected at any encounter during pregnancy and/or on the delivery date was recorded, and proportions were compared across HDP diagnosis (eclampsia/severe preeclampsia [severe PE], chronic hypertension with superimposed preeclampsia [CHTN+PE], preeclampsia [PE], gestational hypertension [GHTN]) by Chi-square tests and logistic regression.

Results: The study population was mean±SD 30.5±6.5 years, 41.0% and 15.7% self-identified as Black and Hispanic, respectively, and 30.5% had a pre-pregnancy hypertension history. Antihypertensive use was high overall and differed across HDP type (Table). Relative to GHTN, antihypertensive use was significantly more likely (odds ratio [95% CI]) in patients with severe PE (5.94 [3.85-9.16]), CHTN+PE (4.99 [3.46-7.19]), and PE (2.13 [1.61-2.82]).

Conclusion: In a real-world setting, antihypertensive medication use among HDP patients was common; labetalol, nifedipine, and hydralazine were the most commonly selected agents, and HDP severity was strongly associated with a higher likelihood of antihypertensive use. Future studies comparing medication effectiveness in pregnant patients with distinct HDP diagnoses are needed.

Clinical Administration

Mon PM-34. Board certification preparation among pharmacy residency programs.

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Introduction: Board certification among pharmacists is increasing in prevalence accompanying expanded practice opportunities and exam availability to broader specialty areas. Residency training is one common prerequisite for board certification. Although there are documented benefits, board certification preparation (BCP) has yet to be evaluated among American Society of Health System Pharmacists (ASHP)-accredited residency programs.

Research Question or Hypothesis: What is the status of BCP among ASHP-accredited residency programs and corresponding attitudes of residency program directors (RPDs) regarding BCP?

Study Design: Cross-sectional survey of RPDs from select U.S. states

Methods: Eligible RPDs were identified through the ASHP residency directory. A 33-item survey was developed in REDCap and distributed via email. Those with missing or invalid emails were excluded. The survey was open for six weeks and responses were anonymous.

	All (N=1641)	Severe PE (N=289)	CHTN+PE (N=401)	PE (N=557)	GHTN (N=394)	P-value
Any AntiHTN	1276 (77.8%)	260 (90.0%)	354 (88.3%)	425 (76.3%)	237 (60.2%)	<0.001
Labetalol^	956 (74.9%)	213 (81.9%)	289 (81.6%)	309 (72.7%)	145 (61.2%)	<0.001
Nifedipine^	378 (29.6%)	54 (20.8%)	142 (40.1%)	123 (28.9%)	59 (24.9%)	<0.001
Hydralazine^	261 (20.5%)	84 (32.3%)	80 (22.6%)	83 (19.5%)	14 (5.9%)	<0.001

^*% of Any AntiHTN*

Respondents were eligible to receive one of six available gift cards through a random drawing. Descriptive statistics were applied for data evaluation.

Results: Among the 149 survey respondents, 126 (84.6%) were board certified. Respondents primarily served as RPDs of PGY1 (49%) or PGY2 (48.3%) programs. Structured BCP was offered by 9.4% (n=14) of programs and 14.1% (n=21) support residents by purchasing review materials or sending them to complete a board certification course. The majority (70.5%) do not offer financial support or BCP for residents. Among programs that offer structured preparation, 71.4% (n=10) use institution-specific materials. Among programs that do not currently offer BCP, 56.2% (n=59) indicated they were "somewhat" or "very" interested in implementation, identifying the top barriers as cost and time.

Conclusion: A small proportion of programs offer structured BCP, although interest appears high among RPDs to consider implementation. The likelihood of implementation would presumably increase if associated barriers were addressed. Further qualitative evaluation of may assist interested programs in efficient, cost-effective implementation of BCP through institution-specific or commercially available products.

Community Pharmacy Practice

Mon AM-45. Understanding Community Pharmacy Barriers to Care in Opioid Use Disorder: Perspectives from Peer Recovery Coaches, Pharmacists, and Providers.

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Introduction: Previous literature shows that pharmacy-specific barriers, including inadequate supplies of medications for opioid use disorder (MOUD), pharmacists refusing to fill MOUD prescriptions, and fear of regulatory oversight, affect patients' access to MOUD.

Research Question or Hypothesis: What are current barriers, facilitators, and opportunities for improvement in community pharmacy MOUD care practices from the perspectives of peer recovery coaches, community pharmacists, and prescribers?

Study Design: Individual semi-structured interviews were conducted with each participant.

Methods: Interviews explored stakeholders' perspectives on their current role in MOUD care practices and how current pharmacy practices could be improved. After all interviews were conducted, data was analyzed using preconceived deductive codes as well as iterative inductive codes that evolved with the project. The first author analyzed all transcripts, of which three were also analyzed separately by the last author to confirm consistent utilization of codes. All transcripts were coded once, followed by a second coding to ensure inductive codes were thoroughly applied.

Results: Ten peer recovery coaches, ten pharmacists, and six prescribers were included. Interviews identified barriers and facilitators in current MOUD care practices and opportunities for improvement. Stigma was a major barrier identified by all groups. Other barriers identified included societal-level barriers, limited patient engagement at pharmacies, and lack of access to health-system electronic medical records in community pharmacy settings. Pharmacists also identified additional barriers including DEA regulations and difficulties balancing patient care with external factors such as insurance and legal policies. Positive prescriber/pharmacist relationships were identified as a facilitator of care. Opportunities for improvement included having community MOUD resource information readily available at pharmacies and further education on MOUD for pharmacists.

Conclusion: Many barriers exist in current MOUD care practices. Community pharmacies can better engage with current MOUD care practices through collaboration with other stakeholders in a manner that leverages the accessibility of pharmacists within their communities.

Critical Care

Mon AM-49. Gender Bias in PGY2 Emergency Medicine and Critical Care Pharmacy Residency Letters of Recommendation.

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Introduction: Post-graduate second year (PGY2) pharmacy residency programs are increasingly sought after and are highly competitive, especially for those pursuing specialized clinical pharmacist positions. In the pharmacy residency recruitment process, letters of recommendation (LOR) are vital as they provide insight regarding the applicant and their experiences. Other medical fields, such as ophthalmology, oncology, and urology, have studied implicit gender bias potentially present in LORs submitted to their programs, but there is little data in relation to pharmacy residency LORs.

Research Question or Hypothesis: Does implicit gender bias exist in LORs of PGY2 emergency medicine and critical care pharmacy residency applications?

Study Design: This was a non-randomized, retrospective study including applications submitted through ASHP National Matching Program to five emergency medicine and critical care pharmacy residency programs for the 2017-2021 application cycle.

Methods: LORs were de-identified and analyzed using validated Linguistic Inquiry Word Count software to evaluate language variables present in the LORs submitted on behalf of the applicants. The primary outcome measure was the difference in language used in the LORs based on gender of the applicant. Secondary analysis compared gender and confounders to whether applicants were offered to interview with a program. Additional data were collected surrounding applicant demographics and application criteria.

Results: A total of 372 applications were submitted. Of those, 260 (70%) were categorized as women and 112 (30%) were categorized as men. In the primary analysis, there existed statistical differences in 9 of 117 linguistics categories. Secondary analysis demonstrated no difference in interview invitation between men and women.

Conclusion: Linguistic differences exist in LORs written for women and men applying to PGY2 pharmacy programs. Recognition of these differences may better the residency selection process.

Mon PM-40. Lidocaine Dose Requirements in Ventricular Tachycardia Storm.

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Introduction: Lidocaine is a commonly used antiarrhythmic agent in the setting of ventricular arrhythmias. Current guidelines recommend a continuous infusion of 0.5-4 mg/min, but data are limited on the rate of supratherapeutic levels in critically ill patients. The aim of this study is to determine the incidence of supratherapeutic lidocaine levels.

Research Question or Hypothesis: Initial lidocaine doses of 2 mg/min or greater are associated with an increased incidence of supratherapeutic lidocaine levels in critically ill patients.

Study Design: Single center, retrospective cohort study

Methods: Critically ill patients receiving lidocaine for ventricular arrhythmias between January 2010 and August 2021 who had a level drawn after at least 8 hours of drug administration were assessed for inclusion. Pregnant patients and those who had lidocaine levels drawn at outside hospitals were excluded. Patients were grouped by dose of lidocaine administered ($\geq$ 2 mg/min and < 2 mg/min). The primary endpoint was the incidence of supratherapeutic lidocaine serum concentrations (> 5 mcg/ml). Chi-squared and Student t- tests were used as appropriate.

Results: A total of 140 patients were included. Baseline characteristics were similar between groups. Supratherapeutic lidocaine serum concentrations occurred in 61.2% of patients who received a dose of lidocaine of $\geq$ 2 mg/min as compared to 20.9% in patients who received lidocaine at a dose of < 2 mg/min. (p-value 0.001). Patients with supratherapeutic levels were more likely to have a dose reduction or discontinuation of therapy. There were no statistically significant rates of documented lidocaine toxicity in either group (p-value 1).

Conclusion: Critically ill patients receiving lidocaine doses of 2 mg/min or greater have a high rate of supratherapeutic lidocaine levels. If this dose is used in clinical practice, early therapeutic drug monitoring is warranted.

Tues-41. Impact of a Pharmacist-Driven Diluent Optimization Protocol on Fluid Balance in Critically Ill Patients.

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Introduction: Critically ill patients experience volume overload which is associated with negative clinical outcomes. Approaches to optimize fluid status have been investigated with varying results. No study has prospectively investigated optimizing medication diluent volume in the intensive care unit (ICU), and pharmacists are in a unique position to facilitate this intervention.

Research Question or Hypothesis: This study evaluated if a pharmacist-driven medication diluent optimization protocol centered on antimicrobial and continuous infusions decreases net fluid balance in critically ill patients.

Study Design: This was a prospective pilot study conducted in a single medical ICU during October 2021 to December 2021 (pre-protocol) and February 2022 (post-protocol).

Methods: A three-step protocol for vasopressor and antimicrobial diluent volume optimization was implemented. Baseline demographics and clinical data were collected for the pre- and post-protocol groups. The primary outcome was net fluid balance on day three. Secondary outcomes included vasopressor and antimicrobial medication volumes administered, need for de-resuscitation, need for renal replacement therapy, ICU length of stay, and ICU mortality. Multivariable linear regression was performed using day three fluid balance as the primary outcome.

Results: One-hundred and sixty patients were included in the pilot study. There was no statistical difference found in day three fluid balance between the pre- and post-protocol groups (3560.2 mL [-1811.5 to 3665.7] vs 2117.2 mL [-2631.3 to 4735.0]; p=0.581). The post-protocol group received less cumulative volume from vasopressors (15.7 mL/hr [8.3-29.6] vs 10.5 mL/hr [3.9-15.4]; p=0.043) and antimicrobials (433.3 mL/day [307.1-650.0] vs 303.3 mL/day [200.0-500.0]; p=0.014). No differences were seen in other secondary outcomes. In multivariable linear regression, no variables were significantly associated with day three fluid balance.

Conclusion: Optimizing vasopressor and antimicrobial diluent volume does not significantly impact volume status, despite decreasing volume contributed by these specific medications. Medication volume is likely a nonmodifiable variable within the ICU, and pharmacists should focus efforts elsewhere to limit volume overload.

Sun-33. Pharmacy Student Knowledge and Competency Regarding Application-Based Critical Care Topics.

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Introduction: Foundational skills laboratories often allow students to actively engage in material taught didactically and then reflect through post laboratory exercises. There is a lack of information regarding outcomes of implementing active learning, critical care focused laboratory activities in pharmacy curricula.

Research Question or Hypothesis: For third year student pharmacists, does an active-learning critical care laboratory help students gain knowledge and confidence with selected topics, including advanced cardiovascular life support (ACLS), rapid section intubation (RSI), and toxicology?

Study Design: Pre/post-test study.

Methods: Prior to the critical care focused skills laboratory, students completed an optional assessment composed of six confidence questions and eight knowledge questions related to ACLS, RSI, and toxicology. Students then participated in a critical care focused laboratory with four stations focused on ACLS review, ACLS simulations, RSI, and toxicology. After the laboratory, students completed the same assessment again. Descriptive statistics assessed pre/post-test responses. Paired pre/post-test Likert data were analyzed using the Wilcoxon signed-rank test and paired pre/post-test multiple choice responses were analyzed using the McNemar test.

Results: Of the 88 students in the cohort, 76 students completed both the pre- and post-lab assessments. In the knowledge questions, students demonstrated a significant increase in their overall knowledge scores after the laboratory ($p<0.001$). Between the pre- and post-assessments, students reported confidence regarding ACLS, RSI, and toxicology, showing a statistically significant increase ($p<0.001$). The majority of respondents rated the critical care laboratory as excellent or good with regards to how effective the activity was to help understand critical care topics and with regards to how much they enjoyed the laboratory.

Conclusion: A hands-on, active learning laboratory devoted to teaching and reinforcing common critical care concepts allowed students to gain knowledge and confidence regarding ACLS, RSI, and toxicology.

Mon PM-39. Clinical and hemostatic efficacy of reduced dose 4PCC for anti-Xa inhibitor associated intracranial hemorrhage.

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Introduction: There is an uncertainty regarding hemostatic effectiveness of 4F-FCC for the reversal of anti-Xa inhibitor associated intracranial hemorrhage (ICH). Clinical practice guidelines suggest 50 unit/kg 4F-PCC for reversal major bleeding secondary to anti-Xa inhibitors, however, other studies have demonstrated high rates of hemostasis for patients who received a lower dose.

Research Question or Hypothesis: Reduced dose 4F-PCC is as efficacious as guideline recommended 50 unit/kg for resolving anti-Xa inhibitor associated ICH.

Study Design: Retrospective chart review

Methods: Retrospective chart review of adult patients who received 4F-PCC between June 2016 and August 2021. Patients included were ≥18 yo and received a 4F-PCC dose ≤40 unit/kg for the reversal of apixaban or rivaroxaban associated ICH. Patients were excluded if they expired prior to a follow-up CT scan or had comfort only measures. The primary endpoint was the occurrence of hematoma expansion >20%. Secondary endpoints included 28 day mortality and neurosurgical intervention. Chi-squared was used to compare the rate of hematoma expansion in the study group to published rates for 4F-PCC 50 unit/kg dosing strategies. Descriptive statistics were used to describe the occurrence of secondary outcomes.

Results: Thirty patients were included for analysis. The average age was 73 and 66.7% were on apixaban. The most common ICH was IPH (36.7%) and 43.3% were traumatic injuries. Majority of patients presented with a GCS of 7-15 (86.7%) and six required operative intervention. The average dose of 4F-PCC was 26.1 unit/kg (17.8-39.3) and the average initial hemorrhage size was 1.8 cm (0.8-7.6). When comparing dosing regimens, 16.7% of patients in our study vs 25.1% of patients from the selected studies had a hematoma expansion >20% ($p=0.484$). At day 28, 83.3% of patients were alive and discharged.

Conclusion: There is no significant difference in hemostatic efficacy between reduced dose 4F-PCC compared to guideline recommended 50 unit/kg for resolving anti-Xa inhibitor associated ICH in our study population.

Mon AM-47. Evaluation of Outcomes in Critically-ill Patients with COVID-19 Disease Receiving Short Versus Long Courses of Methylprednisolone.

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Introduction: Determination of an optimal dosing regimen incorporating an effective agent, dose, and duration of corticosteroids in patients presenting with severe acute respiratory syndrome coronavirus-2 leading to coronavirus disease of 2019 (COVID-19) is pivotal in order to balance the benefits and risks of corticosteroid use in this high-risk patient population.

Research Question or Hypothesis: How do outcomes differ with use of short versus long course methylprednisolone therapy in patients with confirmed COVID-19 disease?

Study Design: multi-center, retrospective, chart review

Methods: Patients were stratified into two intervention groups comparing short course (<14 days) versus long course (>15 days) methylprednisolone therapy. The primary outcome evaluated was time to sustained oxygenation improvement. Safety outcomes included incidence of serious secondary infections, hyperglycemia leading to a new insulin requirement, and new corticosteroid prescription at discharge.

Results: A total of 142 patients were included in this study with 95 patients in the short course cohort and 47 patients in the long course cohort. Baseline characteristics had a few notable differences in female sex (p=0.037), intubation rates (p<0.001), and certain lab values. The composite time to sustained oxygenation improvement was significantly shorter in the short course cohort with 8.1 days (IQR 3.4-12.1) on supplemental oxygen in comparison to 13.4 days (IQR 13.4-37.5) for the long course cohort (p<0.001). In-hospital mortality was significantly lower in the short course cohort when compared to the long course cohort (30.5% versus 55.3%; p=0.004). This study found that the long course cohort had higher rates of serious secondary infections (p<0.001) and increased rates of hyperglycemia with additional insulin requirements (p=0.014).

Conclusion: Shorter courses of methylprednisolone in patients with COVID-19 were associated with decreased time to oxygenation improvement as well as with decreased rates of secondary infections and hyperglycemia. Due to the limitations of this study, further prospective studies are needed to evaluate the impact of corticosteroid duration on patient outcomes.

Sun-35. Retrospective safety evaluation of peripheral vasopressors compared to central line administration.

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Introduction: Emerging literature suggests the benefit of peripheral intravenous (PIV) vasopressor administration over central venous catheters (CVC). Additional research is required to determine optimal PIV location and gauge, suitable vasopressor dose and concentrations, and patient characteristics for safe PIV vasopressor administration.

Research Question or Hypothesis: What is the incidence of adverse events of PIV vasopressor administration?

Study Design: Single-centered, retrospective electronic medical records review.

Methods: From October 2021-May 2022, 150 patients were categorized in the PIV or CVC arm according to the type of line used for the first vasopressor administered. Vasopressor Associated Line Adverse Events (VALAEs) frequency were evaluated in both arms. The VALAEs included local tissue complications, line infections, and thrombophlebitis. VALAEs that occurred during a vasopressor infusion or within 4 hours of vasopressor infusion cessation were categorized as Highly Likely. If pain, erythema, or phlebitis occurred between 4 and 24 hours after vasopressor cessation, VALAEs were categorized as Likely. While infiltration or leaking events between 4 and 24 hours after vasopressor cessation, were categorized as Less Likely VALAEs. For patients converted from PIV to CVC, VALAEs documented during CVC administration were included in the CVC arm safety analysis.

Results: During the study period, 195 vasopressor infusion entries were analyzed from 50 patients in the CVC and 100 in the PIV arm. PIV infusions accounted for 57% of these entries with norepinephrine 16mcg/mL used in 74 out of 111 PIV administrations. The median (IQR) of vasopressor infusion duration was 302 (130-700) and 893 (261-2312) minutes in the PIV and CVC arms respectively. A total of 17 VALAEs occurred: two in the CVC and 15 in the PIV arm. Six VALAEs were categorized as Highly Likely, seven Likely, and four Less Likely. None of the VALAEs required surgical or medical interventions beyond line removal.

Conclusion: Results suggest short vasopressor PIV administration as being a safe temporary alternative to CVC.

Sun-36. Use of thiamine, folic acid and multivitamin for alcohol use disorder at a Level 1 trauma center.

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Introduction: Alcohol use disorder (AUD) increases the risk of nutritional deficiencies. Although the importance of thiamine, folic acid and multivitamin (MVI) for AUD is established, lack of standardized dosing can lead to insufficient repletion or overtreatment.

Research Question or Hypothesis: What percentage of patients with AUD receive appropriate thiamine, folic acid, and MVI therapy for prevention and treatment of Wernicke's Encephalopathy (WE)?

Study Design: Single-center, retrospective chart review

Methods: Patients that received thiamine, folic acid, and MVI in the medical intensive and intermediate care units from August 2018 to July 2021 were identified. The inclusion criteria were patients with a length of stay over 24 hours. The exclusion criteria were incarceration and pregnancy. The primary outcomes were percentage of patients receiving appropriate guideline-recommended thiamine, folic acid, and multivitamin. The secondary outcomes were percentage of patients

with WE resolution after treatment and cost of inappropriate use. Descriptive statistics were used for analyses.

Results: Eighty-six patients were identified and 72 patients met inclusion criteria. The majority were male (73.6%), African American (45.8%) with a median age of 51 (range 23-88) years. Fifty-four patients received prophylaxis and 21 patients received treatment for WE. The primary outcomes were appropriateness of thiamine for WE treatment which was 15/21 (71.4%), and prophylaxis which was 32/54 (59.3%). The appropriate folic acid use was 34/72 (47.2%) and MVI was 18/72 (25%). The inappropriate thiamine doses were 226 doses, folic acid were 282 doses, and MVI were 183 doses. The secondary outcomes were percentage of patients with WE resolution with treatment which were 12/21 (57.1%) and 27/54 (50%) with prophylaxis. The cost of inappropriate thiamine use is $705.12, folic acid is $2,600.20, and MVI is $19.51.

Conclusion: Use of thiamine, folic acid and MVI for treatment and prophylaxis of WE needs improvement.

Sun-37. Efficacy of high dose versus low dose levetiracetam in status epilepticus.

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Introduction: Status epilepticus (SE) is a severe neurological condition with significant morbidity and mortality. After emergent benzodiazepine therapy, there is limited guidance for urgent control in SE. Higher dosing of levetiracetam (60 mg/kg) was introduced in the 2019 ESETT trial and has not been studied against the previous standard (20 mg/kg).

Research Question or Hypothesis: The purpose of this study was to investigate the impact of the loading dose of levetiracetam (LEV) in patients with SE on the need for additional antiepileptic drugs (AEDs). Are lower loading doses as effective in decreasing the need for additional AEDs?

Study Design: Single-center, retrospective cohort conducted at an academic medical center in the United States.

Methods: This study evaluated the impact of LEV loading doses on patients treated for SE. Patients were included if they received ≥ 1 dose of intravenous LEV ≥ 20 mg/kg from January 1, 2019 to January 14, 2022, and were ≥ 17 years old. Exclusion criteria included traumatic injury. Primary endpoint included additional AED required within 48 hours of LEV loading dose. Descriptive statistics were used to analyze the data.

Results: Patients who received ≥ 40 mg/kg of LEV were less likely to require a second AED within 48 hours as compared to those who received < 40 mg/kg (39[69.9%] vs. 15[38.5%]; p=0.0127). When considering potential confounders, no difference was seen in AED requirements (OR 0.4, 95% CI 0.2 – 1.2, p=0.0954). More patients who received < 40 mg/kg were on AEDs at home or had a history of seizures.

Conclusion: This study did not demonstrate a difference in additional AEDs required for seizure control when patients received < 40 mg/kg compared to ≥ 40 mg/kg. The higher doses of 60 mg/kg seen in the ESETT trial may not be necessary, but further investigations evaluating the efficacy of 20 mg/kg compared to 60 mg/kg are needed.

Mon AM-46. Effect of the COVID-19 Pandemic on ICU Liberation Bundle Adherence.

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Introduction: The 'ICU Liberation Bundle' is recommended by Society of Critical Care Medicine guidelines as standard supportive care. Significant deviations were made to providing bundled care during the COVID-19 pandemic. Implications on patient outcomes are unknown.

Research Question or Hypothesis: What influence did COVID-19 have on bundle adherence and clinical outcomes?

Study Design: A single-center retrospective cohort study of adult medical ICU patients requiring mechanical ventilation (MV) ≥ 48 hours and ICU stay ≥ 7 days. Patients with comfort measures within 48 hours, long-term care residents, and hospital transfers were excluded. Patients were separated into three cohorts based on ICU admission time and COVID-19 status: (Pre-pandemic [pre-group] April 2019-March 2020; Pandemic COVID-19 negative [COV-neg] and Pandemic COVID-19 positive [COV-pos]: April 2020-March 2021).

Methods: Assessment of daily bundle eligibility and adherence was performed over the first 7 days after intubation. Primary outcomes were average daily adherence and days of complete adherence. Secondary outcomes included days alive and free of MV and delirium, readmission, and mortality. Categorical data were compared using Fisher's exact test and continuous data using Kruskal-Wallis/Mann Whitney U tests.

Results: A total of 410 patients were eligible. A random sample of 170 patients found 137 meeting inclusion of which 31 were excluded. An additional random sample was performed including 67 patients in the final analysis (pre-group n=21; COV-neg n=21; COV-pos n=25). Baseline demographics were similar. Median daily adherence and days of complete adherence were statistically different across cohorts (pre-group 68.6% [65-72.8] vs COV-neg 51.4% [45-60.7] vs COV-pos 32.6% [22.6-47.6]; p <0.001) and (pre-group 1 [0-1] vs COV-neg

0 [0-0] vs COV-pos 0 [0-0]; p <0.001), respectively. Days alive and free of MV was significantly higher pre-pandemic (pre-group 23 [21-24] vs COV-neg 20[15-22] vs COV-pos 18 [7-21]; p=0.0149). No other outcomes were different.

Conclusion: ICU bundle adherence was significantly reduced during the COVID-19 pandemic with possible implications on patient outcomes.

Sat-13. Analysis of Renal Function in Patients Hospitalized with COVID19.

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Introduction: COVID19 was originally thought to be solely a respiratory disease, however, other organs, such as the kidneys, are often also affected. While acute kidney injury (AKI) and augmented renal clearance (ARC) have both been documented, the incidence, renal characteristics, and outcome of each derangement have not been fully elucidated.

Research Question or Hypothesis: What are the incidences, characteristics, and outcomes of AKI, ARC, and no AKI/ARC in patients hospitalized with COVID19?

Study Design: Retrospective, observational cohort study

Methods: Inpatient data from the National COVID Cohort Collaborative database with laboratory confirmed COVID19 who were ≥18 years old were utilized. Patients who had all data to calculate creatinine clearance (CrCl) via Cockcroft-Gault equation were screened. Exclusion criteria were pregnancy, body mass index ≤18kg/m^2, history of end-stage renal disease on dialysis or nephrectomy. Episodes of AKI and ARC were defined using AKIN criteria and CrCl ≥130mL/min, respectively. Renal function characteristics and outcomes included days with episode, hospital length of stay (LOS), and mortality. Descriptive statistics and Mann-Whitney U tests were used for statistical analysis where appropriate with p<0.05 indicating statistical significance.

Results: 15,608 patients from 11 sites were included. Overall, 57.3% were male with median age 62.7[50.1-73.2] years. The incidence of No AKI/ARC, AKI, and ARC was 43.5%, 22.9%, and 33.6%, respectively. Episodes of ARC lasted longer than AKI (4[2-7] vs 3[1-6] days; p<0.0001) Patients with AKI and ARC both had longer LOS compared to no AKI/ARC (19[10-34] and 6[4-11] vs 6[4-10]; p<0.001). Patients with AKI had the highest mortality followed by no AKI/ARC then ARC (41.7% vs 10.1% vs 5.4%; p<0.001).

Conclusion: A significant proportion of patients with COVID19 exhibit altered renal function throughout hospitalization. Clinicians should be mindful of these alterations given their associations with increased LOS and mortality with AKI. Future research should explore the impact of ARC on medication therapy in patients with COVID19.

Sun-32. Effectiveness of Sedation Practices in Pharmacologically Paralyzed Patients: A Retrospective Study

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Introduction: In the intensive care unit (ICU), analgesics and sedatives should be administered before and during use of a neuromuscular blocking agent (NMBA) to achieve deep sedation. Untreated pain and agitation in critically ill patients can lead to negative patient outcomes.

Research Question or Hypothesis: Do pharmacologically paralyzed patients receive adequate analgosedation?

Study Design: Single-center, retrospective cohort study

Methods: Adult ICU patients who received a continuous infusion of NMBA between August 2018 and July 2020 were included. The primary outcome was the rate of adequate analgosedation, defined by: (1) Richmond Agitation-Sedation Scale (RASS) score -4 or -5 prior to NMBA initiation, (2) receiving a sedative with anterograde amnestic properties, (3) receiving a continuous analgesic infusion, (4) bispectral index (BIS) <60 during NMBA (if monitored), and (5) absence of down-titration of analgesic/sedative during NMBA. Secondary outcomes included agents administered, train of four (TOF), time to CAM-negative, and clinical outcomes. Descriptive statistics were assessed using SPSS.

Results: Of 34 patients included, 12 (35%) had documentation of adequate analgosedation. Fourteen (41%) patients achieved a RASS of -4 or -5 prior to NMBA initiation. All patients received a sedative with anterograde amnestic properties and a continuous analgesic infusion. Of the 12 patients with BIS monitoring, 8 had a BIS <60. Thirty-one (91%) patients did not have down-titration of analgesic/sedative during NMBA. The most common analgesic and sedative administered were fentanyl and propofol. Median TOF on days 1-5 were 1 (IQR 1-2), 2 (IQR 1-2), 1 (IQR 1-2), 1 (IQR 0-2), and 3 (IQR 3-3). Median time from stopping NMBA to CAM-negative was 42 hours (IQR 8.5-119.5) and median ICU length of stay was 13 days (IQR 9-19).

Conclusion: Nearly 65% of patients did not receive adequate analgosedation while pharmacologically paralyzed due largely to inadequate sedation depth prior to initiation. This could be due to errors in documenting monitoring parameters or could reflect undersedation.

Tues-31. Initial sedation depth in mechanically ventilated patients admitted to intensive care.

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Introduction: Current guidelines recommend light sedation over deep sedation in mechanically ventilated (MV) patients in the intensive care unit (ICU), however, there is limited data on the initial depth of sedation and its impact on clinical outcomes.

Research Question or Hypothesis: The purpose of this study is to evaluate the depth of sedation in MV patients admitted to the ICU from the emergency department (ED) and the impact of initial sedation depth on clinical outcomes.

Study Design: This is a single-center, retrospective cohort study. Patients greater than 18 years old requiring endotracheal intubation in the ED who received sedatives prior to ICU transfer between January 1st 2021 and June 30th 2021 were included. Patients with a Glasgow Coma Score (GCS) of 3 or who died within 24 hours were excluded.

Methods: The primary outcome was initial sedation depth using the Richmond-Agitation Sedation Scale (RASS) following ICU transfer. Secondary outcomes were mean sedation depth (RASS) during the first 24 hours, ICU length of stay (LOS), hospital LOS, duration of MV, incidence of delirium, and in-hospital mortality. Between-group differences were evaluated using the Student's t-test or Chi-square test as appropriate using STATA/MP 17.0.

Results: Of 418 patients assessed, 110 patients were included. The mean age was 58±17 years, 61% were male and 35% were for a cardiac-related diagnosis. The mean initial ICU RASS was -2.5±0.16. Fifty-seven (52%) patients were deeply sedated with an initial ICU RASS -5 to -3. Deeply sedated patients had significantly lower baseline mean GSC scores (10.3±3.9 vs 12.2±2.9, p=0.005). There were no significant differences in ICU LOS, hospital LOS, duration of MV or in-hospital mortality. Significantly more patients with deep sedation experienced delirium (63% vs 37%, p = 0.03).

Conclusion: Initial deep sedation at ICU transfer increased the likelihood of delirium, but did not impact clinical outcomes such as duration of MV, LOS or in-hospital mortality.

Mon AM-48. Primary analgosedation with ketamine in critically ill surgery and trauma patients requiring mechanical ventilation.

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Introduction: Ketamine has been described as an adjunctive option for analgesia in intubated intensive care unit patients while reducing opioid exposure but use as a primary analgosedation agent has not been explored.

Research Question or Hypothesis: What outcomes are observed among intubated SICU patients receiving ketamine primary analgosedation?

Study Design: Retrospective cohort

Methods: Patients admitted to the SICU between 2015 and 2019 requiring mechanical ventilation and meeting one of three definitions for ketamine primary analgosedation were included: no concomitant opioid infusion; ketamine monotherapy for ≥6 hours with subsequent opioid infusion; ketamine initiated concomitantly or within 4 hours of opioid and total opioid <4 hours. Use of ketamine, analgesics, and sedatives were evaluated. Pain, sedation, and delirium assessments during ketamine infusion were recorded. Ketamine failure was defined as discontinuation due to documented ineffectiveness or toxicity. Data was summarized using frequencies and percentages for categorical data, and either means and standard deviations or medians and interquartile ranges (IQR) for continuous data.

Results: Of 164 included patients, 88% never received a concomitant opioid infusion; 12% met alternative criteria for primary analgosedation. A majority, 68%, were surgical admissions and mean APACHE III score was 90(±30). Median mechanical ventilation duration was 2.5 days (1.1-4.5) and ICU length of stay of 4.9 days (3-8). The median ketamine infusion dose and duration were 0.18 mg/kg/hr (0.1-0.3) and 30 hours (15.1-51.8). Concomitant infusions of propofol and dexmedetomidine were administered in 49% and 29% of patients, respectively. During ketamine infusion, the median percent of total pain scores at goal was 62% (33%-96%), while 64% (37%-91%) of RASS scores were at goal, and 46% of patients were CAM-ICU positive during the ketamine infusion. Hallucinations were documented in 13% of patients and ketamine failure occurred in 18% of patients.

Conclusion: Ketamine may be an effective primary analgosedation option in intubated SICU patients, but prospective studies are needed to evaluate this strategy.

Dermatology

Mon AM-54. Association between the use of biological agents and the risk of cancer among patients with psoriasis.

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Introduction: The cancer risks associated with biological agents, interleukin-17 and interleukin-23, interleukin-12 and interleukin-23 targeting agents in patients with psoriasis remain controversial, and limited evidence exists regarding the cancer risks among patients with psoriasis treated with biological agents treatment in Taiwan populations.

Research Question or Hypothesis: To identify the association between biological agents use and the risks of developing all cancers.
Study Design: A nationwide, population-based, nested case control study.
Methods: Patients diagnosed with ICD-9 code 696.0 or 696.1 between January 1, 2018, and December 31, 2021, were included and followed from the Chang Gung Research Database (CGRD). The main outcomes were cancer diagnoses and associated outcomes obtained from CGRD. Odds ratios and 95% confidence intervals were estimated using the multivariate logistic regression model.
Results: The total of 18,619 study cohorts were included in our study. Propensity score matching was performed according to age, sex, index year, and Charlson Comorbidity Index using a ratio of 1:2. The final population of 3,000 were included, with 1,000 patients with cancer diagnoses after cohort entry date. Adjusted odds ratios showed no associations between anti-IL-17, anti-IL-23 and anti-IL-22 biological agents use and the risks of all cancer lymphoma compared to TNF-α inhibitors (adjusted odds ratio, 0.786; 95% confidence interval, 0.314–1.967). The use of medications for psoriasis patients like immunosuppressants, steroids (topical and systemic) and non-steroids anti-inflammatory drugs (NSAID) were no associated with the risk of cancer.
Conclusion: This study represents the first population-based study focused on the cancer risk of topical calcineurin inhibitors use among patients with psoriasis in Taiwan population. Exposure to anti-IL-17, anti-IL-23 and anti-IL-22 agents was not associated with any increased risk in overall cancer development compared with TNF-α inhibitors agents among patients with psoriasis.

Drug Information

Sun-39. Evaluation of the Accessibility of Medication Guides for Patients with Visually Impairment.

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Introduction: Currently, there is a lack of options for patients with visual impairment to obtain medication guides in an accessible format. This specific project focuses on written drug information in an electronic format for patients with computer as recommended by the Guidelines for Prescription Labeling and Consumer Medication Information for People with Vision Loss.
Research Question or Hypothesis: Determine the availability of accessible medication guides provided by the pharmaceutical company and evaluate the accessibility of the medication guides through a manual checklist and testing with a screen reader.
Study Design: Prospective, cross sectional, descriptive study
Methods: A total of 39 pharmaceutical companies were contacted via email and phone call to inquire whether the company has an accessible medication guide or can provide an alternative format for individuals with visual impairment who use a screen reader. In conjunction with contacting the pharmaceutical companies, a checklist was developed to assess the accessibility of 50 medication guides that were on the top 300 most prescribed drugs list in 2019 from ClinCalc Drug Stats Database. After utilizing the checklist, each medication guide was tested using a screen reader to verify or find additional accessibility issues.
Results: The majority (36/39) of pharmaceutical companies did not provide an accessible medication guide or an alternative format for patients with visual impairment. In testing the medication guides for accessibility, the errors commonly detected included lack of a description for images (alternative text), no description for URL links, and headings were not available to help with navigation. All of these errors lead to barriers when using a screen reader.
Conclusion: Medication guides are important to ensure adherence and efficacy of the drug; therefore, pharmaceutical companies need to create accessible medication guides or provide options to request the drug information in an alternative format for patients with visual impairment.

Education/Training

Mon PM-46. Advanced Cardiac Life Support (ACLS) Certification Across US Colleges of Pharmacy and Impact on Pharmacy Graduates.

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Introduction: The Accreditation Council for Pharmacy Education (ACPE) recommends integration of ACLS into the Pharm.D. curriculum. Although pharmacist participation on resuscitation teams decreases adverse drug reactions and hospital mortality, the extent to which ACLS is offered in colleges of pharmacy (COP) and the impact of such training on graduates is unknown. The University of Tennessee College of Pharmacy (UTCOP) has offered a month-long ACLS elective since 2009 where students receive certification through the American Heart Association (AHA).
Research Question or Hypothesis: What is the prevalence of ACLS training in US COPs and the impact on UTCOP graduates.
Study Design: Prospective, anonymous surveys were emailed to academic deans and pharmacy graduates.
Methods: A 25- and 15-question anonymous survey was sent with a 2-week reminder to determine the type of ACLS education offered and the impact of the UTCOP ACLS elective, respectively to COPs and graduates.
Results: Approximately 24/127 (27%) of administrators and 50/90 (56%) of graduates responded. Only 42% of curriculums offer ACLS coursework with the majority as didactic lectures. Of those who offer an elective, 21% provide AHA certification. Seventy-six percent of graduates work in clinical settings/academia with 67% required to respond to codes. AHA ACLS training was required for 84% of post-

graduate trainees with 59% stating the training they received at UTCOP was better. Only 57% of graduates remain ACLS certified at time of survey. Ninety-eight percent stated the ACLS course at UTCOP was beneficial and would recommend it to future students.

Conclusion: Few COP offer ACLS training with or without certification within their curriculum. Most students who take ACLS at UTCOP pursue post-graduate training, practice in clinical settings, and are required to participate in codes. Additionally, most felt training received at UTCOP was better than the AHA course they took after graduation. Including ACLS into COP curricula should be explored.

Sat-19. Perceptions, knowledge and perceived barriers to practicing evidence-based medicine (EBM) among pharmacists in Japan: A cross-sectional multicenter survey.

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Introduction: Knowledge and skills of evidence-based medicine (EBM) are foundations to patient care. Although EBM education has been incorporated into the pharmacy curriculum in Japan, previous studies have reported a lack of EBM training in Japanese pharmacy schools. Therefore, there is an urgent need to elucidate current pharmacists' perceptions, knowledge and perceived barriers to practicing EBM in Japan.

Research Question or Hypothesis: What are the pharmacists' perceptions, knowledge and barriers to practicing EBM in Japan?

Study Design: A quantitative, cross-sectional study.

Methods: Pharmacists from four hospitals in Japan were invited to complete a 55-item, self-administered questionnaire in April 2022. We included pharmacists who graduated from four-year and six-year pharmacy programs. The main outcome measures included self-evaluated EBM skills and knowledge, attitudes toward EBM, usage of EBM resources, and barriers to EBM. Descriptive analysis was conducted accordingly.

Results: A total of 63 pharmacists completed the survey with 90% response rate. The majority of respondents were female (60.3%) with <10 years of practice experience (61.9%). Approximately 65% of pharmacists reported unable to perform EBM, and 80% expressed uncertainty of common EBM terminologies. Furthermore, 82.5% felt uncomfortable teaching EBM to students or residents. While 87.3% of pharmacists recognized the importance of EBM and supported lifelong learning of EBM techniques, 85.7% felt the amount of evidence was overwhelming. The usage of the EBM resources was limited to 30% reporting to access primary resources frequently. Barriers to practicing EMB included lack of searching skills (96.8%), statistical knowledge (96.8%), training (95.2%), critical appraisal skills (93.7%) and English proficiency (88.9%).

Conclusion: The majority of pharmacists in Japan recognized the importance of EBM and were motivated for lifelong learning. However, many felt inadequately prepared for EBM, expressing low confidence towards practicing and teaching EBM. Additional EBM training opportunities such as continuous education activities may enhance the practice of EBM among Japanese pharmacists.

Sat-23. Facilitating Pharmacy Students' Understanding of Cardiac Anatomy and Physiology Using an E-Learning Module Approach.

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Introduction: Students need to have a firm understanding of cardiac anatomy and physiology to adequately comprehend cardiology pharmacotherapy. However, this foundational knowledge is often lacking based on timing of this content from the pharmacotherapy course in most curricula. Methods to reinforce this background information efficiently and effectively is warranted. E-learning modules are an instructional strategy that involves technology to enhance learning by engaging students in new and interactive ways.

Research Question or Hypothesis: An e-learning module on cardiac anatomy and physiology would significantly improve students' understanding of this foundational knowledge.

Study Design: Pre and post analysis

Methods: We created the "Heart Anatomy and Physiology" e-learning module to be completed outside of class in about 15-20 minutes. A ten-question assessment was taken before and after completing the module. A follow-up survey using a Likert scale was used to assess how well the module facilitated their learning at the end of the cardiology module. Our primary endpoints were a score of ≥80% on the final assessment and/or a ≥30% improvement in score. Comparisons were analyzed using the chi-square test, Wilcoxon signed rank test, or paired t-test as appropriate.

Results: 90% of the class completed both assessments and 78% completed the survey. There was a significant difference between the median (IQR) assessment scores (60% (30) vs. 90% (20); $p<0.0001$). Significantly more students achieved a score of ≥80% on the final assessment compared to baseline (29% vs. 91%; $p<0.0001$). An improvement of ≥30% was achieved by 52%, while 82% had a score of ≥80% or an increase of ≥30%. In the follow-up survey 100% and 90% agreed that the material was presented in an effective manner and that the e-module facilitated their learning in the cardiology section of pharmacotherapy, respectively.

Conclusion: The "Heart Anatomy and Physiology" e-learning module significantly improved and facilitated students' understanding of this foundational knowledge.

Mon AM-56. Evaluation of students' perceptions and outcomes of a policy offering remediation after each individual examination in a professional pharmacy course.

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Introduction: Maintaining institutional remediation policies is required for pharmacy education accreditation. However, institution- and course-specific remediation policies and students' perceptions of remediation are not well described in the literature. At St. Louis College of Pharmacy, most required courses offer a single course remediation examination while one utilizes a policy that remediates individual examinations.

Research Question or Hypothesis: What are students' perceptions of an individual examination remediation policy in a required professional pharmacy course?

Study Design: Pre/post-quantitative surveys

Methods: An 11-item pre-remediation questionnaire was offered to all students enrolled in a biomedical literature evaluation course in 2022. A matched post-survey was administered to students eligible to remediate individual examinations. Survey items were assessed on a 5-point Likert scale (1=strongly disagree through 5=strongly agree). Remediation examination grades were analyzed in aggregate. The primary objective of the study was to evaluate students' perceptions of the individual remediation examination policy. Descriptive statistics, including medians with interquartile ranges and frequencies, were utilized as appropriate.

Results: One hundred (92.5%) of 108 students enrolled in the course completed the pre-remediation survey. Students noted they would prefer to remediate individual examinations instead of taking one cumulative course remediation examination (median 5 ± 1) and believed remediating would improve their understanding of course material (5 ± 1). Nineteen (44%) of 43 students eligible for individual examination remediation chose to remediate. Of students who responded to the post-remediation survey (37%), the most common reason for remediating was the desire to receive a better score. Significantly more students improved their examination scores through remediation (n=14 vs. n=5, $p < 0.001$).

Conclusion: Students enrolled in the course preferred to remediate individual examinations, but only 44% of students eligible to remediate chose to. Future studies with larger sample sizes and course outcome data are warranted to explore examination remediation in professional pharmacy courses further.

Mon AM-57. Impact of an independent patient centered medical home clinic experience during residency training on post-residency clinical confidence.

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Introduction: A longitudinal independent patient centered medical home (PCMH) rotation has been part of our postgraduate year 2 (PGY2) Ambulatory Care residency since program inception. Residents see patients for chronic disease management, functioning under their own collaborative practice agreement (CPA). This allows residents to build patient relationships, manage their own schedule, and help with coordination of care; and aims to prepare the resident for their first position. While previous studies have described the impact of incorporating a PGY2 Ambulatory Care resident on clinical outcomes and revenue, the impact of an independent PCMH experience from the resident perspective has not been reported on.

Research Question or Hypothesis: What is the impact of an independent PCMH rotation on clinical confidence post-PGY2 residency training?

Study Design: Descriptive study

Methods: A 23-item Qualtrics survey was developed and electronically distributed to all previous PGY2 Ambulatory Care residents who completed the independent PCMH rotation. Survey questions included impact on overall confidence in providing clinical care, establishing clinical services post-residency, ownership of practice, and pharmacist-provider interactions with a 5-point Likert scale used. Strengths and weaknesses of the rotation and post-residency position information, including involvement in experiential education were assessed.

Results: All invited residents (n=15) responded. Following PGY2 completion, 46.7% of respondents worked as a clinical pharmacist specialist at an academic medical center and the majority (86.7%) practiced in primary care and/or population health. Identified strengths of the experience included: independent practice model (100% indicated positive impact), having their own CPA (86.7%), and rapport building with patients (80%) and providers (73.3%). Facilitating a warm handoff for patients between residents was the most frequent area identified for improvement. More than half of respondents indicated that clinical practice during the independent PCMH rotation was more progressive than in their first position post-residency.

Conclusion: An independent PCMH rotation during PGY2 ambulatory care training has a positive impact on post-residency clinical confidence.

Mon AM-114. Impact of time since completion of immunization certificate training on performance in a community-based immunization objective structured clinical examination (OSCE).

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Introduction: Colleges of pharmacy often incorporate immunization training certification programs into the curriculum. Student pharmacists may assist with administering vaccines, increasing capacity for pharmacy-based clinics, and providing education on vaccines and preventable diseases in experiential or workplace settings. This College of Pharmacy moved immunization certificate training to an earlier point in the curriculum with a change in pharmacy regulations.

Research Question or Hypothesis: To determine if time since completion of immunization certificate training in the didactic curriculum impacts performance on an immunization OSCE

Study Design: Retrospective student cohort performance review

Methods: An immunization OSCE based in a community setting was administered to third-year students. Scores on individual checklist items were compared between students who received immunization training during their first year of pharmacy school versus students who received training during their second year. Overall scores on the analytical checklist for recommendations were compared between groups. Descriptive statistics were obtained for each item in Microsoft Excel. Overall exam scores were compared using a t-test. A chi-square test in IBM SPSS Statistics was used to assess for a difference in performance with individual checklist items. Alpha was set at 0.05.

Results: 95 students completed their training during their first year of pharmacy school, while 106 students completed training during their second year. The majority of students correctly recommended influenza and tetanus vaccines with more than 95% providing the correct response for these items. There was a statistically significant difference in the overall checklist score between the two groups ($p = 0.03$). There were no statistically significant differences in performance between groups in comparable checklist items related to vaccine screening, influenza, tetanus, and Shingles vaccine recommendations.

Conclusion: Time since completion of immunization certificate training affected overall student performance on an immunization OSCE. Differences in overall checklist scores may be related to changes in guideline recommendations since completion of certificate training.

Tues-36. Gender Bias in PGY1 Letters of Recommendation: A multicentered study.

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Introduction: Letters of recommendation (LORs) are important in pharmacy residency applications and may contain implicit biases that could impact residency attainment.

Research Question or Hypothesis: We hypothesized that LORs have linguistic gender differences.

Study Design: This was a multiyear, multicentered study involving postgraduate year one (PGY1) applicants to participating pharmacy residency programs.

Methods: The primary objective was to determine if gender linguistic differences exist in applicants' LORs. Gender was assessed via the pronouns utilized within the applications. The secondary outcome was to assess LOR linguistic and demographic differences between candidates who did and did not receive interviews.

Demographic data was extracted using PhORCAS WebADMIT portal, and LORs were analyzed by validated linguistics processing software. SPSS and alpha levels of 0.05 and 0.01 compared demographic and linguistic data. Bivariate variables with alpha level of 0.01 were included in our multivariate regression, which utilized an alpha level of 0.05.

Results: 7539 LORs and 2383 applicants (28.5% men vs. 71.5% women) were included. Women candidates had higher mean number of awards (4.71 vs. 4.1, $p=0.001$) and leadership positions (4.87 vs. 4.48, $p=0.019$).

Compared with men candidates' LORs, women candidates' LORs had statistically significant higher levels of clout ($p<0.001$), positive emotion ($p=0.01$), social processes ($p<0.001$), prosocial behavior ($p=0.002$), and social referents ($p<0.001$). Women also had lower authenticity compared with men applicants ($p<0.001$). 2120 applicants included in the secondary analysis found that women candidates had increased odds of receiving interview offers (OR 1.354, [95%CI: 1.047-1.751]).

Conclusion: Men and women applicants' LORs differ in a number of linguistic variables. Women candidates had higher odds of receiving interview in the unadjusted analysis. LOR writers and programs should consider implicit biases that could affect residency attainment.

Sun-43. Comparison of an In-Person versus Virtual Interprofessional Escape Room and Simulation Experience for Pharmacy, Nursing and Physical Therapy Students.

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Introduction: The COVID-19 pandemic has forced health professions programs to deliver educational content virtually, including interprofessional education (IPE). Data are lacking comparing educational outcomes and students' attitudes toward virtual versus in-person IPE.

Research Question or Hypothesis: Will virtual interprofessional (IP) escape room/simulation experiences impact students' IP socialization and knowledge similar to equivalent in-person experiences?
Study Design: Pre-posttest quasi-experimental design.
Methods: IP student teams (pharmacy, nursing, physical therapy) completed an in-person or virtual escape room/simulated case conference experience. Escape room themes were sepsis and joint precautions following hip replacement surgery. In the case conference, students collaboratively developed an IP discharge care plan for a patient after hip replacement complicated by post-operative sepsis. Before and after the learning experience, students completed a knowledge test and a validated pre-post survey assessing IP socialization (Interprofessional Socialization and Valuing Scale-21; ISVS-21). At post, students completed a program evaluation. Data were compared using two-way repeated measures ANOVA using SPSS v26 with alpha=0.05.
Results: ISVS-21 scores increased for both in-person (n=262) and virtual (n=210) experiences. Pre-experience scores were statistically but not meaningfully different between groups [5.1(0.9) in-person; 5.5 (0.9) virtual; p<0.05]. ISVS-21 mean change scores differed slightly between groups [0.9(1.3) in-person; 0.5(0.8) virtual; p<0.05; Cohen's d=0.40]. Pre-test knowledge scores were not different [6.7(1.8) in-person; 6.6(1.6) virtual; p=0.4], however mean change scores differed modestly between groups [0.7(1.4) in-person; 0.1(1.8) virtual; p<0.05; Cohen's d=0.39]. Both in-person and virtual experiences were rated highly per the program evaluation.
Conclusion: Differences between in-person versus virtual IPE escape room/simulated case conference experiences for pharmacy, nursing and physical therapy students were present but minor. Virtual IPE may offer a comparable alternative to in-person IPE and could be an acceptable option for programs encountering financial or logistical barriers to implementing effective in-person IPE.

Mon PM-54. Comparison of standardized patient versus pharmacist evaluation of student performance on a blood pressure technique assessment.

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Introduction: Primary care and community pharmacists frequently measure blood pressure in patient care. Appropriate technique is critical to obtain an accurate measurement. During the COVID-19 pandemic, availability of standardized patients (SP) for a standardized blood pressure assessment was limited. Therefore, this College of Pharmacy used practicing pharmacists to assess student accuracy in measuring blood pressure.
Research Question or Hypothesis: To compare student performance on a blood pressure technique assessment using SP versus pharmacist evaluators.
Study Design: Retrospective, cohort student performance review
Methods: A blood pressure objective structured clinical examination (OSCE) was created to assess proper technique for measuring blood pressure. In February of 2020, SP evaluators were trained with the use of a grading rubric, while in 2021 and 2022, pharmacist evaluators were trained on the rubric and evaluated students in a patient care lab setting. The blood pressure technique assessment was administered to third-year students. Scores on the technique skills checklist graded by SP and pharmacist evaluators were compared. Descriptive statistics were obtained for each checklist item in Microsoft Excel. Overall exam scores were compared using a Mann-Whitney U test. Individual checklist items were compared using A chi-square test in IBM SPSS Statistics. Alpha was set at 0.05.
Results: 106 students were evaluated by an SP in 2020, while 167 students were evaluated by a pharmacist in 2021 and 2022. Performance on individual technique checklist items was similar between the two groups except more students in the pharmacist evaluator group correctly positioned the patient (89.6% vs 97.6%, p< 0.01). There was a statistically significant difference in the overall scores between the two groups (92% vs 95%, p= 0.04), with the pharmacist evaluator group scoring higher.
Conclusion: Students scored slightly higher with pharmacist evaluators compared to SP evaluators. The difference in overall scores may be attributed to the patient positioning checklist item or the location of the assessment.

Tues-39. Using Design-Based Research Methodology to Improve Two Different Competency-Based Grading Schemas.

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Introduction: Traditional grading practices have been criticized for not providing meaningful information regarding students' deficiencies with course content. Competency-based education (CBE) is a grading system emphasizing mastery of outcomes.
Research Question or Hypothesis: What are student dislikes and suggestions for improving a CBE grading schema?
Study Design: IRB-approved, prospective study using qualitative analysis of open-ended student reflections
Methods: All students submitted a reflection regarding dislikes and suggestions for improvement for the grading schema. In the MAXQDA Analytics Pro qualitative data analysis software, open-ended question responses were coded and produced correlation matrices (p < .05). The matrices were imported into the UCINet social network analysis software and the NetDraw network visualization software for semantic network analysis. We correlated student's dislikes about the grading schema and their suggestions for improvement

to identify design moves to improve the grading schema within each course.

Results: Sixty computer science (CSCE 111) and 88 pharmacy (Phar 606) students consented (response rate: 72%). Qualitative analysis identified several student issues: 1) Students did not know their grade as the letter grade in the learning management system does not match the actual course grade, 2) Students disliked the variety of assignments, while others found the assignments unclear, misunderstood the choices, or misunderstood choices as "extra credit," and 3) Some students felt exams (i.e., OSCE) stakes were too high, easily demoting their grade. Significant correlations between student dislikes and suggestions to improve the grading schema led to the following design moves: creating a grade calculator, making a "menu" of activity options, clarifying the syllabus and assignment titles, and allowing limited re-submissions.

Conclusion: Qualitative analysis of student reflections on course grading schema revealed several statistically significant correlations between dislikes and suggestions for improvement. These suggestions will be implemented in subsequent course offerings and we plan future analysis of student perceptions.

Sat-21. Elevating student pharmacist research experience through a longitudinal research-intensive internship program.

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Introduction: While student research involvement has been a component of the Atrium Health Wake Forest Baptist (AHWFB) pharmacy internship since its establishment in 2017, a longitudinal research-intensive summer Research Boot Camp (RBC) series was implemented in May 2019 to elevate the intern research experience. This programming provides short didactic lectures on the research process and direct application of these principles to a group research project that is completed over one academic year. Opportunities for further research involvement through small group projects are available.

Research Question or Hypothesis: Does a longitudinal research-intensive experience increase scholarly output from a pharmacy internship program and increase interns' confidence in the research process?

Study Design: Single-center retrospective observational study.

Methods: Intern research projects conducted at AHWFB from May 2017 through April 2022 were assessed for meeting one or more of the following completion criteria: poster or platform presentation, publication, or institutional impact. The number of projects meeting completion criteria before (pre-group) and after (post-group) implementation of the RBC series was compared. Additionally, interns were asked to complete an annual survey to capture their perceptions of the RBC series. A qualitative analysis of annual survey responses from the intern class entering the program in May 2019 was conducted.

Results: Twenty-two projects with pharmacy intern involvement were conducted during the study period (12 [55%] pre-group and 10 [45%] post-group). The completion rate increased by 52% following RBC implementation, with 8 (66%) projects in the pre-group and 10 (100%) projects in the post-group meeting at least one completion criteria. Themes from the qualitative analysis were overall positive, with a consistent increase in interns' confidence in the research process after participating in 3 annual RBC series.

Conclusion: A longitudinal, intensive research experience increased scholarly output from a pharmacy internship program. Furthermore, a gradual increase in interns' confidence in the research process was observed across 3 annual RBC series.

Mon PM-49. Evaluating the Quality and Structure of the Core Entrustable Professional Activities for New Pharmacy Graduates.

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Introduction: To classify as an entrustable professional activity (EPA), a task must be observable, measurable, professional, fit for entrustment, performed independently, and require training to execute. Higher quality EPAs can improve learner assessment in pharmacy education and representation of pharmacy practice The Queen's EPA Quality (EQual) Rubric is a 14-item tool used to assess EPA quality. The American Association of Colleges of Pharmacy's Core EPAs for New Pharmacy Graduates (Core EPAs) have not been objectively evaluated to ensure they meet EPA quality standards.

Research Question or Hypothesis: Does the Core EPAs' quality align with EPA quality standards?

Study Design: Hybrid cohort study using survey methods.

Methods: Pharmacists with EPA expertise were invited to watch a training video, apply the EQual Rubric to the Core EPAs, indicate if and why each EPA required revision, and suggest revisions utilizing Qualtrics®. Descriptive statistics were calculated for overall and domain-specific EQual scores for each EPA. Free text responses were summarized. The primary outcome was the number of EPAs assessed as high-quality, defined as exceeding the previously published acceptability cut-off score (4.07). Secondary outcomes included whether EPAs exceed EQual domain-specific subscore cut-offs and whether pharmacists recommended revisions.

Results: Nine pharmacists participated. Most EPAs (9/15) did not exceed the overall cut-off score. The EQual score for EPAs 1 through 5 (the Patient Care Provider domain) and EPA 14 exceeded 4.07, indicating acceptable quality. Regarding domain-specific EQual scores, 11 EPAs did not reach the cut-off for the discrete units of work

subscale, 5 did not reach the cut-off for the entrustable tasks of the profession subscale, and 1 did not reach the cut-off for the curricular role subscale. An average of 3 pharmacists recommended revision for each EPA.

Conclusion: The majority of Core EPAs are of insufficient quality and require revision for use. Quality determination should drive EPA revisions.

Sun-40. Obesity Education and Training in United States Pharmacy Schools: Results of a Cross-Sectional Survey.

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Introduction: Obesity is a disease of energy homeostasis dysregulation with serious health consequences. Healthcare professionals need the skills and knowledge to provide patients with disease management options. As members of the care team, pharmacists are uniquely positioned to support patients' obesity pharmacotherapeutic management efforts.

Research Question or Hypothesis: We aimed to understand how obesity-related education and training are addressed in the curricula of pharmacy (Pharm.D.) programs.

Study Design: Cross-sectional study

Methods: We conducted an anonymous online survey among Pharm. D. program leaders between October 31, 2021, and January 24, 2022.

Results: Among the 153 Pharm.D. programs invited, 75 program leaders involved in Pharm.D. curriculum development completed the survey. Nearly all respondents believed obesity education is fairly/very important and appropriate to include in Pharm.D. program curricula (88% and 96%, respectively). A small proportion (19%) of Pharm.D. programs have a faculty member who specializes in obesity, and most (79%) respondents reported not being at all familiar with the 'Provider Competencies for the Prevention and Management of Obesity.' A majority (61%) reported obesity being an intentional educational objective of their program. However, only two of 14 obesity core competencies were covered to a great extent. Pharmacologic treatments of obesity were covered to some/great extent according to 93% of respondents; knowledge of obesity-related comorbidities was covered to some/great extent per 91%. Incorporating or expanding obesity education was either not a priority or a low priority for most programs (72%); lack of room in the curriculum was cited as the greatest obstacle, with 85% reporting it as a moderate or large barrier.

Conclusion: Despite their role as pharmacotherapy experts, pharmacy students are not well-positioned to support obesity management for their patients with obesity. Educators need to find more time in the curriculum devoted to obesity and may need teaching resources to augment faculty expertise.

Mon AM-17. Understanding Cultural Intelligence: Evaluating Pharmacy Preceptors' Experiences and Self-efficacy.

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Introduction: Pharmacy trainees must be equipped to interact with stakeholders and patients from various cultural backgrounds. However, little is known about how pharmacy preceptors foster cultural intelligence in trainees. Perceptions of ability are a critical antecedent to improving teaching practice.

Research Question or Hypothesis: How do preceptors perceive their ability to teach cultural intelligence?

Study Design: A convergent parallel mixed methods design was utilized with quantitative survey data and qualitative interview data.

Methods: A 10-item survey was developed to assess preceptor self-efficacy in the four domains of Cultural Intelligence Framework (CIF): cultural awareness, knowledge, cultural practice, and cultural desire. Items were measured on a scale from 0-cannot do at all to 10-highly certain can do. The Qualtrics survey was piloted with a small group of preceptors at the University of North Carolina Eshelman School of Pharmacy. Concurrently, preceptors were invited to an interview focused on cultural intelligence experiences within experiential settings. Interviews were recorded, transcribed, de-identified and deductively coded independently using the CIF by two researchers. Consensus building was used to resolve discrepancies. Survey data were analyzed descriptively using mean ± standard deviation (SD) and analyzed for reliability using Cronbach's alpha.

Results: Survey results (n=24) suggested that preceptors were most confident teaching cultural awareness (6.88±2.25) and least confident teaching cultural practice (5.60±1.91). During interviews (n=10), preceptors described struggles with cultural practice when working with trainees (e.g., handling patient microaggressions towards students). In working with trainees, preceptors noted limited opportunities for cultural practice, lack of accessible cultural information to enhance knowledge, and inadequate trainee cultural awareness.

Conclusion: such as training on addressing microaggressions in the clinical environment. Future research should include increasing the sample size, inviting additional institutions, and testing implementations aimed at improving preceptor skills and trainee cultural intelligence.

Mon PM-47. Evaluation of Student Peer- and Self-Grading in an Integrated Pharmacotherapy Course.

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Introduction: Accurate peer- and self-grading has the potential to decrease faculty workload and aid in student learning. This study evaluates the accuracy of student peer- and self-grades compared to faculty grades for cases in a Professional Year One (P1), Integrated Pharmacotherapy (IP) course.

Research Question or Hypothesis: Are student peer-, self-, and faculty-grades on cases well correlated?

Study Design: Retrospective cohort

Methods: This study involved 78 P1 students enrolled in an IP: Self-Care and Dermatology course. The course included three Team-Based Learning (TBL) activities – each consisting of individual and team readiness assessment tests, followed by three open-note cases completed in teams. Each student uploaded completed cases to the learning management system and was assigned to complete a self- and a random, anonymous peer-assessment using a provided key. Peer- and self-grades were compared to faculty grades using a null multi-level model to determine the intra-class correlation coefficient (ICC). Faculty time spent grading was captured, and students were asked to complete a survey to determine perceived value of peer- and self-assessments.

Results: Faculty- and peer-grades had a slightly higher correlation than faculty- and self-grades (ICC=0.75 vs 0.73, respectively). The ICC between all three graders was 0.74. The average faculty-grade was approximately 0.5 point lower than peer- and self-grades for each case. Faculty spent an average of 2.5 hours grading the cases after each TBL session. Students reported spending a median of 36 minutes on the peer- and self-assessments for each TBL session. Overall, students agreed that completing both the self- and peer-assessments helped identify gaps in knowledge (90% and 56%, respectively). 78% of students agreed that completing the self-assessments was beneficial for their learning.

Conclusion: There is moderate-to-good correlation between peer-, self-, and faculty-awarded grades for cases. Significant faculty time can be saved through peer evaluation while maintaining accuracy of scores. Furthermore, students found the interactive grading opportunity valuable for self-learning.

Tues-22. Impact of Gender and Race on promotion within Pharmacy Academia.

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Introduction: Gender and race equity is becoming an increasingly important topic in pharmacy education.

Research Question or Hypothesis: How do gender and race affect the odds for promotion within pharmacy academia?

Study Design: A retrospective cross-sectional/observational study

Methods: We recorded rank, race, and gender of faculty at pharmacy schools in the United States using Profile of Faculty surveys from 2010 to 2021. We used multinomial logistic regression to determine the odds ratios (OR) and 95% confidence intervals (CI) for promotion from Assistant Professor or from Assistant Dean based upon race and gender in comparison to White males.

Results: OR (95% CI) of promotion from Assistant Professor to Associate Professor or to Professor (respectively): Female faculty 0.77 (0.68 to 0.88, P<0.001) and 0.39 (0.34 to 0.45, P<0.001); Black faculty 0.57 (0.43 to 0.75, P<0.001) and 0.47 (0.34 to 0.65, P<0.001); Hispanic faculty 0.61 (0.43 to 0.75, P<0.01) and 0.57 (0.39 to 0.84, P<0.01); Asian faculty 0.79 (0.67 to 0.94, P<0.01) and 0.68 (0.56 to 0.82, P<0.001). OR of promotion from Assistant Dean to Associate Dean or to CEO Dean (respectively): Women 0.55 (0.39 to 0.78, P<0.001) and 0.19 (0.11 to 0.31, P<0.001); Black 0.80 (0.41 to 1.56, P=NS) and 1.44 (0.60 to 3.50, P=NS); Hispanic 0.98 (0.23 to 2.84, P=NS) and 0.70 (0.13 to 3.72, P=NS); Asian 0.49 (0.28 to 0.86, P<0.05) and 0.47 (0.21 to 1.06, P=NS). Analysis of odds ratios over time (2010-2021) revealed increasing ORs of promotion of women, Black, and Asian faculty to Associate Professor and Professor; increasing ORs of promotion to Associate Dean for Blacks and Hispanics; and decreasing ORs of promotion to CEO Dean for women, Asians, and Hispanics.

Conclusion: Race and gender remain strong predictors of promotion within pharmacy academia with women and racial minorities facing lower odds of promotion compared to their white male counterparts.

Mon AM-60. Utilizing Interprofessional Education to Enhance Healthcare Professional Students' Learning Surrounding Opioid Use Disorders.

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Introduction: The opioid crisis remains a major public health concern in the United States with radically increasing rates of overdose deaths

in recent years. However, healthcare professional schools have limited curricular time to thoroughly address this crisis. In response to this, faculty at Roseman University and Touro University cooperatively designed and facilitated an Interprofessional Education (IPE) event to improve future healthcare professionals' understanding and comfort levels in addressing substance use disorders and providing overdose prevention.

Research Question or Hypothesis: The purpose of this study is to evaluate the effect of IPE focused education discussing substance use disorders by measuring healthcare students' comfort levels regarding overdose prevention and substance use disorder treatment.

Study Design: An anonymous cross-sectional study was conducted using pre- and post-IPE surveys in Qualtrics.

Methods: 245 healthcare professional students were invited to complete a 17 question pre- and post-IPE survey covering understanding and comfort levels regarding educating and counseling on naloxone, and familiarity with community resources (likert-scale of 1-5). Analysis was performed in SPSS v28 with alpha set to 0.05.

Results: A total of 229 completed the pre-IPE survey and 129 completed the post-IPE survey. Over 80% of respondents were 25 – 34 years of age, 60% were female, and approximately one-third were from pharmacy, one-third from physician assistant, and one-third from doctor of osteopathic medicine programs. Significant improvements were observed with respect to level of understanding of naloxone (0.52, 95%CI 0.44-0.62) and comfort level surrounding counseling (0.99, 95%CI 0.85-1.14) and initiating naloxone conversations in high-risk patients (0.45, 95%CI 0.32-0.58) and persons living with opioid use disorder (0.54, 95%CI 0.43-0.66). Respondents reported improved familiarity with community opioid use disorder and overdose prevention resources (1.16, 95%CI 1.07-1.26).

Conclusion: IPE offers an opportunity to positively impact future healthcare professionals' comfort levels in initiating critical conversations surrounding substance use, providing overdose prevention counseling, and raising awareness with community resources.

Mon AM-58. Cultivating Emotional Intelligence and Communication Skills Among Pharmacy Students.

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Introduction: Emotional intelligence and strong communication can improve provider–patient relationships and should be developed among students, alongside clinical knowledge. In a skills-based course at Chapman University School of Pharmacy, first year students participate in patient care simulations with mock patients as part of the curriculum.

Research Question or Hypothesis: Does post-simulation feedback improve student communication skills over three patient care simulations and better align students' self-graded scores with faculty's scores?

Study Design: Retrospective, quantitative

Methods: Students participated in three simulations with emotionally-focused patient cases. After each simulation, student performance was graded by faculty pairs and self-graded by students using a validated communication rubric. A feedback workshop was implemented after the first simulation for students to receive individualized feedback on their performance. Statistics were performed using The R Project for Statistical Computing version 4.1.1. Type II Wald F tests were run using the Kenward-Roger method of calculating degrees of freedom. Post-hoc tests were performed using estimated marginal means with a Tukey adjustment for repeated comparisons. Correlations between student and faculty scores at each simulation period were computed using Pearson's product-moment correlations.

Results: A total of 82 students completed the first simulation, 81 completed the second, and 74 students completed the third. Faculty-graded scores increased from the first to second simulation, but not significantly. The third simulation's faculty-graded scores were likely lower due to increased case complexity. Faculty-graded and student-graded scores were correlated in the first simulation ($p < 0.001$) but not in the second and third simulations. Students with lower overall scores appeared to have less correlation between their self-graded and faculty-graded scores.

Conclusion: Post-simulation feedback showed improvement in communication scores in the short run (closer to when the session was held), but not in the long run. This study highlights that post-simulation feedback should occur more frequently to improve communication skills and foster emotional intelligence among students.

Sun-46. Assessing the Impact of the COVID-19 Pandemic on Pharmacy Faculty Burnout.

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Introduction: Burnout in academia is an issue of growing concern. The COVID-19 pandemic has increased the risk of burnout; however, the data are limited for pharmacy faculty and the associating factors have not been identified.

Research Question or Hypothesis: To evaluate the factors contributing to burnout among pharmacy faculty during the COVID-19 pandemic.

Study Design: Quantitative survey study

Methods: Pharmacy faculty in the U.S. and Canada were invited to take part in a web-based survey. The survey collected demographic information, responses from the standardized Maslach Burnout

Inventory Educators Survey (MBI-ES) and questions assessing how the pandemic has affected the respondent's personal and professional life. MBI-ES specifically measured emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Responses to each of the three MBI-ES subcategories were converted to a sum score. Factors contributing to burnout were identified by comparing the mean sum scores of the MBI-ES versus demographics, primary responsibilities, academic ranks, and other variables. Single-factor analysis of variance and the post-hoc Tukey HSD-Kramer test were used to determine statistical significance between groups.

Results: We received 128 responses during a 10-week period. The mean sum scores for EE, DP, and PA for the entire cohort were 25.9, 6.1, and 33.6 respectively. These scores are higher than those from studies conducted before the pandemic, suggesting higher burnout in general. Junior faculty experienced higher burnout. Faculty with primarily research responsibilities experienced the greatest EE; those with primarily patient-care responsibilities experienced the most DP; and those with primarily didactic teaching responsibilities experienced the lowest PA. Factors having the most impact on burnout included increased workhours, having school-age children, and not having a consistent work location.

Conclusion: Pharmacy faculty experienced a heightened level of burnout during the pandemic. Interventions should be targeted towards junior faculty, those with significant research responsibilities, and those with school-age children.

Mon AM-69. Pharmacy Student Perceptions of an Academic Support Program for First-Year Graduate Students.

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Introduction: Early intervention efforts to improve student academic literacy in pharmacy programs may promote future academic and practice success. Limited information is available on student perceptions of early intervention programs. Thus, the objective of this project was to describe student pharmacist perceptions of an early intervention program.

Research Question or Hypothesis: What are students' perspectives of an academic literacy program designed to promote student success in pharmacy school?

Study Design: Qualitative analysis of interviews

Methods: Boost, an early intervention online program, was completed over 6 weeks in the summer prior to the first professional year by identified students. Following completion, students from all professional cohorts (P1-P4) were invited to participate in a thirty-minute interview. Guiding interview questions were created a priori, and interviewers were trained to probe answers when appropriate. Investigators thematically analyzed responses through Dedoose via two independent research students.

Results: A total of 16 interviews were conducted (9.5% response rate). Thematic analysis generated 63 codes and 6 root themes from these codes. These root themes included feelings toward Boost, components of Boost, areas of improvement, helpful materials for preparation, key skills, and delivery method. For two root themes (feelings towards Boost and components of Boost), weighted statistics were utilized to assess strength of attitudes towards the program.

Conclusion: Student perceptions of the Boost program were positive as an important addition to ensure student success in the program. Additionally, students expressed positive feedback for the program in preparation for journal clubs, leveraging technological mediums, managing conflict, opportunities to collaborate and mentor amongst peers, improving personal and professional development, reading, and note taking. Future Boost iterations will include a focus on self-care to further promote success as students and pharmacists.

Tues-40. Durability of Pharmacy Education Over Time.

Johny Nguyen, Pharm.D. Candidate[1], Aya Ahmed, Pharm.D. Candidate[1], Anna Estes, Pharm.D. Candidate[2], Carol Webb, Pharm.D. Candidate[3], Brianne Dunn, Pharm.D.[3] and P. Brandon Bookstaver, Pharm.D.[3]; [1]University of South Carolina College Of Pharmacy, Columbia, SC [2]University Of South Carolina College of Pharmacy, Columbia, SC [3]University of South Carolina College of Pharmacy, Columbia, SC

Introduction: It is suggested that 50% of medical scholars' education is outdated in five years. Growing literature and drug discoveries add to the complexity of providing up-to-date education. There is a need to demonstrate timeliness of medical scholar education as it relates to advances in respective fields, particularly focusing on pharmacy.

Research Question or Hypothesis: To determine the proportion of questions evaluated from NAPLEX® preparation materials that are inaccurate within 5- and 10-year time periods. It is hypothesized that 10-20% of educational materials provided in such databases are inaccurate after 10 years.

Study Design: Retrospective study using publicly available data

Methods: Questions were extracted from various NAPLEX® preparation materials. The primary endpoint was accuracy of questions from 5- and 10-year time periods compared to current clinical guidelines. Three books from 2015-2016 and 2011-2012 were assessed. Review questions were numbered sequentially, excluding those associated with pharmaceutical calculations. Microsoft Excel® was used to generate the sample of random questions assessed for each time period. Reasons for inaccuracy were categorized as no longer preferred treatment, medication(s) no longer available, medical controversy, or other. Descriptive statistics were used to evaluate the data.

Results: Over the 10-year and 5-year periods, 306 and 187 questions were assessed respectively. Of the 493 questions, 9% (n=45) were inaccurate in total with 11% (n=34) from the 10-year period and 6% (n=11) from the 5-year period. Categories with the highest proportions of inaccurate questions were psychiatric conditions (17%) and infectious diseases (13%). Change in guidelines or formal recommendations was the primary reason for inaccuracy (38%, n=17).

Conclusion: Results indicate 6% of NAPLEX® preparation questions were inaccurate after 5 years and 11% after 10 years. These data support the need for enforcement of lifelong learning and the value of continuing education.

Tues-38. Evaluation of preparation activities used for post-graduate training applications.

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Introduction: Post-graduate training (PGT) residency and fellowship positions are becoming increasingly more competitive. Pharmacy schools try to prepare students to be competitive candidates by offering various preparation activities. Our institution implemented a "Training Beyond the Pharm.D." program in 2018 to offer various preparation activities throughout the four progressional pharmacy years. The first class of students exposed to the entire program is the graduating class of 2022.

Research Question or Hypothesis: The primary outcome of this educational research study was to determine which type of activities provide the most benefit to students applying for PGT.

Study Design: This was a cross-sectional, survey-based study identifying and targeting students from the pharmacy class of 2022 who had applied for PGT.

Methods: All pharmacy students within the 2022 graduating class were requested to complete an anonymous voluntary 9-question survey prior to their graduation. The survey asked students various questions relating to PGT. The purpose was to elicit from the students' perspective which PGT preparation programs were helpful during their application/interview process and what additional programs might have been helpful.

Results: Of the 80 students requested, 62 (77.5%) completed the survey. Of the respondents, 32 (51.6%) applied for PGT with the most common being "traditional PGY1" (56.3%) and "pharmaceutical fellowship" (25%). The most utilized activities were "mentorship of a non-official mentor" (60%), "attending any residency showcase" (60%) and "mock interview" (53.3%). Students found "mock interview", "attending a residency showcase" and "mentorship with assigned mentors" to be "very helpful" (67%, 56.5%, and 52%, respectively). A practice clinical case was the most requested new program.

Conclusion: Students utilized a variety of preparation activities offered to prepare for PGT. Identifying activities with the most participation and those rated most helpful will allow for more targeted programming.

Mon PM-51. Residency program director perceptions of PGY1 pharmacy residency applicants without United States citizenship.

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Introduction: Postgraduate year one (PGY-1) pharmacy residency programs are highly competitive. While the number of positions has increased significantly since 2010, opportunities for non-US candidates are limited. Inclusion of non-US candidates is one way of increasing the diversity among residency applicants. However, little is known about the perceptions and barriers of recruiting non-US candidates.

Research Question or Hypothesis: To determine the views of Residency Program Directors (RPDs) on non-US candidates.

Study Design: Cross-sectional survey.

Methods: An electronic survey was developed and sent to all ASHP accredited PGY-1 RPDs within the US in July 2021. The survey tool was pilot tested among faculty and students within school for readability, question validation, and length of completion. Changes were made after testing and estimated time for completion was established. The survey included up to 16 questions that investigated whether the program has had any non-US candidates. We also evaluated barriers to recruiting non-US candidates and the perceptions of candidates with valid F-1 visa/Optional Practical Training (OPT), a work authorization in the US, specifically. Descriptive statistics were used to summarize the data.

Results: Response rate was 14.4% (209/1455). Of these, 58 programs (27.8%) have had residents with an F-1 visa/OPT. Regarding barriers of recruiting candidates with a F-1 visa/OPT, 33 (15.8%) programs reported ineligibility due to institutional recruiting policies and 12 (5.7%) because of departmental preference. There were 41 (19.6%) programs only accepting US citizens or permanent residents. Eighteen (8.6%) were unfamiliar with recruiting candidates with a F-1 visa/OPT, and 42 (20.1%) did not have resources to support those applicants.

Conclusion: Most RPDs surveyed only recruit US residents. The most common barriers taking non-US residents were lack of resources, followed by accepting only US citizens, institutional policies, unfamiliarity with procedures, and department preference. While our study provides valuable information, a low response rate and potential bias limit its broad applicability.

Mon AM-77. Impact of Personality Type on Pharmacotherapeutics Focused Systems-Based Therapy Grades in a Doctor of Pharmacy Curriculum.

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Introduction: The conscientiousness personality type has been associated with increased didactic performance in certain health professions programs. Previous data suggest personality type did not impact performance in the foundational sciences focused, first professional year within the West Virginia University Doctor of Pharmacy (Pharm.D.) curriculum. The purpose of this study was to evaluate impact of personality type on academic performance in pharmacotherapeutics focused systems-based therapy (SBT) courses within the same curriculum.

Research Question or Hypothesis: Students with a conscientiousness-dominant personality type using DiSC assessment will have higher cumulative grade point averages (GPAs) than other dominant personality types.

Study Design: This was a prospective cohort-based evaluation regarding correlation between dominant personality type and SBT and overall GPA.

Methods: All students entering the Pharm.D. program from 2015-2018 were invited to participate. Participants completed an online DiSC personality assessment to identify dominant personality type (i.e., dominance, influence, steadiness, or conscientiousness). Cumulative GPA and SBT GPA were calculated at the end of each academic year. For the primary outcome evaluating cumulative SBT GPA and the secondary outcome evaluating overall cumulative GPA, the conscientiousness-dominant personality type was compared against all other dominant personality types using the Mann-Whitney test (GraphPad Prism, version 9.3.1). Statistical significance was set at a p-value of <0.05.

Results: A total of 304/318 eligible students (96%) provided informed consent and participated. Students exhibiting a conscientiousness-dominant personality type had significantly higher cumulative SBT GPA (3.26 vs. 3.09, p=0.02) compared to other dominant personalities. Additionally, students exhibiting conscientiousness as their dominant personality type had significantly higher cumulative GPA at the end of the third year in our Pharm.D. program (3.51 vs. 3.34, p=0.03).

Conclusion: Students exhibiting a dominant personality type of conscientiousness achieved higher cumulative SBT and overall cumulative GPAs. These findings support current literature and may provide Pharm.D. programs with some insight into the potential impact of personality on academic performance.

Sun-44. Virtual Continuous Glucose Monitoring Education with Hands-on Device Application for Pharmacists and Students.

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Introduction: Continuous glucose monitoring (CGM) is a growing component of diabetes management. Pharmacists are well-suited to implement CGM clinical services; however, documentation of pharmacist implementation is sparse. Available training on CGM devices includes traditional online programs, but there is no published data on the impact of hands-on virtual CGM education.

Research Question or Hypothesis: Does a two-week, hands-on, virtual CGM-focused educational intervention for pharmacists and students increase CGM-related knowledge and confidence?

Study Design: Prospective, single-center, pre-post intervention study

Methods: Pharmacists providing outpatient diabetes management without CGM and third-year pharmacy students enrolled in a diabetes elective were invited to participate in a two-week, hands-on, virtual CGM module. Week one included a lecture on CGM technology followed by participants placing a study-provided CGM device. Participants wore the device and recorded lifestyle activities for one week followed by the second session, which included report interpretation, patient cases, and discussion of experiences. Pre-post surveys included CGM-related knowledge (12 multiple-choice questions), confidence (20 questions, Likert scale 1-5), and perceived benefit. The primary outcome was change in knowledge, and data were compared using paired t-tests via STATA/SE 15.1.

Results: Thirty-nine pharmacists and 13 students (response rate 95% and 100%, respectively) completed both pre- and post-surveys. Performance on knowledge questions increased from 62.82% to 78.85% (pharmacists, p<0.001) and 48.08% to 59.62% (students, p=0.072). Confidence increased from 2.25 to 4.18 (pharmacists, p<0.001) and 2.11 to 3.93 (students, p<0.001). Regarding satisfaction, over 94% of participants agreed or strongly agreed with six questions assessing the benefit of the education delivery and utility of wearing the device, and 98% would recommend the training to others.

Conclusion: A virtual, hands-on CGM intervention was successful in increasing confidence for pharmacists and students. Knowledge improved significantly for pharmacists and trended upwards for students. Participants perceived the educational intervention as valuable. Future studies will evaluate changes in long-term knowledge, confidence, and clinical use.

Sun-50. Hepatitis Education within Pharmacy Curricula in the United States.

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Introduction: The Viral Hepatitis National Strategic Plan emphasizes the importance of a collaborative provider workforce trained in providing hepatitis prevention and treatment to eliminate viral hepatitis in the United States by 2030. Pharmacists play a key role in viral hepatitis management, yet the Accreditation Council for Pharmacy Education (ACPE) does not mandate minimum requirements for hepatitis content in pharmacy curricula in the United States.

Research Question or Hypothesis: What quantity and type of viral hepatitis education is provided to students within United States pharmacy school curricula, and from what instructors?

Study Design: Cohort survey study

Methods: Investigators developed a 19-item Qualtrics survey, validated by 5 colleagues, sent survey links to curricula content experts at 139 ACPE-accredited pharmacy colleges/schools in May 2022, and allotted 28 days for survey completion. Survey questions assessed the timing, type, amount, and topics of viral hepatitis instruction provided to Doctor of Pharmacy students, and the hepatitis instructors' training/experience. We used descriptive statistics for analysis.

Results: By 6/15/2022, 20 pharmacy institutions across 14 states responded; 80% were 4-year programs, 35% had 50-99, and 35% had 100-149 students/class. The average required hepatitis education was 4.6±0.70 hours/program; 50% use lecture only, 50% use lecture +discussion. Students receive an average of 0.69(±0.31), 1.11(±0.58), 1.64(±0.70), and 0.83(±0.47) hours of hepatitis A,B,C, and other hepatitis-topic lectures, respectively; and 1.00(±0.77), 1.14(±0.64), 1.08(±0.75), and 1.75(±0.75) hours of hepatitis A,B,C, and other hepatitis-topic small-group discussion, respectively. Most(68%) institutions provide required didactic hepatitis education, while 30% offer elective coursework averaging 4.60(±5.28) hours. 94% of respondents stated their primary hepatitis instructor had post-graduate training/certifications; 89% were full-time faculty, and 47% of the 15 instructors with clinical appointments spent <20% time on patient care.

Conclusion: Survey results demonstrate variability in hepatitis education across United States pharmacy curricula. Data offer stakeholders in nationwide hepatitis elimination efforts knowledge about the extent of viral hepatitis education provided to Doctor of Pharmacy students.

Mon AM-59. An exploration of the relationship between pharmacy school admission characteristics and PGY1 residency program match.

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Introduction: PGY1 pharmacy residency applicants are outpacing the number of available positions, with a 65% match rate in 2021. Exploring the relationship between pharmacy school applicant admission characteristics and successful PGY1 matching has the potential to help inform the pharmacy school admissions process and assist with career services support for those students interested in pursuing residency.

Research Question or Hypothesis: What is the relationship between pharmacy school admission characteristics and matching to a PGY1?

Study Design: Retrospective observational

Methods: Demographic data, academic indicators, and application review scores were collected for the 2017-2020 Pharm.D. graduating classes. Multiple mini-interview (MMI) scores were collected for the 2018-2020 Pharm.D. graduating classes. PGY1 matching data were collected for all students. Bivariate analyses were performed comparing students who matched to a PGY1 residency vs. those who didn't match vs. those who didn't pursue a residency. Logistic regression modeling was performed to explore predictors of matching to a PGY1.

Results: Six hundred and sixteen students were included. Bivariate analyses revealed that students who matched to a PGY1 had a higher undergraduate GPA ($p<0.0001$), higher PCAT composite score ($p<0.035$), were younger in age ($p<0.0001$), and were more likely to identify as female ($p<0.0001$). Students who matched also scored higher on MMI stations with constructs related to integrity ($p=0.001$), adaptability ($p=0.007$), critical thinking ($p=0.002$), and why pursuing our school ($p=0.002$). Logistic regression modeling found that an increase in age was associated with lower odds of matching to a PGY1 [0.88(0.78-0.99)] and an increase in composite MMI station score was associated with higher odds of matching [1.8(1.31-2.47)].

Conclusion: Several pharmacy school admission characteristics were found to be associated with successful matching to a PGY1 residency. These findings have the potential for impact at a programmatic level when evaluating the weight of certain criteria for admission decisions and at the individual student level when providing career services support.

Mon PM-50. International Advanced Pharmacy Practice Experiences: Unpacking the Perceptions of Residency Directors.

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Introduction: At least two-thirds of colleges of pharmacy offer international Advanced Pharmacy Practice Experiences (APPE). With the increased capacity for student learning internationally, it is assumed there has been a growing number of these experiences being showcased within residency applications. It is unknown within the literature how international APPEs are viewed by residency programs.

Research Question or Hypothesis: The objective of this study was to determine residency program directors' perceived value of international experiences.

Study Design: Researchers used a narrative inquiry qualitative approach as a part of this mixed methods study.

Methods: An anonymous 22 question Qualtrics™ survey was sent to all ASHP accredited residency directors from October 2020 - January 2021. Descriptive statistics were completed for most questions and a qualitative review was performed on the open-ended question addressing the impact of an international experience on a candidate's application. Inductive coding was completed by four researchers. Thematic analysis was reviewed and finalized during two research team discussions. Purdue University IRB approved this study.

Results: There were 198 (15%) residency directors that responded to the survey. The majority (95%) were Post Graduate Year 1 (PGY1) directors. Fifty-five percent had been in their roles five years or less. Overall, the respondents viewed international APPEs as "neutral" (60%) or "positive" (39%) relative to other APPEs. The qualitative review identified positive attributes associated with international APPE participation: adaptability, cultural awareness/competence, diverse population/people encounters, diverse experiences, enhanced perspective of self in context to others and increased perspective on different care modalities. The highlighted negative attributes were limitations to practice setting and possible lack of skill development opportunities.

Conclusion: Residency program directors find at least the same, if not more value to international APPEs than domestic APPEs when considered in a residency application. They also shared many positive attributes to these experiences that can assist applicants within a residency program.

Tues-23. Analysis of Gender Equity in the Salary of Pharmacy Faculty and Administration.

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Introduction: Gender equity merits attention in the determination of faculties' salary in the higher education.

Research Question or Hypothesis: How does the gender difference affect the faculty salary within the pharmacy academia?

Study Design: A retrospective cross-sectional/observational study

Methods: We recorded rank, gender, and salary of the faculty at pharmacy schools in the United States using Profile of Faculty surveys from 2010 to 2021. We used meta-analysis to estimate the salary gap (and 95% confidence intervals [CI]) for female faculties in comparison to their male counterparts for each faculty rank followed by a meta-regression to evaluate potential trends over time.

Results: Female faculty has a higher salary as an assistant professor compared to their male counterparts with the salary gap of +$1,353 ($967 to $1,739; P<0.001). However, upon promotion to associate professor or professor this salary gap reverts in to -$1,861 (-$1,194 to -$2,528; P<0.001) and -$6,917 (-$5,360 to -$8,475; P<0.001), respectively favoring their male counterparts. There is also a significant negative linear trend in the salary gap of female faculty compared to their male counterparts in the professor rank from 2010 to 2022 (P=0.0017). Within the dean's office, female faculties' salary was less as an assistant dean and associate dean with the gap of -$7,077 (-$4,796 to -$9,359; P<0.001) and -$11,301 (-$8,947 to -$13,656; P<0.001), respectively, compared to their male counterparts. However, there was not a significant difference in the salary between females and males' faculties at the level of CEO dean based on limited data available.

Conclusion: Gender remains as a strong predictor of faculties' salary within pharmacy faculty in particular in higher ranks of academia.

Sun-45. Impact of pharmacy faculty/student-led medication literacy sessions for refugees .

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Introduction: Refugees entering the U.S. are often unfamiliar with the healthcare system and have different medication beliefs. Since 2016, students and faculty have been conducting medication literacy workshops to improve knowledge of medications for newly arriving refugees.

Research Question or Hypothesis: Participants will enhance their medication knowledge after an educational session.

Study Design: Retrospective quantitative and qualitative evaluation.

Methods: Participants engaged in a student-led 90-minute educational session utilizing interpreters, translated materials, and demonstrations. Session topics included medical definitions, information on getting sick, medication use, and label reading.

A translated multiple-choice evaluation included 22 questions grouped into categories of: demographics (n=4), medication use (n=7), label reading (n=6), access (n=3) and cultural beliefs (n=2).

Three optional, free-response questions regarding on session feedback were also included.

Quantitative data was analyzed utilizing descriptive statistics. Thematic analysis was used to analyze qualitative data. Two independent coders reviewed each free-response question and discussed any discrepancies. The study team developed key themes based on the codes.

The primary outcome was to analyze participants' ability to correctly answer basic medication-related information.

Results: Twenty sessions were conducted with 423 participants from 39 countries. Correct responses centered around cultural beliefs (84%), label reading (77%), access (74%), and medication use (73%). Prescription label reading was high (86%), while preventative medicine was lower (34%).

Three major learning themes developed include, (1) There are cultural differences in medications habits, (2) Access to different healthcare settings and knowing provider roles was important, (3) Label reading to identify components of medication labels was useful. Themes on session feedback included: (1) Participants found demonstrations helpful in learning, (2) Additional learning on prevention and specific disease states would be useful.

Conclusion: This program allowed refugees to correctly identify basic medication health information upon arrival in the U.S. Additional classes that explore other medication-related topics, including preventative medicine, should be considered.

Emergency Medicine

Tues-47. Social and demographic determinants of empiric sexually transmitted infection treatment among emergency department patients.

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Introduction: Emergency department (ED) providers play an important role in diagnosing and managing sexually transmitted infections (STI) for both patients and their partners. Studies suggest that factors such as race, gender, likelihood of follow-up, and socioeconomic status are associated with significant differences in empiric STI treatment in the ED, especially with under- or over-treatment of STIs and testing outcomes. To provide equitable and optimal care, clinicians should recognize biases that may influence choice of empiric STI treatment.

Research Question or Hypothesis: Among ED patients tested for gonorrhea/chlamydia, is race/ethnicity associated with initiation of empiric antibiotic treatment?

Study Design: Single-center, retrospective, cohort study from January 1, 2019 to December 31, 2019

Methods: Patients were identified based on a consecutive sample of first episode per patient per study period and included if ≥18 years old, received a gonorrhea/chlamydia nucleic acid amplification test (NAAT), and discharged from the ED. Primary outcome was incidence of empiric STI treatment between racial/ethnic groups as per Census Bureau definitions. Secondary outcome was incidence of a positive STI test result. Descriptive and inferential statistics we performed.

Results: A total of 306 patients, consisting of 50 patients in the White non-Hispanic (WnH) cohort and 240 in the non-White, non-Hispanic (non-WnH) cohort, were included. The incidences of empiric STI treatment were 38% and 34% in WnH and non-WnH patients, respectively ($p = 0.22$). STI positivity incidence was 16% amongst WnH and 14% in non-WnH patients ($p=0.66$). Incidence of gonorrhea/chlamydia were 10% and 6% in WnH patients and 8% and 6% in non-WnH patients ($p=1.0$), respectively.

Conclusion: There was no difference in empiric initiation of STI antibiotics based on race/ethnicity. Further analysis using multiple logistic regression will be performed to assess for alternative exploratory predictors for initiation of STI treatment.

Tues-45. A Retrospective Review of Ketamine and Emergency Department 30 Day Recidivism.

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Introduction: Ketamine has been used in emergency department (ED) and critical care settings since the 1970's. Given that ketamine has been used recreationally, there is a potential ketamine usage could be addicting- especially in subpopulations with a particular propensity for addictive behaviors such as those with a history of psychiatric illness or a substance abuse disorder (SUD).

Research Question or Hypothesis: Does receiving ketamine at an ED visit lead to a higher rate of ED return within 30 days in the general population, patients with SUD, or patients with psychiatric diagnoses?

Study Design: This was a multi-center, retrospective cohort study.

Methods: Data was collected through chart reviews of patients who consented to having their Epic profiles used in research. This consisted of 643,727 ED visits out of 1,278,148 identified. The rates of 30-day return were summarized with 95% confidence intervals calculated using binomial approximation and compared using population-averaged logistic generalized estimating equations (GEE).

Results: Among the 868 patients treated with ketamine during the index ED visit, 20.3% (95% CI: 17.7-23.1%) returned to the ED within 30 days, compared to 18.6% (95% CI: 18.4-18.8%) of patients not receiving ketamine. Among all patients, both those treated with ketamine and those not treated with ketamine, history of SUD was associated with a 53% increase in 30-day ED returns (OR= 1.53, 95% CI: 1.50-1.55, p<.001), history of key psychiatric disorders was associated with a 45% increase in ED returns (OR=1.45, 95% CI: 1.42-1.47, p<.001), and a history of either concern was associated with a 51% increase in ED returns (OR=1.51, 95% CI: 1.48-1.53, p<.001). Independently, however, ketamine was not a risk factor increase rate of return visits for patients with SUDs (p=.362) or psychiatric history (p=.095).
Conclusion: Ketamine administration at an index ED visit was not an independent risk factor for an increased rate of subsequent ED visits in our study cohort.

Sat-27. Evaluation of Management and Outcomes in Patients Treated with Discordant Antibiotics for Cystitis in the Emergency Department.

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Introduction: Clinical Laboratory and Standards Institute (CLSI) breakpoints are based on serum rather than urinary breakpoints and may not accurately convey antibiotic resistance for antibiotics which achieve high urinary concentrations. The purpose of this study is to evaluate the incidence of clinical cure amongst individuals with cystitis discharged from the emergency department (ED) on an antibiotic to which urinary isolates were resistant (discordant therapy).
Research Question or Hypothesis: Patients with cystitis treated with discordant antibiotics with high urine concentrations may demonstrate higher clinical success rates than those treated with antibiotics with moderate urine concentrations.
Study Design: Single center retrospective cohort study from January 1, 2015, to December 31, 2020.
Methods: Microbiology laboratory records of urine cultures collected in the ED were reviewed to identify patients ≥18 years of age discharged from the ED with discordant antibiotic therapy for cystitis. Patients were stratified into high and moderate groups based on the urinary concentration of the antibiotic prescribed at discharge. The primary outcome of clinical success was compared between high and moderate concentration groups. Incidence of symptom resolution and changes in antibiotic therapy were analyzed individually as secondary outcomes.
Results: 2,388 patients records were reviewed, and 86 patients met inclusion criteria. Baseline characteristics were similar between groups. *Escherichia coli* was the predominant organism overall (70%). Clinical success occurred in 13% and 19% of the high and moderate concentration groups respectively (p=0.74). Symptom resolution occurred in 57% of patients in the high and 38% in the moderate concentration group (p = 0.31). Antibiotics were modified in 87% of patients with high concentration antibiotics and 81% of patients with moderate (p = 0.75).
Conclusion: The extent of an antibiotic's urinary concentration may not independently supersede traditional CLSI resistance breakpoints in the treatment of cystitis. Treatment with discordant antibiotics in our study was associated with high rates of clinical failure.

Mon PM-59. Evaluating the safety and efficacy outcomes between tenecteplase and alteplase for acute ischemic stroke.

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Introduction: Alteplase is the only FDA-approved thrombolytic agent for the treatment of acute ischemic stroke (AIS), however administration of this agent has resulted in incomplete and delayed reperfusion. Tenecteplase, another thrombolytic agent, has several advantages over alteplase, which includes faster administration time and greater resistance to plasminogen activator inhibitor. There are few institutions that use tenecteplase as the primary thrombolytic agent for AIS, thus there is limited data on its efficacy and safety.
Research Question or Hypothesis: Is there a difference in efficacy and safety outcomes between alteplase and tenecteplase after the implementation of tenecteplase as the primary thrombolytic agent for AIS at a single comprehensive stroke center?
Study Design: Single-center, prospective cohort
Methods: The study reviewed medical records of patients with a final diagnosis of AIS at Robert Wood Johnson University Hospital during a one-year period. Patients were included if they had received alteplase or tenecteplase within 4.5 hours of symptom onset during the study time frame. The primary outcome was a composite of bleeding-related adverse events. Secondary outcomes included door-to-needle (DTN) time, median 24-hour National Institute of Health Stroke Scale (NIHSS) score, discharge NIHSS score, and median discharge modified Rankin score (mRs). Data was assessed using the Mann-Whitney Rank Sum test and Chi-square test.
Results: The final analysis included 110 patients, who were collected from the hospital stroke database. There were no significant differences in baseline characteristics between groups. There was no

difference in the primary outcome of bleeding-related adverse events. For the secondary outcome of DTN time, a significant difference was shown with tenecteplase compared to alteplase (32 minutes vs. 40 minutes, p=0.022). The other secondary endpoints were not statistically significant.

Conclusion: There was no significant difference in safety between alteplase and tenecteplase. The efficacy endpoint of DTN time was greatly improved with tenecteplase.

Mon PM-58. Incidence of peri intubation hypotension during rapid sequence intubation based on induction agent dose.

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Introduction: Rapid sequence intubation (RSI) is a common emergency department (ED) procedure. A complication of RSI is post-intubation hypotension (PIH), which is associated with adverse patient outcomes. It is less established how the selection of the induction agent and the dose affect the risk of PIH.

Research Question or Hypothesis: The objective was to determine the incidence of peri-intubation hypotension in patients receiving full-dose compared to reduced-dose induction agents for RSI.

Study Design: This was a health-system wide, retrospective cohort study comparing peri-intubation hypotension based on induction medication given for RSI in the ED.

Methods: Patients were included if they underwent RSI in the ED from July 1, 2018 – December 31, 2020, were ≥18 years of age and received etomidate, ketamine or propofol as an induction agent. Reduced dose was ≤1.25 mg/kg of ketamine or propofol and ≤ 0.2 mg/kg of etomidate. Full dose was anything greater than those doses. The peri-intubation period was defined as 30 minutes post-intubation, and hypotension considered a systolic blood pressure <100 mmHg.

Results: There were 939 patients in the final analysis, with most receiving etomidate (n=764, 81.4%), followed by ketamine (n=145, 15.4%) and propofol (n=30, 3.2%). Reduced doses of induction agents were observed in 107 patients receiving etomidate (14%), 60 ketamine patients (41.4%) and 13 propofol patients (43.3%). PIH was observed in 23.3% receiving etomidate, 28.3% in the ketamine group and 7.7% with propofol. When comparing individual induction agents, full dose ketamine showed the highest rate of PIH (n=31, 36.5%), which was significant compared to reduced dose ketamine (16.7%, p=0.021) and full dose etomidate (22.8%, p=0.010).

Conclusion: Patients who received full-dose ketamine as an induction agent experienced the most peri-intubation hypotension. Further studies are needed to determine if this is a correlation with patient acuity versus a causation from the ketamine or its dose.

Sun-5. Effect of short course antibiotic therapy on clinical cure rates in males with urinary tract infections.

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Introduction: The 2011 Infectious Diseases Society of America (IDSA) guidelines classify men with urinary tract infections (UTIs) as "complicated," warranting longer treatment courses. However, recent evidence suggests that shorter courses of antibiotics (7 days) were non-inferior to longer courses (14 days) in males with UTIs.

Research Question or Hypothesis: The purpose of this study was to evaluate the clinical success rate of shorter antibiotic courses (≤6 days) compared to longer courses (>6 days) for UTI in males treated in the Emergency Department (ED).

Study Design: Single-center retrospective cohort study.

Methods: This was an evaluation of adult men treated in the ED for a UTI from January 1, 2020 to June 30, 2021. Patients with systemic infections, history of renal transplant, or antibiotic usage 14 days prior to ED visit were excluded. The primary outcome was 30-day clinical success, defined as those not meeting criteria for clinical failure. Clinical failure included return to the ED, urgent care, or primary care provider for non-resolving or worsening UTI symptoms or change in antibiotics based on urine cultures within 30 days of presentation. The primary outcome was analyzed via Chi-square.

Results: In all, 91 patients were included (44 treated for ≤6 days and 47 treated for >6 days, respectively). Patients were predominantly white (74.7%) with a mean age of 61.4±17.2 years. Common comorbidities were urinary catheter (41% vs. 36%) and diabetes (27.3% vs. 27.7%). The mean treatment duration was 5.6±1.2 vs 9.4±2.6 days in the ≤6 days and >6 days treatment groups, respectively. No difference in clinical success at 30-days was observed between shorter and longer courses of antibiotics (87.9% vs 86.8%, p=0.95). Most clinical failures were attributed to a drug-bug mismatch (57.1% vs 42.9%).

Conclusion: Shorter course of antibiotics (≤6 days) for males with UTIs may be considered and warrants continued research.

Tues-46. Evaluation of efficacy of weight-based versus flat dose of intravenous valproic acid in the treatment of migraine.

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Introduction: Valproic acid (VPA) is utilized as an abortive medication in the management migraines with similar efficacy as triptans and dihydroergotamine. Varying dosing regimens have been utilized in previous studies, making it unclear which is most efficacious in achieving migraine resolution.

Research Question or Hypothesis: Is a weight-based dose of intravenous (IV) VPA more effective than a 500 mg or 1000 mg dose in reducing pain associated with migraine?

Study Design: A multi-center, single healthcare system, retrospective chart review.

Methods: This was a retrospective chart review of patients presenting to the emergency department between April 2013 to April 2018. Patients were included if they were ^{3}12 years old, ^{3}40 kg and received IV VPA for an intractable headache. The primary endpoint was the reduction of pain score, assessed using the numerical rating scale (NRS), by at least 50% after IV VPA administration. The 500 and 1000 mg groups were combined for analysis due to limited number of patients in the 1000 mg dose group. For normally distributed continuous variables, means and standard deviations were reported and compared using t-tests and one-way ANOVAs; otherwise, medians and first and third quartiles were reported and compared using Mann-Whitney U and Kruskal-Wallis tests.

Results: A total of 408 patients were included with 261 in the weight-based group and 147 in the flat dose group. Patients in the weight-based group were younger ($p = 0.013$) and the average weight-based dose was 20.2 mg/kg. The primary endpoint occurred in 106 (40.6%) in the weight-based group and 57 (38.8%) in the flat dose ($p = 0.796$). Hospital length of stay (LOS) differed with the weight-based group having a median LOS of 45 hours compared to 34.1 hours in the flat dose group ($p = 0.004$).

Conclusion: There was no difference in reduction in pain score in weight-based versus flat doses of IV VPA for management of migraine.

Mon AM-51. Single-Dose Ceftriaxone in Adjunct to Oral Antibiotics for the Treatment of Acute Uncomplicated Urinary Tract Infections in the Emergency Department.

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Introduction: Published guidelines for optimal antibiotic use for acute uncomplicated urinary tract infections have demonstrated a wide variation in emergency department (ED) prescribing practices. Various combinations of parental and oral therapy have been utilized to treat UTIs, yielding inconsistent outcomes. Furthermore, overuse of antibiotics can result in collateral damage.

Research Question or Hypothesis: Does a single dose of intravenous ceftriaxone in combination to oral antibiotics impact the rate of 30-day ED revisits in acute uncomplicated urinary tract infections?

Study Design: Single-center, IRB-approved, Retrospective analysis

Methods: Female patients presenting for acute uncomplicated urinary tract infections over 2 years (1/2020-1/2022) were identified using the electronic medical record system.

Results: N=227, 73 patients received ceftriaxone in addition to oral antibiotics (CRO-O). No significant difference in ED 30-day readmission for persistent UTI symptoms between the CRO-O group versus oral antibiotics only group (5.5% vs 5.8%, $P>0.999$). Urine cultures with identified bacteria isolates and sensitivity data were available for 144(63.4%) of 227 patients. There were no significant differences among the susceptibilities to ceftriaxone (90.1% vs 93%, $P=0.755$) or oral antibiotics (89.1% vs 86%, $P=0.602$) between the two groups, as well as changes made to initially prescribed antibiotics (6.5% vs 8.2%, $P=0.635$). Anecdotally, ED prescribers chose the addition of ceftriaxone more often in patients with co-morbidities.

Conclusion: For patients presenting to the ED for treatment of acute uncomplicated urinary tract infections, a single dose of ceftriaxone in adjunct to oral antibiotics compared to oral antibiotics alone did not result in a statistically significant different rate of 30-day ED revisits. Urinary isolate susceptibilities or frequency of changes made to the initial antibiotic regimen between the two groups did not differ. These data may highlight an opportunity to reduce ceftriaxone usage in the ED for acute uncomplicated urinary tract infections, but further investigation is needed to determine the impact of comorbid diseases, antibiotic choice, and patient outcomes.

Endocrinology

Mon AM-65. Retrospective Review of Blood Glucose Control in Inpatients Receiving Peritoneal Dialysis.

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Introduction: Though it is well described in literature peritoneal dialysate may cause hyperglycemia, there are only outpatient studies observing blood glucose control in peritoneal dialysis patients. Little is known how peritoneal dialysate may affect inpatient blood glucose control.

Research Question or Hypothesis: To retrospectively investigate the effect of dextrose-based peritoneal dialysis solutions on inpatient blood glucose control.

Study Design: Retrospective crossover study in Cincinnati, Ohio

Methods: Medication records of patients were reviewed from July 1, 2016 through June 30, 2021 to include patients ≥ 18 years of age with renal insufficiency requiring peritoneal dialysis, previously diagnosed diabetes requiring insulin use, and completion of a pharmacist medication history interview during the inpatient encounter. Patients were excluded if peritoneal dialysis was initiated within the previous 30 days, admitting diagnosis for a surgical procedure, use of or conversion to hemodialysis, receipt of glucocorticoids, active peritonitis or peritoneal dialysis catheter infection, pregnancy, or an admitting

diagnosis of diabetic ketoacidosis, euglycemic ketoacidosis, or hyperosmolar hyperglycemic state.

Results: Over the study period, 160 patients were screen with 64 patients meeting inclusion criteria. The mean age was ~64 years old, 45.5% of patients were male, a majority of patients were Type II diabetics (87.5%) with an average hemoglobin A1c of 7.59%. Upon day one of hospital admission, patients used significantly less insulin than prior to admission (95% CI 16.99 – 34.99; p < 0.001). However, the average blood glucose on day one of admission was 192.8 mg/dL and the mean number of hyperglycemic episodes per patient during admission was 8 (min 0, max 45).

Conclusion: Patients were prescribed significantly less insulin during the first days of admission than preadmission requirements. This lead to inadequate blood glucose control and hyperglycemic events. Further studies are needed investigating the effects of differing peritoneal dialysate concentrations have on blood glucose control.

Mon AM-64. A Retrospective Analysis of Once-daily versus Twice-daily Dosing of Insulin Glargine in Non-critically Ill Patients.

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Introduction: Insulin is the treatment of choice for inpatient diabetes management. There is limited evidence on once-daily versus twice-daily insulin glargine in the hospital. The purpose of this pilot study was to compare the efficacy and safety of insulin glargine administered as a once-daily versus twice-daily regimen in non-critically ill people.

Research Question or Hypothesis: Is there a difference in efficacy and safety when insulin glargine is given once daily versus twice daily?

Study Design: This study was a retrospective chart review ranging from June 1, 2020, to May 31, 2021.

Methods: Inclusion criteria included people older than 18 years old and had received once-daily or twice-daily insulin glargine for at least 72 hours. The primary endpoint was comparison of the number of days that all blood glucose measurements were within 70-180 mg/dL over a 24-hour period (0000-2359). Secondary endpoints included the number of hyperglycemic and hypoglycemic events in each group. Wilcoxon/Kruskal-Wallis and t-tests was used for continuous data, whereas Fisher's exact and chi-square tests was used for categorical data.

Results: Group 1 included participants who received insulin glargine as once-daily regimen (n=101), whereas Group 2 were participants who received the basal insulin as twice-daily regimen (n=103). Baseline characteristics were similar in both groups except for higher BMI at admission (p=0.01) and higher pre-admission A1c (p=0.02) in Group 2. No differences were found between the groups for the primary outcome (p=0.5) or the secondary outcomes of number of hypoglycemic (p=0.6) and hyperglycemic events (p=0.7).

Conclusion: There was no significant difference in the efficacy or safety of insulin glargine given as a once-daily versus twice-daily regimen in the non-critically ill population. This project was a retrospective pilot study with a small sample size so further research may be required to confirm these results in the inpatient setting.

Mon PM-21. Added impact of nurse- and pharmacist-driven diabetes management and education.

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Introduction: Diabetes is a common, expensive, and potentially debilitating condition. Nurse- and pharmacist-driven programs have demonstrated effective management previously, particularly as part of multidisciplinary office visits. We implemented a primarily telephonic multidisciplinary diabetes management and education program to improve diabetes control among primary care patients.

Research Question or Hypothesis: Does supplemental nurse and pharmacist support improve diabetes outcomes and utilization?

Study Design: matched retrospective cohort quality improvement analysis

Methods: Patients historically engaged with the program were matched with and compared to patients receiving usual care. Patients from a single payer were included if they had at least 18 months of continuous coverage including 6 months of baseline (before engagement) and 12 months of follow up (after engagement) and had at least 2 A1c values at least 3 months apart during the 12-month period. Outcomes included diabetes control, utilization, and preventive care metrics. The program timeframe was 2017-2021 with each patient having a unique 18-month window of data collection. Statistics included comparisons of medians and frequencies.

Results: A total of 281 patients (51 program, 230 usual care) were identified and matched in 38 pairs. A1c improved more for the program group (-2 vs -1.6) and more patients in the program achieved A1c<8 (53% vs 40%). A greater proportion of program patients completed at least 2 visits with a PCP or endocrinologist (95% vs 79%) and completed microalbuminuria screening (82% vs 61%). Program patients had fewer emergency and inpatient visits (8 vs 10, 3 vs 4, respectively). Statin use was more frequent in the program group as well (84% vs 56%).

Conclusion: Patients participating in a supplemental nurse- and pharmacist-driven diabetes management and education program experienced improved diabetes control, increased provider follow up, decreased utilization of emergency and inpatient services, and optimized medications compared to usual care. The primarily telephonic program may provide an efficient and scalable approach to improving diabetes care.

Sat-5. Effect of Metformin Use on Vitamin B12 Deficiency Over Time: A Real-World Evidence Database Study.

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Introduction: Metformin use has been linked to reductions in serum vitamin B12 among patients with type 2 diabetes (T2DM). The prevalence and onset of metformin-induced B12 deficiency, however, are yet to be fully elucidated. In this study, we aimed to examine the effect of metformin on B12 status using a large health records database for the first time in the literature.

Research Question or Hypothesis: To what extent does metformin increase the risk of vitamin B12 deficiency over time in patients with T2DM?

Study Design: This was a retrospective cross-sectional study, utilizing NIH's All of Us Database, which consists of >342,000 diverse participants from across the U.S.A.

Methods: T2DM patients with a history of metformin use were included for evaluation of B12 deficiency. Patients with B12 deficiency prior to metformin use were excluded. An adjusted logistic regression model was implemented to evaluate association between metformin use, as well as long-term metformin use (≥4 years), and the risk of B12 deficiency. We further compared differences in borderline B12 deficiency in metformin and non-metformin users. Analyses were performed in R with alpha value of 0.05.

Results: Of 36,740 patients with a T2DM diagnosis, 6,221 (16.93%) had documented metformin use. The average age of metformin users was 65.3 years, 60.15% female. B12 deficiency was confirmed in 464 (7.46%) metformin patients and 1,919 of 30,519 patients not reporting metformin use (6.3%). Metformin users had 4.7% increased risk of developing deficiency compared to non-metformin users (p=0.44). Each additional year of metformin use was associated with 5% increased risk of deficiency (p<0.05). Metformin use ≥4 years resulted in a 41% increased risk of deficiency, compared to those with metformin use <4 years (p<0.05). Metformin use increased the risk of borderline B12 deficiency by 27.01% (p<0.05).

Conclusion: Long-term metformin use was associated with increased risk of B12 deficiency in T2DM patients, with compounding risk over time.

Sat-28. Impact of Pharmacists' Intervention on Diabetes Management in a Primarily Hispanic Population.

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Introduction: Hispanic patients have more pronounced diabetes related complications compared to patients from other ethnicities. Studies have shown that pharmacist interventions demonstrate statistically significant improvements in diabetes outcomes.

Research Question or Hypothesis: The purpose of this study was to evaluate the impact of pharmacist care on diabetes management and patient outcomes in a primarily Hispanic patient population compared to standard care in a Federally Qualified Health Center.

Study Design: Retrospective cohort analysis.

Methods: IRB-approved retrospective cohort analysis of patients 18 years or older diagnosed with Type 2 diabetes. Change in HbA1c was analyzed using GraphPad Prism 8 for Mac (San Diego, CA). The difference in HbA1c value was compared with a two-sided paired t-test and a p-value of <0.05 was considered statistically significant. Medication use evaluation was performed by comparing pharmacists prescribing habits with respect to GLP-1 receptor agonists and SGLT-2 inhibitors compared to standard of care.

Results: Among the 495 patients enrolled in the study, the average drop in HbA1c was reported as 2.107%. Within the first month of Comprehensive Medication Management services received by a clinical pharmacist, 5% reached the HbA1c of less than 8% and were discharged. By month six, 40% of patients reached HbA1c of less than 8%. A total of 45% of patients were seen by pharmacists and prescribed a GLP-1 receptor agonist compared to 12% of patients who received standard of care. Similarly, 23% of patients were prescribed a SGLT-2 inhibitor by pharmacists compared to 9% of patients who received standard of care.

Conclusion: Pharmacist interventions can significantly improve diabetes control in medically underserved primarily Hispanic patients with uncontrolled diabetes. Results showed greater utilization of GLP-1 receptor agonists and SGLT-2 inhibitors by clinical pharmacists compared to standard of care.

Family Medicine

Mon AM-66. Serial Blood Pressures vs a Single Repeated Blood Pressure in the Management of Hypertension.

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Introduction: Appropriate blood pressure (BP) measurement is key to diagnosis and management of hypertension. The best practice for obtaining BP remains debated. The American Heart Association recommends the average of two readings after 5 minutes of rest. Recent

research indicates the best predictor is the average of the last two readings in three serial BP measurements, each 2 minutes apart.

Research Question or Hypothesis: Do serial BPs result in lower blood pressure readings compared to repeat BPs after 5 minutes?

Study Design: Retrospective analysis of a quality improvement process.

Methods: Under normal rooming procedure, a patient with a BP reading >140/90 mmHg, will have their BP repeated after approximately 5 minutes. For this QI project, patients of three medical assistants (MAs) whose BP was >140/90 mmHg had three serial BP readings obtained, two minutes apart, with the last two readings unattended. After measurements were completed, the MA recorded all readings, and averaged the last 2 readings. Comparisons were made between initial rooming BP, first serial BP reading (representing standard rooming procedure), and the average of the last two serial BP readings.

Results: Seventy-eight patients were included. Average BP on rooming was 155.5 mmHg systolic and 88.7 mmHg diastolic. This decreased to 146.0 mmHg systolic (-8.79, p<0.001) and 85.7 mmHg diastolic (-3.06, p=0.0062) for the first serial BP, and 147.5 mmHg systolic (-8.33, p<0.0001) and 86.9 mmHg diastolic (-1.83, p=0.0108) for the average serial BP. There was no significant difference between the first serial BP and average serial BP. Approximately one-fourth of patients achieved a blood pressure <140/90 mmHg after the first serial BP and average serial BP.

Conclusion: In comparison to rooming BP, both the first serial BP and average serial BP were significantly reduced. However, there was no advantage to serial BPs over the initial serial BP reading.

Gastroenterology

Sun-97. Clinical Pharmacist Role in Improving Management of Care for Hepatitis-C Patients.

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Introduction: The World Health Organization has set a worldwide goal of eliminating hepatitis C (HCV) infections by 2030. Currently, a clinical pharmacist collaborates with our hepatologist to manage medication therapy for HCV patients. With pharmacist involvement, access to HCV treatment is improving. However, patients at our medical center remain non-adherent and fail to complete sustained virologic response (SVR), the absence of detectable HCV RNA on blood testing six months after the completion of antiviral therapy. The clinical pharmacist needs to modify our program to improve HCV clinical outcomes. The objective of this study is to assess the rates of patients successfully achieving SVR after restructuring our program.

Research Question or Hypothesis: The restructuring of services in the pharmacist-managed HCV clinic will improve SVR success rates compared to the previous program.

Study Design: This study is a retrospective cohort chart review.

Methods: Patients ≥18 years old with an HCV diagnosis were referred to the pharmacist by the hepatologist from July 1, 2020 to April 9, 2022. Clinical pharmacist interventions included (1) individualized in-person or video consultations, (2) pre-ordered serialized labs, and (3) monthly lab reminders via phone. We compared patients before and after restructuring the clinical pharmacist program. Baseline characteristics and SVR lab completion were analyzed using chi square and unpaired t-tests.

Results: This study included 144 patients. The mean age of the control group was 52±13.7, and the intervention group was 51±11.9 (p=0.81). There were no significant differences among baseline characteristics. 78% (18/23) of patients achieved SVR in the intervention group compared to 55% (67/121) in the control group (OR=2.9 95% CI (1.0-8.3), p=0.041). The clinical pharmacist intervention reduced the failure rate of achieving SVR from 45% (54/121) to 22% (5/23) (OR=0.34 95% CI (0.12-0.99), p=0.041).

Conclusion: Restructuring of the HCV program by the clinical pharmacist is associated with improved SVR rates among HCV patients in our medical center.

Sun-98. Using Clinical Pharmacists to Close the Herpes Zoster Vaccination Gap in IBD Patients in a County Medical Center.

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Introduction: Patients with Inflammatory bowel disease (IBD) have an increased rate of developing herpes zoster infection. Currently, the American Gastroenterological Association (AGA) guidelines recommend that patients with IBD receive the recombinant zoster vaccine (RZV), compared to the CDC guidelines which recommend the RZV vaccine for patients 50 years and older. The misalignment in the guidelines has resulted in IBD patients 50 years and younger being declined vaccinations at local pharmacies. This creates an increased barrier to receiving the RZV vaccine.

Research Question or Hypothesis: We propose that involving a clinical pharmacist in the IBD clinic at a county medical center will improve access to the vaccine and significantly improve vaccination rates.

Study Design: Single-center, retrospective, quality improvement project

Methods: We evaluated the outcomes when a clinical pharmacist participated as part of the team with gastroenterologists to identify IBD patients less than age 50 requiring RZV vaccination. They directly assisted in accessing the RZV vaccine. Vaccination rates with clinical

pharmacist involvement were compared to vaccination rates without pharmacy involvement from July 1, 2021, to April 04, 2022.

Results: The mean age in years of the intervention and control group was 34±7.9 and 36±7.7, respectively (p=0.4772). Of these 61.9% were female, 71.4% were Hispanic, and 69% were diagnosed with ulcerative colitis. There were no significant differences among baseline characteristics. After pharmacy intervention the rates of RZV vaccination increased from 3.2% (n=31) to 38.1% (n=42) (risk ratio = 11.8; 95% CI = 1.7 to 84.4, P=0.0005). There was a highly significant increase by 12-fold in vaccination rates associated with pharmacy intervention.

Conclusion: We have demonstrated how clinical pharmacists may be utilized to increase vaccination rates, improve access to care, and close the RZV vaccination gap in IBD patients. We conclude that clinical pharmacists can be an essential member of the health care team in achieving preventative measures in the IBD population

Sun-58. Advanced liver disease and Coronavirus Disease-2019 (COVID-19) vaccination rates among prisoners with Hepatitis C Virus (HCV).

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Introduction: Incarcerated populations with HCV are at high risk of contracting COVID-19 disease and COVID-19-induced liver injury, causing significant morbidity and mortality. Despite the availability of vaccines, vaccine hesitancy among these populations remains a problem. Unfortunately, few studies discussed COVID-19 vaccination rates among HCV-positive prisoners. To identify subgroups that will require more interventions to prevent COVID-19, this study will assess the association between COVID-19 vaccination rates and the degree of hepatic impairment among HCV-positive prisoners.

Research Question or Hypothesis: HCV-positive prisoners are more likely to receive COVID-19 vaccine if they have advanced liver disease compared to HCV-positive prisoners without hepatic impairment.

Study Design: Retrospective chart review at the Illinois Department of Corrections (IDOC) HCV Clinic.

Methods: Patients seen between 12/11/2020 to 1/10/2022 were evaluated. Eligible IDOC patients included if >18 years old, had a documented COVID-19 vaccination status, and were eligible for HCV treatment. Vaccination status, FibroScan scores, abdominal ultrasound, and APRI were collected to determine if there is an association between COVID-19 vaccination rates and degree of hepatic impairment. Estimates and odds ratios were assessed using continuous and categorical variables, respectively. P-values determined statistical significance.

Results: This IRB approved study including 336 patients showed no significant associations between the degree of hepatic impairment and COVID-19 vaccination rates using the regression model for analysis. The odds of one receiving the COVID-19 vaccine are 1.24 times more likely for someone with ultrasound evidence of cirrhosis compared to one without a documented ultrasound, and 1.01 times more likely for someone with advanced fibrosis compared to one with mild fibrosis.

Conclusion: There was a trend showing that HCV-positive prisoners with advanced liver disease were more likely to be vaccinated against COVID-19. While an association cannot be made given statistically non-significant results, education about the importance of COVID-19 vaccination among all HCV-positive prisoners, including those with minor hepatic impairment, is imperative.

Mon AM-50. Does Focused Education on the Use of Proton Pump Inhibitors (PPIs) Reduce the Incidence of Acute Upper Gastrointestinal Bleeding (aUGIB) in Patients on Antithrombotic Therapy?.

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Introduction: The use of dual antithrombotic therapy (DAT) has been shown to increase the risk of aUGIB. Prophylactic antisecretory therapy with PPIs has been found to be protective and associated with a lower risk of aUGIB in patients on DAT.

Research Question or Hypothesis: Does focused PPI therapy education to medical teaching teams lead to appropriate prescribing for patients on DAT?

Study Design: Prospective, observational, IRB-approved, pilot study

Methods: Patients divided into historical control arm-Group A (no education) and prospective arm-Group B (education). Group A patients on DAT admitted for aUGIB between 1.2019 and 1.2020 and Group B (prospective treatment) from 11.2021 to 6.2022. Focused education regarding the use of PPIs provided to medical residents during daily didactics and weekly on teaching rounds; this was for the duration of the prospective group, 8 months.

Nominal data analyzed using Chi-squared test and continuous data using unpaired t-test.

Results: Group A (historical) 148 patients enrolled of which 43.9% (65/148) were on anti-secretory therapy prior to admission. Group B (prospective), 22 patients enrolled of which 54.5% (12/22) were

discharged on PPI therapy and 68.2% (15/22) were discharged on anti-secretory therapy which was statistically significant (p=0.03). Of the 22 enrolled, no patients have been readmitted for aUGIB.

Conclusion: Focused education on PPI use in DAT patients lead to more patients being discharged on antisecretory therapy, as opposed to the historical group. Furthermore, patients enrolled into the prospective treatment arm, to date have not been readmitted for aUGIB. The benefits of using prophylactic PPI therapy in attempts to prevent aUGIB may outweigh the risks of adverse effects.

Geriatrics

Sun-59. Medication related admission and association with inappropriate polypharmacy in patients admitted from nursing home to geriatric medical center of tertiary hospital .

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Introduction: The use of inappropriate polypharmacy among nursing home residents is high. This can lead to acute hospital admissions and such medication-related admissions (MRAs) may increase social and economic costs.

Research Question or Hypothesis: The prevalence of MRAs in patients admitted from nursing home are high and it is associated with inappropriate polypharmacy.

Study Design: This study was a cross-sectional and case-control analysis.

Methods: We identified older patients who admitted from nursing home to acute care setting. MRAs were determined using previously suggested systematic review method for verifying medication-related admissions. Use of potentially inappropriate medications (PIM) in pre-admission medications were identified according to the each and combined criteria of Beers criteria, NORGEP-NH, STOPP/START-NH, and STOPPFrail guidelines. Medication use factors associated with MRA were analyzed using multivariate logistic regression.

Results: Among 304 patients of acute admissions, 32.2% were assessed as medication-related. The main cause of MRA was acute kidney injury, and the most causative drug was renin-angiotensin system inhibitors. Around 81% of patients used at least one PIM according to the combined criteria. Using one or more PIMs, renin-angiotensin system inhibitors, diuretics, nonsteroidal anti-inflammatory drugs and benzodiazepines were significantly associated with MRA. Combined criteria revealed out to better predict MRA than individual criteria.

Conclusion: Approximately, one in third acute admission of nursing home residents were medication-related. Interventions for optimal drug use of nursing home older residents are needed.

Sat-29. Prescribing Pattern of Medications in Geriatric Patients with Cardiovascular Diseases in Kuwait.

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Introduction: Inappropriate prescribing is a risk factor for adverse drug reactions and hospitalizations in geriatrics and places a considerable burden on the healthcare system. Therefore, it is imperative to evaluate prescribing patterns among this population.

Research Question or Hypothesis: What is the prevalence of potentially inappropriate medications (PIMs) use and potentially prescribing omissions (PPOs) among geriatric patients with cardiovascular diseases (CVDs) in Kuwait? and What are the factors associated with PIMs use in geriatric patients with CVDs?

Study Design: A quantitative, retrospective, and cross-sectional multicenter.

Methods: Data were collected randomly from the outpatient cardiology clinics in seven governmental hospitals. Three of these hospitals have specialized cardiac centers. Inclusion criteria were age ^{3} 65 years, diagnosed with at least one CVD, and attended the clinic during the last 6 months prior to data collection.

Results: A total of 383 patients (63.3%) had at least one PIM or PPO or both based on STOPP/START criteria. Over three-fifths (n=391, 64.6%) of the patients were prescribed PIMs classified as C and/or D medications based on the Euro-FORTA list. Twenty-eight percent (n=174) of patients had drug-drug interactions class D or X. Less than 2.4% of patients were using medications with inappropriate dosing and/or contraindicated based on their recent eGFR and/or Child-Pugh score. Patients taking ^{3} 10 medications had significantly more PIMs according to STOPP criteria, FORTA list, and drug-drug interactions (P<0.001). PPOs according to START criteria and PIMs according to STOPP criteria and drug-drug interactions were significantly lower in specialized hospitals compared to general hospitals (p= 0.024, p <0.001, and p=0.017, respectively). Patients with ^{3} 6 chronic diseases had more PPOs (p=0.034) and PIMs according to FORTA list (p < 0.001) and drug-drug interactions (p=0.003).

Conclusion: The present findings highlight the need to develop and implement multifaceted interventions to prevent or minimize inappropriate prescribing among the geriatric population with CVD in Kuwait.

Health Services Research

Tues-54. Accessibility of Board-Certified Pharmacists for Patients Living in Rural Areas of Texas.

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Introduction: Clinical pharmacists functioning in advanced practice roles are well-positioned to improve medication-related outcomes. Though pharmacists are described as "the most accessible health care provider" that accessibility may not extend to advanced practice roles such as comprehensive medication management. Disparate access to clinical pharmacists could impact patient care, particularly in rural areas, and may be a barrier to acquisition of payment recognition. Board-certification is a primary mechanism for credentialing clinical pharmacists and is a useful surrogate for identifying pharmacists who provide direct patient care. We sought to characterize the geographic representation of board-certified pharmacy specialists practicing in the state of Texas based on rurality and the demography of healthcare populations.

Research Question or Hypothesis: Do rural patients have access to advanced trained, certified pharmacists?

Study Design: Descriptive, quantitative analysis

Methods: Certificants were identified from the Board of Pharmacy Specialties (BPS) public database by location and cross-referenced Texas State Board of Pharmacy data. Practice sites were categorized by Rural Urban Community Area (RUCA) code based on zip code. Certificants were aggregated by county and reported per 100,000 population. Those no longer residing in the state, in non-practice-based employment, or who could not be identified by practice address were excluded.

Results: Of 20,614 actively licensed pharmacists, 3,276 (15.9%) were board-certified. Certificants were predominately female (71%), 5-20 years from graduation, and practicing in hospital settings (67.3%). Nearly all were located in metropolitan areas 97.7% (2% micropolitan, 0.3% small town, 0 rural areas). Chloropleth mapping by county demonstrated clustering in major population centers with 70% of counties having no certified pharmacists. Population-adjusted maps reflected similar findings. Only 3 were employed in small-exempt or critical access hospitals.

Conclusion: Patients in rural Texas do not have access to advanced trained certified pharmacists. Provider access in community settings was limited across the state. Additional workforce data, including role delineation are needed to fully characterize the certified workforce.

Sun-63. Cost-Benefit Analysis of a Pharmacist-led Transition of Care Intervention in Primary Care Setting.

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Introduction: Transition of care (TOC) interventions aim to provide high quality care while showing cost-benefit within a primary care setting. The pharmacist's role and the economic benefit within a primary care TOC team is not distinctly defined.

Research Question or Hypothesis: A pharmacist-led TOC intervention in primary care is associated with a positive economic benefit.

Study Design: A cost-benefit analysis (CBA) embedded in a randomized clinical trial between October 2019 and May 2021.

Methods: Patients were randomized to either the intervention (n=36) or the usual care group (n=264). The pharmacist-led TOC intervention was multifaceted including comprehensive medication review and provider/patient follow-up. The primary composite outcome included all-cause readmissions and emergency department visits within 30 days after discharge. Economic outcomes were estimated based on clinical outcomes and available cost data from a medical provider perspective. Costs were adjusted to inflation and estimated based on rates per 100 patients. The CBA evaluated three cost measures: net benefit, benefit to cost ratio (BCR) and return on investment (ROI). One-way sensitivity analyses evaluated changes in the BCR by adjusting benefit and cost inputs.

Results: The study demonstrated a significant reduction in the composite outcome (all-cause readmissions and ED visits) within 30 days (aIRR,0.54;95% CI,0.44–0.66; p<0.001). Total intervention cost ($8,189) was driven by pharmacy personnel. Intervention benefits were driven by healthcare utilization cost avoidance determined using the differences in incidence rates and average cost of utilization. Cost avoidance was estimated at $15,682 for hospital readmissions and $4,091 for ED visits. The total intervention benefit was estimated at $23,013, which delivered a net benefit of $14,824, a BCR of 2.8, and a ROI of 181%. Sensitivity analyses were robust to changes in economic inputs with BCR ranging from1.9 to 4.8.

Conclusion: Pharmacist-led TOC intervention resulted in a positive economic benefit. This provides further support for the integration of pharmacists into the primary care TOC team.

Sun-62. Early Impact of Collaborative Remote Patient Monitoring (C-RPM) for Hypertension on Underserved Populations during the COVID19 Pandemic: A Multicenter Retrospective Observational Study.

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Introduction: Underserved populations are 40% more likely to have hypertension and three times more likely to die from heart diseases due to uncontrolled blood pressure (BP). Disrupted access to care

from the COVID-19 pandemic further puts these populations at higher risks of complications. A C-RPM for hypertension was established in response to this threat.

Research Question or Hypothesis: Will C-RPM promote timely BP control among underserved patients during the COVID19 pandemic?

Study Design: A retrospective, single-arm observational study conducted in two federally qualified health center sites.

Methods: All adult patients with uncontrolled BP (≥140/90) who received physician or nurse practitioner referral to participate in C-RPM were included. Patients who failed to use BP device independently were excluded. All participants received a BP device that transmitted their BP measurements to the institution electronic health records. Clinical pharmacists, under a collaborative practice agreement, followed the readings and provided dose adjustments via telemedicine. Patient demographics were collected at baseline and BP readings were tracked daily for the first three months. Descriptive analysis, ASCVD risk calculator and paired t-test were used accordingly.

Results: Between August and December 2021, 89 patients were referred, of which 70 (78.7%) monitored BP daily while 19 (21.3%) were lost to follow up. The average age of the patients was 60.8 years with majority being Hispanic (76.4%), female (63%), and diagnosed with type 2 diabetes (52.8%). The average BP improved from 163/82 at baseline to 132/71 at three months ($p<0.001$) with an average ASCVD risk score reduction of 25%. Approximately 76% achieved BP target (<140/90) within three months. BP of those lost to follow up maintained uncontrolled over the three months.

Conclusion: C-RPM achieved clinically meaningful and timely improvement in BP control and cardiovascular risks among underserved patients, bypassing the threat of care access disruption due to the COVID19 pandemic.

Mon AM-71. Increasing Vaccine Access Among Uninsured Patients at a Free Clinic.

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Introduction: Vaccination rates for uninsured low-income individuals are often low for routine vaccinations, including pneumococcal disease, human papillomavirus, hepatitis B, and herpes zoster, primarily due to cost. However, these agents can be accessed through pharmaceutical manufacturer assistance programs (PMAPs), though approval must be granted prior to vaccine administration.

Research Question or Hypothesis: To evaluate gaps in vaccination rates for individuals seeking care at a free clinic and to develop a process to increase access to vaccinations via PMAPs.

Study Design: Retrospective chart review

Methods: All charts for patients with a documented visit from July-December 2021 were reviewed for eligibility for the following: 13-valent pneumococcal conjugate vaccine (PCV13), 23-valent pneumococcal polysaccharide vaccine (PPSV23), human papillomavirus vaccine (HPV), hepatitis B vaccine (HBV), and recombinant zoster vaccine (RZV). Eligibility was determined using recommendations from the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control as of 12/16/2021. A quality improvement process was used to implement a process to obtain and administer vaccinations using PMAPs.

Results: A total of 477 patient records were included. The average age of the patients was 46.5±17 years . For patients who were eligible, vaccination rates were: PCV13 (16/36: 44.4%), PPSV23 (120/207: 59.2%), HPV (15/66: 22.7%), HBV (27/129: 20.9%), RZV (61/206: 29.6%). The clinic staff developed a process to facilitate patient enrollment in PMAP, and subsequent administration of vaccine dose(s) once approved. Implementation of the vaccine administration program is ongoing.

Conclusion: These preliminary results confirm the expected gaps in vaccination rates among the patient cohort. Creating a process that engages the entire clinic team and identifies existing resources can effectively fill gaps for vaccination among free clinic patients. While cost may not be the only barrier, implementation of the vaccination administration program aims to close gaps in routine vaccinations in this patient population.

Tues-50. Quality of diabetes care at a district hospital in rural Namibia.

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Introduction: Diabetes mellitus, type 2 (DM2) is a growing health threat worldwide. Namibia, in Southern Africa, has an estimated prevalence of 5.4%. The WHO recommends multimodal care including glycemic control, co-morbidity management, screening for complications, diet, physical activity, diabetes education, and self-care practices. Pharmacists can improve DM2 management through systems change and direct patient care, particularly in limited resource settings.

Research Question or Hypothesis: To assess the quality of care for patients with DM2 at a district hospital in rural Namibia and to identify predictors of poor diabetes control.

Study Design: Cross-sectional study

Methods: This study evaluated diabetes quality measures including glycemic control, co-morbidity management, diabetes knowledge, and self-management activities. All patients with DM2 who presented to

the outpatient pharmacy from October 2020-January 2021 were enrolled. Data was collected from health record review and patient interview. Predictors of diabetes control were determined through binary and logistic regressions. Control was defined as an A1C <8%. This research was approved by the Ministry of Health and Social Services.

Results: A total of 108 patients were included, but analysis was performed on 84 participants with available A1Cs. Most (60.7%) had poor glycemic control with an average A1C of 10.24%. Fewer than one-third of patients had annual monitoring for A1C (29.8%) and lipids (29.8%). Fewer than 25% were prescribed statins. Most (82%) had hypertension with few (16%) at goal. Foot (11.9%) and eye examinations (13.1%) were performed infrequently. Many (69%) had low diabetes knowledge. The only factor found to predict poor glycemic control was a BMI >25 (OR=1.2).

Conclusion: The quality of care at this district hospital was below the expected standards with significant room for improvement. Pharmacists have a key role in creating systems to improve care, including ensuring adequate monitoring. Further, pharmacists can collaborate with other providers to enhance medication management and empower continued diabetes self-management.

Hematology/Anticoagulation

Mon PM-63. Optimal duration of anticoagulant before de-escalation to aspirin monotherapy for chemoprophylaxis of venous thromboembolism after total joint arthroplasty.

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Introduction: The optimal approach to venous thromboembolism (VTE) chemoprophylaxis after total joint arthroplasty (TJA) remains controversial, especially with modern enhanced recovery practice conferring lower VTE risk. A "step-down" strategy utilizing an initial prophylactic anticoagulant followed by aspirin for the remaining course is increasingly employed. Optimizing this duration may decrease thrombotic and bleeding complications while reducing costs of care for these common surgical procedures.

Research Question or Hypothesis: What is the optimal duration of initial anticoagulant VTE chemoprophylaxis with enoxaparin or apixaban prior to aspirin monotherapy to minimize antithrombotic-related complications after TJA?

Study Design: Retrospective case-control study and regression analysis

Methods: All elective unilateral TJA surgical procedures performed in adults at the study institution between 7/1/15-12/31/21 were screened for inclusion. Patients prescribed an anticoagulant prior to surgical admission, a postoperative prophylactic anticoagulant other than enoxaparin or apixaban, or treatment-dose anticoagulation post-operatively for a non-thrombotic indication were excluded. The primary outcome was a composite of antithrombotic-related complications within 30 days of surgery, including any VTE or arterial ischemic event, readmission for wound complication or any bleeding complication, reoperation for wound complication or bleeding, or transfusion of ≥2 units packed red blood cells. Logistic regression (SAS, v9.4) was used to determine anticoagulant duration associated with lowest composite complication rate while controlling for confounding variables. With a maximum of 6,000 patients and a conjectured composite complication rate of 2%-6%, our final model can include ≤10 statistically significant risk factors.

Results: Study criteria yielded a final population of 5420 patients. The unadjusted model suggests the primary composite complication rate is minimized and constant at approximately 2% across anticoagulant durations of 2-8 days, steadily increasing thereafter.

Conclusion: Conventional durations of anticoagulant VTE chemoprophylaxis after TJA may not be optimal in modern enhanced recovery practice when both thrombotic and bleeding complications are considered. Regression model refinement and subgroup analyses are underway to further analyze the preliminary results.

Sun-65. Retrospective Review of Andexanet Alfa versus 4FPCC for Reversal of DOAC-Associated ICH .

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Introduction: Guidelines recommend direct oral anticoagulants (DOACs) as first-line treatment of Venous Thromboembolism (VTE), but anticoagulation significantly increases the risk of major bleeding. A high mortality complication of major bleeding is intracranial hemorrhage (ICH). Two agents are used for DOAC reversal, andexanet alfa and 4-factor prothrombin complex concentrate (4FPCC). However, there is little data directly comparing the clinical safety and efficacy between the two agents.

Research Question or Hypothesis: The primary objective of this study is to determine if there is a difference in hemostatic efficacy of andexanet alfa and 4FPCC in patients with a factor Xa inhibitor-related ICH.

Study Design: This retrospective, single-center study was conducted at a quaternary academic medical center from September 2017 to March 2022.

Methods: Study data was recorded from the electronic medical record (EPIC, Verona, WI) and stored using REDCap electronic data capture tools. Included subjects were adults with ICH that received either

4FPCC or andexanet alfa for reversal of apixaban or rivaroxaban. The primary outcome was hemostatic efficacy (excellent, good, poor, not reported) determined using physician reviewed CT scans after 4FPCC or andexanet alfa administration. Secondary outcomes assessed included disposition, cerebral performance score, blood product consumption, and the development of a new thrombus.

Results: Among 46 patients included in this study, 15 received 4FPCC (32%) and 31 received andexanet alfa (68%). There was no difference in the proportion of patients with excellent (4FPCC 9 [60%] vs andexanet alfa 16 [51.6%], p=0.61) or poor (4FPCC 1 [6.7%] vs andexanet alfa 5 [16.1%]) hemostasis after administration. There were no significant differences in any secondary outcomes.

Conclusion: This study found no significant difference in hemostatic efficacy between andexanet alfa and 4FPCC. Further studies are needed to clarify the role of each agent in the management of DOAC-related ICH.

Mon AM-73. Aspirin deprescribing in patients on oral anticoagulation for atrial fibrillation or venous thromboembolism: A national survey of clinician practices.

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Introduction: Concomitant use of oral anticoagulation (OAC) and aspirin versus OAC monotherapy increases bleed risk without decreasing thromboembolic events. Weak guideline recommendations and limited data exist for deprescribing aspirin for primary prevention or stable coronary artery disease (CAD) in patients already on OAC for atrial fibrillation (AF) or venous thromboembolism (VTE).

Research Question or Hypothesis: How do aspirin deprescribing practices in patients on OAC for AF or VTE and concomitant aspirin for non-compelling reasons vary among clinicians?

Study Design: Cross-sectional, national electronic survey

Methods: The survey was distributed to pharmacists and providers (physicians, nurse practitioners, physician assistants). Co-primary endpoints were the composite aspirin discontinuation rates in patients on OAC for AF or VTE in primary prevention and stable CAD cases. Key secondary endpoints were clinician comfort level with deprescribing aspirin and availability of institutional protocols.

Results: 304 responses were included: 212 (69.7%) pharmacists and 92 (30.3%) providers. Mean age 35 years, 59.5% female. In the primary prevention cases, pharmacists were more likely to discontinue aspirin than providers (76.7% vs. 54.6%, p<0.001). In the stable CAD cases, there was no difference in composite rates of aspirin discontinuation by pharmacists and providers (41.7% vs. 40.1%, p=0.140). More pharmacists than providers stated that their aspirin deprescribing decisions were independent of whether DOAC or warfarin was used (60.4% vs. 35.9%, p<0.001). Compared to providers, pharmacists were more likely to discontinue aspirin after discussing with patients and other providers (62.7% vs. 47.8%, p=0.016). Only 27.3% of clinicians reported having a protocol to deprescribe aspirin at their institution/clinic.

Conclusion: There are variations in aspirin deprescribing practices among clinicians in patients on OAC for AF or VTE and without compelling indications for aspirin. Further studies and stronger recommendations are warranted to guide clinicians regarding optimal antithrombotic therapy in these scenarios. Lack of institutional protocols for aspirin deprescribing creates opportunities for future quality improvement initiatives.

Mon AM-70. Effect of Chronic Oral Therapeutic Anticoagulation on Thrombotic Morbidity and Mortality in Patients Hospitalized with COVID-19.

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Introduction: Infection with SARS-CoV-2 increases the risk of thrombosis and subsequently mortality. The impact of chronic anticoagulation prior to infection, however, is not well defined.

Research Question or Hypothesis: Does the use of indicated chronic anticoagulation alter morbidity and mortality from thrombotic complications of COVID-19 in hospitalized patients?

Study Design: Single-centered, retrospective chart review from March to December 2020.

Methods: Hospitalized adult patients with a positive COVID-19 test with or without chronic therapeutic anticoagulation were included. Exclusion criteria included pregnancy and hypercoagulable comorbidity not on anticoagulation. The primary endpoint was a combined incidence of venous thromboembolism, arterial thrombosis, myocardial infarction, ischemic stroke, and disseminated intravascular coagulation. Additional endpoints included ventilation or high-flow oxygen requirement, development of acute respiratory distress syndrome (ARDS) or respiratory failure, and bleeding. 152 patients per group would provide 80% power and a two-sided alpha of 0.05 for the primary outcome. Outcomes were analyzed with Chi-square or Fisher's exact tests using SPSS software.

Results: 733 patients were included (453 not on anticoagulation (No-AC) and 280 on chronic anticoagulation (AC)). There were no differences in baseline characteristics between groups except for the Charlson Comorbidity Index score (No-AC: 4.8, AC: 5.8; p < 0.001). For the

primary endpoint, events occurred in 133 patients (29.4%) in the No-AC group versus 27 patients (9.6%) in the AC group ($p < 0.001$). For the secondary endpoints, there were differences in need for ventilation [No-AC: 101 (22.3%), AC: 39 (13.9%); $p = 0.005$] and development of ARDS [No-AC: 252 (55.6%), AC: 124 (44.3%); $p = 0.003$], with no difference in bleed [No-AC: 5 (1.1%), AC: 7 (2.5%); $p = 0.15$].
Conclusion: Patients hospitalized with COVID-19 infection on chronic anticoagulation had lower incidence of thrombosis and mortality.

HIV/AIDS

Tues-57. Real World Efficacy and Safety of 2-Drug Antiretroviral Therapy Switch Regimens in Treatment-Experienced People Living with Human Immunodeficiency Virus in a Minority Population.

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Introduction: Three-drug combination antiretroviral therapy (ART) regimens have dramatically improved the prognosis of people living with human immunodeficiency virus (PLWH). Although 3-drug combinations have been efficacious in the treatment of human immunodeficiency virus (HIV), they are associated with major drawbacks. Recent studies have proposed 2-drug regimens as alternatives to 3-drug regimens to decrease long-term toxicity risks.
Research Question or Hypothesis: What is the efficacy and safety of switching treatment-experienced virologically suppressed PLWH from a three- to a two-drug regimen?
Study Design: This was an observational, retrospective chart review from patients seen at an HIV primary care clinic at an urban academic medical center in Brooklyn, NY.
Methods: All adult PLWH previously on a 3-or 4-drug regimen and switched to a 2-drug regimen between 2018 to 2021 were included. Patients were excluded if they had evidence of ART viral resistance, hepatitis-B virus coinfection, were ART treatment-naïve, or lost to follow up. Primary outcomes included the proportion of patients with maintenance of viral suppression and competent immune function. Secondary outcomes included changes in renal, hepatic, or metabolic parameters, safety, and a cost-savings analysis. Descriptive statistics were utilized to analyze the data.
Results: Eighty-five patients were included in the study. Patients had a median age of 58 years, 45% were female and 80% African American, with many patients having a disease duration between 20 to 30 years. Patients were primarily switched due to optimization of ART regimens or renal impairment. At week 48, 100% of patients were able to maintain viral suppression and competent immune function. The laboratory and metabolic parameters remained consistent throughout the study time-period. There were no reported adverse effects, and all patients were continued on their 2-drug switch regimens.
Conclusion: Two-drug ART switch regimens are efficacious and safe in PLWH who were on a 3- or 4- drug regimen with long disease duration in a minority population.

Infectious Diseases

Mon AM-82. Guideline adherence of therapy for the first episode of *Clostridioides difficile* infection in a tertiary hospital in Taiwan.

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Introduction: *Clostridioides difficile* infection (CDI) is the major infectious cause of nosocomial diarrhea which is associated with prolonged hospital stay, toxic megacolon, and mortality. We reviewed the adherence of therapy for the first episode of CDI according to 2018 updated SHEA/IDSA guideline and identified opportunities for improvement of antibiotic use.
Research Question or Hypothesis: We sought to investigate the prescribing behavior and assess the recurrent rate of CDI in a tertiary hospital.
Study Design: A retrospective study was conducted and included 298 patients between September 1, 2018 and December 31, 2021.
Methods: Patients with first positive nucleic acid amplification test (NAAT) for *Clostridioides difficile* toxin and diarrhea were included by random methods. Patient-related, microbiological, and outcome data were abstracted from clinical databases. The primary outcome was guideline adherence and recurrence rate. Multivariate logistic regression analysis was used for outcome analysis. All statistical analyses were performed using SAS Enterprise Guide version 7.1 (SAS Institute Inc., North Carolina, USA).
Results: Metronidazole was the most commonly prescribed (61.7%) for initial CDI, followed by vancomycin (25.6%), and fidaxomicin (12.7%), respectively. Guideline adherence rate of first episode of CID was 38.3%. On multivariate logistic regression, fidaxomicin therapy had lower recurrence rate as compared with vancomycin and metronidazole therapy (13.6% vs 23.8%, 26.3%, p=0.02). Antibiotic therapy without discontinuation during CDI episode revealed higher recurrent rate as compared with discontinuation group (4.7% vs 1%, $p < 0.05$).
Conclusion: Our investigation disclosed low adherence with 2018 SHEA/IDSA guideline for management of CDI and higher recurrence rate with vancomycin and metronidazole therapy. Handshake

stewardship and case-based education are the key component of comprehensive efforts to improve antibiotic use and guideline adherence.

Sun-81. Real-world Evidence of Virologic Failure in Chronic Hepatitis C Patients Receiving Direct-acting Antiviral Agents.

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Introduction: Taiwan national reimbursement plan has approved the usage of direct-acting antiviral (DAA) agents in hepatitis C virus (HCV) treatment in 2015 due to their effectiveness and tolerability and extended the coverage to all HCV patients since 2017. Since the high costs of DAA agents, treatment failure is particularly a concern.
Research Question or Hypothesis: This study aimed to retrospectively evaluate the effectiveness of DAA agents in chronic hepatitis C (CHC) patients in real-world practice; besides, virologic failure of DAA treatments and the potential predictors for failure were analyzed to provide the real-world evidence.
Study Design: Retrospective observational cohort study
Methods: CHC patients receiving DAA treatments were enrolled from April 2015 to March 2019 at a medical center in southern Taiwan. Sustained virologic response at 12 weeks after completing treatment (SVR12), undetectable HCV viral load, was defined as a primary endpoint. Virologic failure was defined as a non-achievement of SVR12.
Results: Among 758 patients receiving DAAs treatments, the mean age was 63.22 year-old and 311 (41.03%) subjects were male. After adjusting age, gender, HCC history, post-organ transplantation and baseline ALT level by multivariable logistic regression, we found that patients with HCC history had a 4.21-fold risk for virologic failure (95% CI 1.44-12.29, p =0.008). For every unit increase in baseline ALT level, patients had increased risks for virologic failure (aOR 1.01, 95% CI 1.00-1.01, p=0.011).
Conclusion: The finding of this study revealed patients with HCC history were 4.21 times of chance for virologic failure. Besides, patients with higher baseline ALT levels had a significantly increased risk of virologic failure.

Mon PM-75. Risk of Treatment Failure in an Outpatient Parenteral Antibiotic Therapy (OPAT) Patient Population.

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Introduction: Outpatient parenteral antimicrobial therapy (OPAT) is becoming increasingly employed for long term therapy due to its many known benefits, yet less is known about the risks that contribute to a patient failing therapy.
Research Question or Hypothesis: The goal of this study is to determine risk factors for OPAT failure in the outpatient population.
Study Design: This is a retrospective case-control study comparing patients who successfully completed OPAT to those who failed therapy or who were lost to follow up.
Methods: Baseline demographics and clinical outcomes data were collected. The primary outcome was OPAT failure which was defined as a composite outcome encompassing the need for antimicrobial extension, antimicrobial agent modification, or hospital readmission. Bivariate analysis was used to identify factors that increased a patient's risk of failing therapy which was followed by multivariate analysis for significant variables. Additional secondary bivariate analysis identified factors that made a patient more likely to be lost to follow up.
Results: Of the 823 patients included, 40 patients were lost to follow up and 783 were followed through the end of therapy or until failure criteria was met. Seventy-five percent of patients successfully completed therapy. Of the failures, 32.3% required antimicrobial extension, 11.8% required therapy modification, and 55.9% required hospital readmission. Patients infected with vancomycin resistant enterococcus (VRE) (OR: 4.421, 95% CI [1.013–19.290]) or treated with an oxazolidinone (OR: 4.922, 95% CI [1.899–12.823]) were more than four times likely to fail OPAT therapy. Each additional infusion increased failure by nearly 17% (OR: 1.167, 95% CI [1.044–1.304). Additionally, patients who lived further from clinic were more likely to be lost to follow up (80 mi [30.3–130.8] vs. 47 mi [18.7–92.3], p=0.030).
Conclusion: Pharmacists can aid in the success of OPAT via identifying risk factors for failure and recommending safe and effective antimicrobial regimens which require fewer infusions per day.

Sun-77. Safety and Efficacy of Tocilizuamb in Hospitalized Patients with Severe COVID-19: A Retrospective, Single-Center Study.

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Introduction: COVID-19 is a respiratory disease associated with an overproduction of proinflammatory cytokines such as interleukins, leading to cardiovascular collapse, multi-organ dysfunction, and death. Tocilizumab, a monoclonal antibody against interleukin-6, has shown to reduce risk of death for hospitalized patients with severe COVID-19. At the height of the COVID-19 surge, the supply of tocilizumab was limited and many healthcare systems were forced to reserve the medication for the most severe patients.

Research Question or Hypothesis: Does tocilizumab lead to reduced mortality and/or length of stay (LOS) in hospitalized COVID-19 patients without increasing risk of secondary infection or hepatotoxicity?

Study Design: Retrospective, observational, single-center cohort study of COVID-19 hospitalized adult patients.

Methods: Baseline demographics were collected using hospital electronic medical records including comorbidities, oxygen requirements, labs, and concomitant COVID-19 medications from March 2020 to January 2022. Data analysis was performed to determine the odds ratio of mortality, LOS, risk of secondary infection, hepatotoxicity, comorbidity and co-intervention drugs. Chi-square and Student t-test were used for descriptive statistics. Binary logistic regression, MANOVA, and MANCOVA were performed to obtain the odds ratio for efficacy and safety of tocilizumab.

Results: 164 patients were included in the study, 68 (41%) in the tocilizumab group and 96 (59%) in the control group. Baseline data showed significant differences in diabetes, oxygen requirement, lab, and concomitant COVID-19 medications. The odds ratio for mortality was 1.39 (95%CI 1.14-5, p=0.021). Subgroup analysis based on ICU admission was not significant: 0.17 (p=0.758) for ICU and 0.43 (p=0.613) for non-ICU. LOS was prolonged in the tocilizumab group at 13.6 days (p=<0.001). There was no significant risk of secondary infection or hepatotoxicity. Coronary artery disease and piperacillin-tazobactam concomitant use were significant contributing mortality factors.

Conclusion: Among hospitalized patients with COVID-19, receiving tocilizumab did not reduce mortality or LOS. Tocilizumab did not increase risk of secondary infection or hepatotoxicity.

Mon PM-73. Evaluation of a pharmacist-led antimicrobial dose optimization intervention within Medical Intensive Care Units in Thailand.

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Introduction: The intensive care unit (ICU) typically has the highest antibiotic usage rate and meanwhile critical illness can affect the pharmacokinetics and pharmacodynamics of antibiotics. Only limited studies have evaluated the impact of pharmacists-led antimicrobial stewardship program (ASP) in Thailand.

Research Question or Hypothesis: What is the impact of pharmacist-led antimicrobial dose optimization after implementing ASP in medical intensive care units (MICUs).

Study Design: Retrospective study.

Methods: This study was conducted at King Chulalongkorn Memorial Hospital, Thailand. Adults admitted to MICUs from Aug 2020 to July 2021 and received carbapenems, piperacillin/tazobactam, aminoglycosides, colistin, fosfomycin, sulbactam, or vancomycin were included. Prospective audit and feedback from rounding infectious diseases (ID) pharmacists occurred twice weekly. Additionally, ID pharmacists provided presentations on optimal antibiotic dosing once monthly for medical residents. Patients' characteristics were collected, and the primary outcome was the number of prescriptions prescribed according to our dosing guidelines.

Results: There were 604 prescriptions in 376 patients during the study. The mean (SD) APACHE II score was 19.90±6.1. The primary source of infection was pneumonia (50.3%). Meropenem was the most frequently prescribed antimicrobial (65.9%). The ICU mortality rate was 18.6%. 384/604 (63.4%) antibiotic prescriptions were prescribed according to our guidelines. Lack of a loading dose was the leading reason for guideline non-adherence (27.1%). ID pharmacists provided 40 interventions during prospective audit and feedback, 87.5% of which were accepted by the medical team. The most common recommendation was maintenance dose adjustment (60.0%).

Conclusion: We identified significant opportunity for improving antibiotic dosing in our MICUs and implemented education and prospective audit and feedback focused on dose optimization as our first ASP intervention in our MICUs. Although our recommendations for dose optimization were frequently accepted, we still found some nonadherence to our dosing guidelines; additional strategies to optimize dosing are being evaluated.

Tues-62. Impact of antibiotic stewardship on surgical antibiotic prophylaxis: A quasi-experimental study.

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Introduction: Studies evaluating the impact of antibiotic stewardship program (ASP) interventions for surgical antibiotic prophylaxis (SAP) are limited, particularly in Asia where many clinicians believe their patients and microbial resistance are different than in western

countries. The study objective was to evaluate the impact of ASP on surgical site infection (SSI) and antibiotic consumption.

Research Question or Hypothesis: ASP interventions to reduce SAP duration are not associated with an increase in SSI.

Study Design: A quasi-experimental study.

Methods: After ethical approval at an academic hospital in Saudi Arabia, a new ASP intervention targeted post-operative SAP for discontinuation. Surgeries in adults during the pre-intervention period (December 2020-February 2021) and post-intervention period (April-June 2021) were included. Surgeries with implants in place were excluded. The primary endpoint was 30-day SSI, and the secondary endpoints included antibiotic consumption and length of hospital stay (LOS). Chi-square test was used to compare categorical data, while Wilcoxon rank-sum test was used for continuous data (significance level, 0.05) via the SPSS software, version 24.

Results: A total of 245 and 164 surgical procedures were included in the pre- and post-intervention periods, respectively. There were no significant differences in baseline characteristics between the groups. The most common procedures were cesarean section (71.6%), cholecystectomy (15.6%), and hernia repair (8.8%). Cefazolin was used in 90% of surgeries. The was no difference in the 28-day SSI (7.8% vs. 9.1%; P=0.617). The intervention was associated with significantly shorter mean days of SAP (1.84 ± 3.01 vs. 0.39 ± 1.20; P<0.001), and a significantly reduced percentage of inappropriate SAP duration (30.2% vs. 8.5%; P<0.001). The post-operative SAP cost was lower in the post-intervention period (1426.6 vs. 143.7 Saudi Riyals). No significant difference was observed in LOS (3 [3-3] vs. 3 [3-4] days).

Conclusion: The ASP intervention on SAP was associated with significant reductions in the duration and cost of SAP without worsening patient outcomes.

Sun-80. Evaluation of Antibiotic Regimens Used to Treat Uncomplicated Gram-negative Bacteremia Before and After Implementation of Antimicrobial Stewardship Guidance and Rapid Diagnostic Technology.

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Introduction: Uncomplicated Gram-negative bacteremia was often treated for up to 14 days with intravenous or oral antibiotics although recent literature suggests seven days of therapy is non-inferior to longer courses. Antimicrobial stewardship (AMS) interventions and the advent of rapid diagnostic technologies (RDT) like the Accelerate PhenoTest® have promoted shorter durations of therapy (DOT) and quicker de-escalation to definitive agents.

Research Question or Hypothesis: Does the implementation of Gram-negative bloodstream infection guidance and rapid diagnostic technology, in conjunction with active antimicrobial stewardship interventions, reduce duration of therapy for uncomplicated Gram-negative bacteremia?

Study Design: Single-center, retrospective chart review

Methods: Information was collected across three time periods between June 2019 and August 2021 on patients ≥18 years of age. The first cohort was treated for uncomplicated, Gram-negative bacteremia before implementation of an AMS intervention or adoption of RDT, the second after development of Gram-negative bacteremia guidance and prospective AMS review, and the third following RDT adoption and continued AMS review. The primary outcome evaluated was duration of therapy (days) across all three cohorts. Statistical significance for this outcome was determined by one-way measure ANOVA across the three groups.

Results: A total of 126 patients were included across all three time periods examined. A significant decrease in average DOT was occurred after implementation of AMS intervention but no additional decrease in DOT was observed after adoption of RDT (12.53 vs 10.75 vs 10.36 days, p = 0.0039). An apparent decrease in median DOT of empiric therapies following implementation of RDT was observed (3 vs 3 vs 2 days). *Escherichia coli* represented the most isolated organism across all three cohorts (59%), and most bacteremias were attributed to a urinary source (73%).

Conclusion: Implementation of an AMS intervention resulted in a significant decrease in DOT for uncomplicated Gram-negative bacteremia while a subsequent decrease was not observed after RDT became available.

Mon PM-76. Projected Costs of Vancomycin Alternatives for Methicillin-Resistant *Staphylococcus aureus* Bloodstream Infections.

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Introduction: The primary objective of this study was to compare actual infectious disease-related costs with initial vancomycin therapy versus projected costs of an empiric algorithm incorporating vancomycin alternative agents among a patient cohort with methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections (BSIs).

Research Question or Hypothesis: Projected costs will be comparable, if not less, than a historical strategy of initial vancomycin therapy for treatment of MRSA BSI

Study Design: Observational historical cohort study of adult hospitalized patients with MRSA BSI at the Prisma Health-Midlands campuses

between January 1, 2015, and July 31, 2017. Enrolled patients received initial vancomycin therapy within 48 hours from index blood culture and maintained therapy for ≥7 days. Patients were excluded if they had polymicrobial BSI, repeat BSI episode, missing information, or death within 48 hours of index positive culture.

Methods: A local algorithm incorporating vancomycin alternative agents was developed and applied to the historical patient cohort to project who could receive vancomycin alternatives. The primary endpoint was total infectious disease-related costs based on current pricing in 2022 US dollars. Secondary endpoints included incidence of acute kidney injury (AKI) while on vancomycin therapy and previously reported outcome of clinical failure.

Results: A total of 115 patients were included from the historical cohort. Using the algorithm, 27 patients were projected to receive vancomycin, 7 linezolid, 58 daptomycin, and 23 daptomycin and ceftaroline combination empirically. The median projected total infectious disease-related costs using the algorithm were numerically higher than actual costs, but not statistically different (median $4,654.73 vs. $4,238.57, p=0.081). In the historical cohort, AKI and clinical failure occurred in 34 (29.6%) and 37 (32.1%) patients, respectively.

Conclusion: An algorithm that diversifies the empiric anti-MRSA agents used for MRSA BSI resulted in comparable total infectious disease-related costs. Future directions are to implement the algorithm and evaluate clinical outcomes to estimate cost-effectiveness.

Sun-72. Did Eravacycline "IGNITE" a difference among patients with Gram-negative infections, including multidrug-resistant organisms?.

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Introduction: Multidrug-resistant (MDR) *Enterobacterales* and *Acinetobacter baumannii* are urgent threats to public health with mortality up to 50% and attributable annual healthcare costs of $281M. Eravacycline (ERV), a novel synthetic fluorocycline tetracycline, poses a potential option for treatment of MDR Gram-negative organisms. Other than complicated intraabdominal and urinary tract infections, there are limited data regarding the real-world clinical utilization of ERV against other types of infection.

Research Question or Hypothesis: We aimed to investigate the clinical efficacy and safety of eravacycline in Gram-negative infections.

Study Design: A single-center case observational study.

Methods: Hospitalized patients with Gram-negative infections receiving ERV ≥ 72 hours from October 2018 to December 2021 were included. Patients with *Pseudomonas aeruginosa* were excluded. The primary outcome was clinical cure defined as complete resolution of all clinical signs and symptoms. Secondary outcomes were 30-day readmission and incidence of *Clostridioides difficile* infection(s) (CDI) within 30 days of ERV initiation.

Results: We evaluated 19 patients who met inclusion criteria. Seventeen patients required intensive care unit admission. Fourteen (73.4%) patients had pneumonia, followed by 2 (10.5%) patients with bacteremia. We isolated MDR *A. baumannii* from 12 (63.2%) patients, and carbapenem-resistant Enterobacterales from 5 (26.3%) patients. Clinical cure was achieved in 15 (79%) patients. Three (15.7%) patients expired upon discharge unrelated to their infections. One patient failed ERV due to New Delhi metallo-β-lactamase-producing (NDM) *Klebsiella pneumoniae* bacteremia secondary to osteomyelitis. No CDI was observed in our patients, specifically those with multiple high-risk factors [previous broad-spectrum antibiotics, age>65, and previous CDI within 6 months]. No 30-day readmission was observed.

Conclusion: Our study demonstrated that ERV was effective against MDR Gram-negative infections, especially *A. baumannii* and those with high acuity of illness. Caution should be considered when using ERV for NDM-producing pathogens. Further studies are warranted.

Mon AM-81. Pharmacist-led optimal antibiotic use of patients with VRE bacteremia in a tertiary hospital in Taiwan.

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Introduction: Vancomycin-resistant Enterococcus bloodstream infections (VRE BSI) is associated with poor outcomes, longer hospitalization compared with non-VRE BSI, and increased mortality. We examined the impact of pharmacist-led optimal antibiotic use in patients with VRE bacteremia in inpatient department.

Research Question or Hypothesis: Optimization of antibiotic use for patients with VRE bacteremia by using business intelligence (BI) clinical dashboard may improve patients' outcome.

Study Design: This is a prospective study to measure the intervention of pharmacist in patients with VRE bacteremia during March 2020 to October 2021.

Methods: Patient-related, microbiological, and outcome data were abstracted from clinical databases. The primary outcome were interventions of antibiotic choice, dosage regimen and be aware of safety profile. Paired t test analysis was used for outcome analysis. All statistical analyses were performed using SAS Enterprise Guide version 7.1 (SAS Institute Inc., North Carolina, USA).

Results: One hundred and forty patients with VRE BSI were included during study period (mean age 66.9 years, 57.1% male, mean body weight 62.8kg, 67% in ICU). The proportion of pharmacist intervention was 16.9%, of which the recommended category, optimal antibiotic choice was 62.5%, followed by adjustment of daptomycin dosage regimen (29.2%), and monitor of antibiotic adverse effects (8.3%), respectively. The mean dosage of daptomycin before and after the intervention indicated statistical significance (6.9 mg/kg vs 11.2 mg/kg, $p = 0.0014$).

Conclusion: Our study revealed pharmacist-led intervention of therapy in patient with VRE BSI could improve antibiotic use and safety profile with the assistance of BI dashboard. As a future work, we will explore the time to active therapy before and after pharmacist intervention as outcome measure.

Mon PM-77. Evaluation of Dalbavancin at Discharge for Substance Abuse Patients with Acute Bacterial Skin and Skin Structure Infections.

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Introduction: Dalbavancin, a long-acting lipoglycopeptide antibiotic, has previously been shown to reduce hospital length of stay (LOS) through a one-time infusion in the outpatient setting, immediately after discharge for treatment of acute bacterial skin and skin structure infections (ABSSSI). Patients with substance abuse history have increased risk of nonadherence, for which dalbavancin may be useful but data are sparse.

Research Question or Hypothesis: Is there a LOS difference in ABSSSI patients with or without substance abuse receiving a one-time dalbavancin outpatient infusion at discharge?

Study Design: Retrospective, multicenter cohort study

Methods: Patients admitted for ABSSSI from January 2016 to February 2022 at a community health system who were discharged to receive dalbavancin at an outpatient infusion center were evaluated retrospectively. Patients with substance abuse defined as electronic health record documentation of amphetamine, opiate, cocaine or intravenous drug use were compared to non-substance abuse patients. The primary outcome was hospital LOS with secondary outcomes including all-cause and infection-related hospital readmission within 30 days of discharge. Mann-Whitney U test was utilized for LOS while Chi-squared test was used for baseline characteristics and readmissions.

Results: A total of 28 patients with substance abuse and 65 patients without were evaluated. More substance abuse patients were self-pay vs. non-substance abuse patients (64% vs. 12%; p<0.001). Hospital LOS was not different between groups, with a 4 day average (interquartile range 3–6 days, $p = 0.774$). Six substance abuse patients versus 9 non-substance abuse patients were readmitted for any cause ($p = 0.362$). Four substance abuse patients versus 5 non-substance patients were readmitted for an infection ($p = 0.324$).

Conclusion: No statistical difference was found in hospital LOS, all-cause or infection-related 30-day readmission between substance and non-substance abuse patients receiving dalbavancin for ABSSSI at discharge. Dalbavancin may offer a safe, therapeutic option for patients with substance abuse history, especially when oral therapy is not optimal or uninsured.

Sun-70. Determining the Mechanism of Antimicrobial Activity of Quetiapine in *Escherichia coli*.

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Introduction: Antipsychotics are well documented to exhibit antimicrobial activity. We recently reported that exposing *Escherichia coli* to the second-generation antipsychotic (SGA) quetiapine promoted cross-resistance to multiple antibiotics; however, through an unknown mechanism. Given the chronic treatment duration and known antimicrobial activity, it is important to clinical pharmacy to determine how SGAs induce antimicrobial resistant (AMR) phenotypes.

Research Question or Hypothesis: Preliminary analysis of *E.coli* isolates from six-week quetiapine exposure found altered responses to membrane stress. We hypothesize quetiapine targets cell membranes, which activates pathways for stress responses and faulty DNA repair, promoting AMR.

Study Design: *In vitro* longitudinal analysis of *E. coli* response to quetiapine.

Methods: We measured mRNA levels via RT-qPCR. We examined membrane stress by tracking growth in LB containing 0.01% SDS and 0.15 mM EDTA. Minimal inhibitory concentrations (MICs) were determined by the broth microdilution method in LB with or without 100 μg/mL quetiapine.

Results: Transcriptional analysis of the quetiapine-exposed isolates showed increases in *soxS* (p=0.022), *katG* (p=0.031) and *rpoS* (p=0.031) expression, indicating altered activity of stress pathways. Whole-genome sequencing also identified loss-of-function mutations in genes that detect cell membrane stress, such as *marR* (repressor for the *marRAB* operon). When grown in media containing SDS/EDTA, they exhibited increased membrane stress sensitivity compared to the

wild-type strain. To investigate the mechanism, we exposed the wild-type strain to quetiapine and analyzed short-term transcriptional response. Within 30 minutes, *marA* expression increased (by derepression of MarR; p=0.002), suggesting quetiapine acts against cell membranes. However, overnight exposure was not sufficient to induce AMR phenotypes nor alter membrane stress sensitivity.

Conclusion: Quetiapine rapidly activates the *marRAB* pathway in *E. coli* to signal membrane stress. Chronic quetiapine exposure may lead to altered sensitivity to membrane stress and activity of stress response pathways to promote AMR.

Mon PM-71. Impact of Pharmacist-led Multidisciplinary Team to attain targeted vancomycin Area Under the Curved monitoring in a tertiary care center in Thailand.

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Introduction: Vancomycin therapeutic drug monitoring has been recommended to ensure therapeutic outcomes and minimize the risk of nephrotoxicity by using Area Under the Curve (AUC) monitoring rather than traditional trough concentration guided dosing. However, pharmacist-led multidisciplinary team (PMT) on vancomycin AUC monitoring has not been well established in the resource limited setting (RLS).

Research Question or Hypothesis: The attainment of targeted vancomycin AUC monitoring using PMT on vancomycin AUC monitoring is higher than traditional concentration guided dosing in RLS.

Study Design: A quasi-experimental study

Methods: This study was performed at Thammasat University hospital between April 2020 – March 2021. Adult patients who admitted and received intravenous vancomycin were included. Pre-PMT period (April 2020 – Sep 2020) was defined as a period that use traditional trough concentration guided dosing while post-PMT period (October 2020 – March 2021) was defined as a period that use PMT to monitor vancomycin AUC. The PrecisePK program was using for Bayesian approach to estimate AUC. Our primary outcome was percentage of achievement of therapeutic target which classified as an AUC/MIC ratio of 400-600. Data collected include proportion achievement of therapeutic target vancomycin, clinical cure, 30-day mortality. Chi-square test was used to analyze categorical data and T-test was used to analyze continuous data.

Results: Overall, 210 patients were included. Baseline characteristics were similar in both groups. Compared to pre-PMT period, there is a significant higher achievement of therapeutic target vancomycin AUC during PMT period (66.7% vs 34.3%, P<0.001). During PMT period, there are significant improvement in clinical cure (92.4% vs 69.5%, P<0.001) and reduction in 30-day mortality compared to pre-PMT period (2.9% vs 12.4%, P = 0.017).

Conclusion: Our study demonstrates that PMT was effective to help achieved targeted vancomycin AUC, improvement in clinical cure and reduction in 30-day mortality. This intervention can be implemented in RLS.

Mon AM-80. Ceftriaxone-resistant Enterobacterales bloodstream infection: Can we do Intravenous to oral antibiotic conversion?

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Introduction: The prevalence of ceftriaxone-resistant Enterobacterales bloodstream infection (BSI) is increasing globally. There are limited data on intravenous (IV) to oral antibiotic conversion in ceftriaxone-resistant Enterobacterales, especially BSI.

Research Question or Hypothesis: What is the outcome in ceftriaxone-resistant Enterobacterales BSI treated with IV or IV to oral antibiotic conversion?

Study Design: A 5-years retrospective cohort study was conducted at King Chulalongkorn Memorial Hospital, Thailand

Methods: Patients who were ≥18 years of age were hospitalized in general medical wards with ceftriaxone-resistant Enterobacterales BSI with source control and no need for prolonged antibiotic therapy between August 1, 2015, to July 31, 2020. The gastrointestinal tract of patients was intact were included. All factors associated with treatment failure were assessed by logistic regression (statistically significant P < 0.05).

Results: Of 233 patients, 83 (35.6%) patients were in the IV to oral antibiotic conversion group. The median (IQR) age was 74 (63-82) years. The urinary tract was the common source of infection (47.6%). The leading pathogen was *Escherichia coli* (85.8%). Ciprofloxacin was the highest prescribed oral antibiotic (51.8%), followed by amoxicillin/clavulanic acid (36.2%). The overall treatment success rate was 91.4%. There were no significant differences in treatment success rates between the two groups (92% in intravenous VS 90.4% in intravenous to oral conversion, $P = 0.669$). Independent predictors of treatment failure in IV to oral antibiotic conversion group by univariate analysis

included preexisting factors with liver disease (OR =2.84), solid cancer (OR = 3.05), hospital-acquired infection (OR = 2.29), and Charlson Comorbidity index score (CCI) ≥ 5 (OR =3.27).

Conclusion: IV to oral antibiotic conversion can be considered in patients with ceftriaxone-resistant Enterobacterales BSI. Patients with preexisting factors with liver disease, solid cancer, hospital-acquired infection, and CCI score ≥ 5 may not be ideal criteria for this approach. Future research is needed in a randomized controlled trial.

Mon AM-79. Antibiotic Modifications and Health Care Utilization Outcomes among Patients Prescribed Antibiotics on Discharge from the Hospital to Nursing Homes.

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Introduction: Approximately half of nursing home (NH) antibiotics are initiated in hospitals. However, little is known about outcomes associated with these antibiotics following NH admission.

Research Question or Hypothesis: What are the frequencies of antibiotic modifications, emergency department (ED) visits, and hospital readmissions among patients prescribed antibiotics on discharge from the hospital to NHs?

Study Design: Retrospective cohort study among adult (age>18 years) patients discharged from an acute care hospital to a NH with an antibiotic prescription between January 1, 2016, and December 31, 2018. We included 8 acute care hospital sites in Oregon and Washington and 13 NH sites in Oregon.

Methods: Two student pharmacists manually reviewed NH electronic health records to collect data on antibiotic modifications and hospital readmissions/ED visits within 30 days of NH admission. We also assessed whether these readmissions/ED visits were infection- or antibiotic-related; defined as documentation of an infection in the patient's progress notes or discharge summary.

Results: Overall, 191 patients received 225 antibiotic prescriptions on discharge from the hospital to a NH. Mean (standard deviation) age was 76 (12) years and 67% were female. Approximately 14% (31/225) of antibiotic prescriptions were modified following NH admission: 9 (29%) were discontinued early, 13 (45%) were continued beyond the initially prescribed duration, 6 (21%) were switched to a new antibiotic, and 5 (17%) had ≥1 antibiotics added. Of the 191 patients, 38 (20%) patients were readmitted to the hospital (n=32) and/or had an ED visit (n=28) within 30 days of NH admission. Of these hospital readmissions/ED visits, 39% (15/38) were infection- or antibiotic-related.

Conclusion: Only 14% of hospital-initiated antibiotics were modified following NH admission. These data suggest low modification need or low awareness of opportunity to modify antibiotic regimens initiated in hospitals.

Tues-64. Gram negative bacteremia in a general hospital in Qatar: Epidemiology, susceptibilities, and outcomes.

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Introduction: Gram-negative bacteremia (GNB) is a major cause of morbidity and mortality in hospitalized patients. Emerging resistance among bacteria pose a significant challenge for treatment. Therefore, this study is important for identifying the current status of gram negative bacteremia in our hospital in terms of prevalence, resistant organisms and treatment outcomes.

Research Question or Hypothesis: What is the epidemiology, antimicrobial susceptibility patterns and clinical outcomes in hospitalized adult patients with gram-negative bacteremia?

Study Design: Retrospective study.

Methods: A retrospective observational study in a 320-beds general hospital. We identified all adult patients with gram negative bacteremia in 2 years (January 2019 to December 2020). Our primary outcomes included the percentage of cured patients, deaths and recurrence.

Results: We analyzed 358 patients with GNB, majority being males (60%) and a mean age of 50.9 years. Urinary tract infections constituted most of the sources (39.6%) followed by intra-abdominal infections (28.4%) and lower respiratory tract infections (10%). Twelve percent needed intensive care during their hospitalization. The mean duration of treatment was 14 days ± 2 days. Source control was done in 35.7% of patients, where as most (75.9%) infections were treated with antibiotics only. The most common isolated organisms were Escherichia-coli (47.2%) followed by Klebsiella Pneumoniae (16.4%), Salmonella Typhi (10.6%) and Psuedomonas Aerogenosa (7.8 %). Among all the isolates, 66% were pan-sensitive strains, 28% were extended spectrum beta-lactamase (ESBL) producing bacteria and 6% were multi drug resistant organisms (MDRO). Polymicrobial bacteremia occurred in 6% of cases. We found that most (76 %) infections

were cured, recurrence within 90 days occurred in 6 % patients, whilst in hospital mortality was 10 % and 8 % had unknown outcome.

Conclusion: GNB remains a concern with significant mortality and morbidity. Due to the variability among patient populations, immune status and prior antimicrobial use, it is necessary to optimize antibiotic treatment though analysis of local trends and epidemiology.

Sat-47. Outcomes associated with secondary *Staphylococcus aureus* infection in COVID-19 patients.

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Introduction: Among COVID-19 patients, bacterial infections are associated with significant morbidity and mortality. *Staphylococcus aureus* is the principal pathogen causing bacterial infections in COVID-19 patients. Typically, clinical outcomes between methicillin-resistant *S. aureus* (MRSA) and methicillin-susceptible *S. aureus* (MSSA) infections have demonstrated worse outcomes with MRSA. Outcomes of MRSA vs. MSSA remain limited in COVID-19 patients.

Research Question or Hypothesis: We sought to evaluate clinical outcomes among COVID-19 patients with MRSA vs. MSSA infections.

Study Design: Observational, retrospective cohort

Methods: Hospitalized adults with confirmed COVID-19 and secondary *S. aureus* infections were evaluated from January 2020 to July 2022. Secondary infection was defined as a positive culture 48-hours after COVID-19 diagnosis. Cohorts were stratified by *S. aureus* susceptibility and pandemic year. Primary outcome was in-hospital all-cause mortality. Secondary outcomes included 30-day mortality, all-cause intensive care unit (ICU) mortality, and 60-day hospital readmission.

Results: A total of 108 adults met the study criteria, 33 (30.5%) MRSA and 75 (69.4%) MSSA patients. At baseline, 84 (78%) patients were in the ICU with a mean APACHE-II score of 34.21±19.53. Six patients (5.6%) received at least 1 dose of mRNA vaccine. Primary sources of infection included respiratory (68%) and blood (25%), with no differences between cohorts. There was no statistical difference in in-hospital all-cause mortality (51.5% vs. 62.7%, p=0.37), 30-day mortality (60.6% vs. 66.7%, p=0.61), all-cause ICU mortality (51.5% vs. 62.7%, p=0.37) and 60-day readmission (6.1% vs. 6.7%, p=0.92) between MRSA and MSSA, respectively. Mortality remained high when stratified by pandemic year 56.2% (2020), 68.2% (2021), and 46.2% (2022); p=0.619.

Conclusion: Unlike patients without COVID-19, no significant differences in MRSA and MSSA outcomes were found. Mortality remained high in patients with secondary *S. aureus* infections throughout the study period. Further investigations are warranted to determine if COVID-19 patients respond differently than non-COVID-19 patients regarding the type of *S. aureus* secondary infection.

Mon PM-72. Comparison of Methicillin-Resistant *Staphylococcus aureus* Nasal Screening Predictive Value in the Intensive Care Unit and General Ward.

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Introduction: The clinical utility of Methicillin-resistant *Staphylococcus aureus* (MRSA) nasal screening appears promising in mitigating unwarranted empiric therapy. However, a paucity of data remains on the diagnostic performance in the intensive care unit (ICU) for pneumonia and bacteremia.

Research Question or Hypothesis: The purpose of this study was to compare the predictive value of MRSA nasal screening for pneumonia and bacteremia in ICU and general ward patients.

Study Design: Multicenter, retrospective cohort study

Methods: Patients ≥18 years with MRSA nasal screening ≤48 hours of collecting a respiratory and/or blood culture with concurrent initiation of either vancomycin or linezolid were included over a 23-month period. The primary endpoint was to compare the negative predictive value (NPV) associated with MRSA nasal screening between ICU and general ward patients with suspected pneumonia. Secondary aims compared the diagnostic performance of MRSA nasal screening between study populations for suspected bacteremia as well as evaluate the clinical impact on anti-MRSA therapy duration.

Results: A total of 5106 patients representing the ICU (n=2515) and general ward (n=2591) were evaluated. The NPV of the MRSA nares for suspected pneumonia was not significantly different between ICU and general ward patient populations (98.3% and 97.6%, respectively; p=0.41). The MRSA nares screening tool also had a high NPV for suspected bacteremia in ICU (99.8%) and general ward groups (99.7%) (p=0.56). The overall MRSA prevalence among patients with

suspected pneumonia and bacteremia were 5.6% and 0.7%, respectively. Among patients with a negative MRSA nares result, the total duration of anti-MRSA therapy in the ICU and general ward group was 4.0 (1.6-11.9) and 3.0 (1.5-6.2) days, respectively (p<0.0001).

Conclusion: Our findings support the routine clinical utility of MRSA nasal screening for pneumonia in critically ill adults. However, further research is warranted on the diagnostic performance for suspected MRSA bacteremia in ICU patients.

Sun-78. A Comparative cost analysis of trough-based vancomycin monitoring versus AUC/MIC estimated with first-order pharmacokinetic equations.

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Introduction: Although recent evidence has suggested better clinical outcomes with area under the curve (AUC)-guided vancomycin dosing and monitoring, costs of AUC calculation has been seen as a barrier to its implementation, particularly in middle-income countries.

Research Question or Hypothesis: Is there a difference in total costs of vancomycin dosing and monitoring between trough-guided and AUC/MIC-guided monitoring?

Study Design: Single center, retrospective cohort study in Brazil.

Methods: Adult patients (≥18 years) with preserved renal function who received ≥72 hours of vancomycin from January/2019 to December/2021 were divided into two groups according to monitoring method. AUC was estimated using 2 steady-state serum concentrations and first-order kinetics equations. The primary outcome was total cost of vancomycin therapy and monitoring from the perspective of the hospital, which included costs of cumulative doses, laboratory fee, materials used in blood collection, nursing time for collection and pharmacist time for result interpretation. Costs were assessed in Brazilian reais and then converted to US dollars (exchange rate: 0.177). Mann-Whitney U test was performed for continuous variables using GraphPad Prism software, with significance defined as a P-value <0.05.

Results: A total of 144 patients were included, with 68 patients in the AUC/MIC based monitoring group and 76 patients in the trough-based monitoring group. There were no significant differences between groups regarding baseline serum creatinine, duration of vancomycin therapy and cumulative vancomycin dose ($P > 0.05$). The median (interquartile range) of total vancomycin drug and monitoring cost was $298.32 (IQR 153.81 – 429.85) for the AUC/MIC–based group compared to $285.59 (IQR 198.81 – 435.57) for the trough-based group ($P = 0.9658$).

Conclusion: Total costs of vancomycin AUC/MIC-based dosing and monitoring using 2 steady-state serum concentrations and first-order kinetic equations were equivalent to the trough-based strategy. This approach is a feasible alternative for limited-resource institutions that intend to transition to AUC/MIC-guided monitoring and cannot afford Bayesian software costs.

Managed Care

Mon AM-85. Quantifying the Rate of Pharmacist-actionable Interventions after Implementation of a Pharmacy Trainee-based Clinical Service for Quality Improvement.

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Introduction: Ambulatory care pharmacists providing patient care services have limited opportunities for direct revenue generation in traditional fee-for-service payment models; however, value-based payment models have created opportunities for pharmacists to leverage their pharmacotherapy expertise to improve patient- and population-level outcomes and generate revenue. Though pharmacy services have demonstrated improved patient outcomes, pharmacistsÕ ability to make extensive, population-level interventions may be limited due to patient volume and other clinical and academic commitments. Delegation of patient care activities to trainees has the potential to extend the pharmacists' capacity to improve outcomes and increase payment from contracted payers.

Research Question or Hypothesis: What is the rate of pharmacist-actionable interventions in a managed care population after implementation of a pharmacy trainee-based clinical service?

Study Design: Single-center, retrospective cohort study.

Methods: Pharmacy trainees used insurer-generated population lists to conduct telehealth outreach to patients not meeting health plan quality measures at an urban, academic medical center. Interventions were documented in the electronic health record and retrospectively quantified and categorized. Outcomes assessed included rate and type of interventions, number of contact attempts, and time spent.

Results: Of the 179 patients included, 52% were female, the mean age was 59 years, 87.2% had diabetes, 83.8% had hypertension, and 14.5% had atherosclerotic cardiovascular disease. The total number of interventions was 394, and the total time spent was 3995 minutes. The rate of interventions was 5.9 interventions per hour. An average of 30.3 minutes were spent, and 1.4 contact attempts were made per patient. The most common interventions included counseling (103), recommendations (102), lab orders (74) and referrals (70).

Conclusion: The implementation of a pharmacy trainee-based clinical service generated a large quantity of pharmacist-actionable interventions and expanded the capacity of clinical pharmacists performing population health outreach at an urban, academic medical center.

Future studies are needed to evaluate the impact on associated quality measures and revenue generation.

Medication Safety

Mon PM-80. A Patient Activation Approach towards Reducing Medication Harm among Older Adults – A Pilot Study.

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Introduction: New patient-driven deprescribing approaches are being utilized to protect seniors from medication harm. An educational video intervention was developed through community-based participatory research to improve participants' medication self-advocacy skills.

Research Question or Hypothesis: To describe attitudes toward deprescribing, level of alertness to medication problems, and patient perceived self-advocacy skills to address medication related harm after viewing an educational video.

Study Design: Serial cross-sectional survey following an educational video intervention.

Methods: Patients ≥65 years old at two primary care clinics were recruited through mail and/or email to view the educational video. Following review of the video a baseline survey was completed that included the following modules: 1) baseline demographics; 2) video intervention feedback; 3) alertness to medication problems module; and 4) the Patient Attitudes Toward Deprescribing instrument. A follow up survey assessing experience with self-advocacy skills regarding medication related harm was sent to those who completed the baseline survey 1 month after the initial baseline mailing was returned. Response rate was calculated for each survey. Descriptive statistics were utilized to summarize the data. Statistical analyses were conducted using SAS Software Version 9.4.

Results: The usable response rate was 406 (12.4%) and 242 (59.6%) for the baseline and follow up surveys respectively. Most respondents were 65-74 years old 257 (63%), female 237 (58%), and took 3-5 medications 164(40%). The majority 392 (97%) of respondents agreed that the video helped them understand how to be alert for adverse reactions caused by medications. Among respondents taking medications, most endorsed a willingness to deprescribe medications if their doctor said it was possible 351 (89%). On the follow up survey, 223 (92%) of respondents felt confident they would be able to talk to their doctor about medication related concerns.

Conclusion: Following an educational video intervention, patients reported a high level of confidence in self-advocacy skills to address medication related harm.

Tues-68. Hospitalisation and associated costs of gastro-intestinal bleeding from primary prevention aspirin use in South Australia – a retrospective case series analysis.

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Introduction: Aspirin is well-known for its association with gastro-intestinal bleeding (GIB). Recent guidelines for primary prevention aspirin restrict use to selected high-risk groups and discourage use in those >70 years.

Research Question or Hypothesis: What is the extent and cost of hospital admissions for GIB associated with unwarranted use of primary prevention aspirin?

Study Design: Three metropolitan hospitals, 6-month period, retrospective, case-series analysis.

Methods: Primary diagnosis GIB was identified via ICD10 case-mix codes and confirmed via case-notes. Patients with pathological causes for GIB or taking other gastro-corrosive medications were excluded, along with previous myocardial infarction, transient ischemic attack, ischaemic stroke, ischemic heart disease, peripheral vascular disease, haematological disease requiring aspirin use and postsurgical deep vein thrombosis prophylaxis. Individualized hospital admission costing was from the state Hospital Pricing Authority activity-based funding database. National exposure extrapolation was based on beds at the study hospitals capable of management of GIB (acute referral, public acute A, and public acute B) as a proportion of national beds available and population statistics at the time of the study.

Results: Twenty-two patients met the criteria for primary prevention aspirin GIB, representing 7.4% of all hospitalisations for drug-related GIB. All patients had a Naranjo score of 7 (probable ADR), 68% were >70 years, 91% were >60 years, carried little co-morbidity per Charlson score, used 100mg daily, and 41% received concurrent proton pump inhibitors. Mean hospital admission cost was AUS$6,769 (95% CI $5,198-$8,340). Conservative national estimations indicated 1,200 admissions annually at a cost of AUS$8.12 million.

Conclusion: Primary prevention aspirin use contrary to recent guideline changes in low-risk patients results in significant patient harm and

healthcare cost. Realignment of clinical practice with this recent guideline change requires clinicians to adjust long-held clinical beliefs and pharmacists should be vigilant in recognizing this opportunity for deprescribing.

Tues-32. Opportunities for improving quality of care during discharge from the acute care setting by reducing medication risk.

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Introduction: To optimize limited clinical pharmacist resources, many risk scores are used to stratify inpatients, but most do not reduce risk. The medication risk score (MRS) used in this study can be used for risk reduction and has been shown to identify inpatients at high risk for readmission, setting the stage to prioritize patients for intervention. To ascertain its possible impact on pharmacotherapy risk reduction in acute care, we evaluated interventions devised using the MRS. Results from this study will justify utilizing the MRS to properly allocate limited healthcare resources at discharge transitions of care.

Research Question or Hypothesis: What is the potential reasonable MRS reduction in high-risk inpatients, and what are the most common recommendation types identified?

Study Design: Single-center, retrospective qualitative study

Methods: We performed safety assessments on pharmacotherapy profiles of medical inpatients with an MRS of ≥ 15 (intermediate or worse risk) discharged home within ten months. The primary outcome was total MRS reduction per patient. Secondary outcomes included descriptive analysis of recommendation types, medication-related problems, and severity, categorized according to previously used methods. All statistics, which are descriptive, were performed using SAS software. Analyses were also stratified by age ≥65, comorbidities, and baseline risk classification to explore present patterns.

Results: One hundred forty-three patients were included in the study with an average age of 67 ± 14 years and 12 ± 3.9 discharge medications. The average reduction in MRS was 4.8 ± 3.5. Of 305 total recommendations, the most common were to discontinue medication (n=147), change the time of administration (n=75), and start alternative therapy (n=72).

Conclusion: This study showed that patient safety-oriented recommendations identified with the MRS have the potential to reduce pharmacotherapy regimen risk in high-risk patients discharged home from the acute care setting. The top three most common recommendations in our inpatient study are similar to those in outpatient studies.

Sun-87. Evaluation of Pulmonary Hypertension Inpatient REMS Compliance after Implementation of an Optimized Electronic Medical Record Order Set.

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Introduction: Treatment for pulmonary arterial hypertension (PAH) includes medications with risk evaluation and mitigation strategies (REMS) programs. Inpatient REMS-certified pharmacies must comply with inpatient dispensing criteria and agree to participate in random audits.

Research Question or Hypothesis: Implementing a system-wide PAH medication policy with computerized provider order entry (CPOE) decision support will improve REMS compliance for inpatient pharmacies.

Study Design: Quasi-experimental study comparing REMS compliance before and after optimizing CPOE decision support in August 2019.

Methods: Patients > 18 years of age with a diagnosis of PAH were included if they received at least one dose of an endothelin receptor antagonist or riociguat while hospitalized during August 2017–July 2021. The primary outcome was compliance rate with REMS between groups. Secondary endpoint included time to REMS compliance. Exploratory analysis was performed to identify factors associated with failed or delayed REMS compliance. Descriptive statistics were used to analyze outcomes. Multivariable regression analysis was used to determine independent risk factors for failed or delayed compliance. Statistics were analyzed using SPSS.

Results: 75 and 75 patients were included in the pre- and post-groups, respectively. Compliance increased from 50% to 92% between pre and post groups, respectively ($p < 0.001$). Time to compliance was 770 and 140 minutes between the pre- and post- groups, respectively ($p = 0.031$). Factors independently associated with REMS compliance were the post- intervention group (OR 16.9; 5.8–49.2) and being admitted to a PAH center of excellence (OR 7.8; 2.9–21.2).

Conclusion: Health-system policies and CPOE decision support improved both rate and time to compliance with inpatient REMS dispensing procedures.

Mon AM-86. A Scoping Review of the Criteria for Causality Assessment of Drug-Associated Acute Kidney Injury: Temporal Sequence and Baseline Serum Creatinine.

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Introduction: Identifying drug-associated acute kidney injury (D-AKI) requires consistent criteria in research to allow for comparisons of prevalence. The extent of variation in criteria for the causality assessment of D-AKI is unknown.

Research Question or Hypothesis: We believe there are discrepancies in the criteria for causality assessment of D-AKI.

Study Design: This was a scoping review.

Methods: PubMed was searched for studies published between January 2011-December of 2021 that evaluated D-AKI with specific mention in the title of the manuscript. Inclusion criteria were retrospective studies of patients who were hospitalized. Two reviewers (IZ, CS) independently screened 391 references for inclusion. A third reviewer assessed discrepancies, as needed (SKG). Specifics about the criteria for D-AKI including baseline serum creatinine and temporal sequence assessments for drug causality were extracted from each manuscript.

Results: Twenty-two studies were included. Fourteen (64%) studies provided a clear temporal sequence assessment linking nephrotoxic drug exposure to an AKI event for vancomycin, non-steroidal anti-inflammatory drugs, angiotensin-converting-enzyme inhibitors, angiotensin II receptor blockers, or diuretics. We provide four categorizes for temporal sequence criteria from the 22 studies including 48 hours (23%), 7 days (18%), other (23%), and none (36%). Four categories for baseline serum creatinine were utilized: 2 days (9%), most recent prior to admission (27%), most recent after admission (23%), and none (41%). No published causality tools were used to support D-AKI assessment.

Conclusion: Criteria for D-AKI assessment is inconsistent in the literature with a lack of agreement in temporal sequence or criteria for baseline serum creatinine creating challenges in comparing prevalence rates between studies.

Tues-71. Potato-Potato: Evaluation of Multiple Prescription Drug Monitoring Information Sources in an Electronic Medical Record.

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Introduction: Medication histories help make safer prescribing decisions. Controlled substance (CS) histories may be readily accessible through multiple sources. Each have different data exchange protocols that can result in inconsistent information quality (i.e., timeliness and accuracy). Most users of these information sources may not be aware of these differences and inaccurate information can effect clinical decision making.

Research Question or Hypothesis: Do differences in data quality exist between three common sources of readily available controlled substance fill data?

Study Design: Retrospective cohort study

Methods: Three sources of medication histories were evaluated for comprehensiveness (most up to date and complete). A convenience sample of 10 patients prescribed CSs by an academic medical center's Sickle Cell clinic located in Illinois were used to search the Illinois PMP online portal (IL PMP), the IL PMP Epic integration (PDMP Review), or EHR integrated medication history tools provided by Surescripts (Dispense History). Over identical time periods the timeliness (earliest measurement date from all sources – earliest measurement date from specific source) and accuracy (max number of measurements from all sources – number measurements from specific source) was determined for: medication fill dates, number of medications, number of fills per medication, and number of prescribers per medication.

Results: No single source provided a comprehensive CS fill record for all patients and medications. On average, IL PMP and PDMP Review contained more missing fill records compared to Dispense History (3.2, 1.8, and <0.1 missing fill events per patient). PDMP Review contained the least timely records, with an average lag of 32 days behind the most timely records per patient.

Conclusion: Significant differences in data quality exist between readily available sources of pharmacy medication histories. This may increase the risk of making prescribing decisions with incomplete information. Education on proper use of these tools and efforts to improve quality are required.

Mon AM-87. The Appropriateness of Empiric Treatment of Urinary Tract Infections in a Tertiary Teaching Hospital in Jordan: A Cross-Sectional Study.

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Introduction: Urinary tract infections (UTIs) are among the most common infections among the adult population. If appropriately adopted and interpreted, diagnostic measures can help optimize UTI management.

Research Question or Hypothesis: To evaluate the appropriateness of UTIs empiric treatment based on microbial culture data and susceptibility testing.

Study Design: This cross-sectional study was conducted at Jordan University Hospital (JUH) to evaluate the appropriateness of UTIs empiric treatment. All urine cultures requested for adult patients (≥18 years) admitted to JUH from January 2019–to July 2021 were reviewed (n = 6950), and only cultures with positive episodes were considered (n = 2400).

Methods: After obtaining ethical approval from JUH, data on the prescribed empiric antimicrobials were collected from patients' medical records, among other clinical and demographic data. Any change in the selection of antimicrobials following the urine culture and susceptibility results were also documented.

Results: Among patients with positive culture episodes (n = 2400), 1600 patients (66.7%) were discharged before the availability of

culture results and were excluded from the study. Of the remaining 800 eligible patients, 701 (87.6%) received empiric treatment. In 26.8% of patients (n = 214), the prescribed empiric agents failed to have appropriate coverage of the identified pathogens. In 14.6% of the cases (n = 117), the identified microorganisms were reported as resistant to the prescribed empiric agents. Only 13.4% of the patients (n = 107) received appropriate empiric antibacterial agents for their UTIs. We were unable to assess the appropriateness of treatment for one-third (n = 263, 32.9%) of patients since no susceptibility tests were performed.

Conclusion: This study revealed an alarmingly high rate of inappropriate treatment of UTIs, which can encourage the emergence of bacterial resistance and affects health-related outcomes negatively. Antimicrobial stewardship programs must be applied to optimize antibiotic consumption in hospital settings.

Sun-85. Medication-related incidents in acute care setting hospitals in different age groups: analysis of national patient safety incident report data.

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Introduction: A nationwide analysis of medication errors (ME) has not been performed in Korea using the national reporting system. In addition, only a few studies have compared the ME patterns by age group.

Research Question or Hypothesis: The medication incidents data may show the age-specific pattern.

Study Design: This study was a cross-sectional study for analysis of medication incidents.

Methods: We analyzed reported medication-related incidents in acute care setting hospitals from July 2016 to December 2020 using the Korea Patient Safety reporting and learning system (KOPS), which is a patient safety reporting system. The stages of the medication use process, type of errors, medication class involved in MEs, and the degree of harm were analyzed using SAS (version 9.4; SAS Institute, Cary, NC, USA).

Results: Among a total of 5071 cases, 37.7% (1,911 cases) were incidents that caused patient harm and 1.2% caused long-term, permanent and fatal harm. The proportion of medication-related incidents that resulted in harm was the highest among the age group under 1-year-old (67 cases, 51.5%), followed by the elderly 40.9% (828 cases). The cases leading to patient death were most frequently reported in patients aged 65 years or older.

Medication incidents originated mainly from the administration stage (2,954 cases, 58.3%), and the wrong dose was the most frequently reported ME type overall. The most prevalent medication class involved in the age group 20-64 years (256 cases, 11.7%) was 'antibacterial for systemic use', whereas 'contrast media' (236 cases, 11.6%) and 'blood substitutes and perfusion solutions' (98 cases, 19.3%) were the most prevalent drug class in the age group 65 years and older and age group of less than 20 years, respectively.

Conclusion: It is necessary to establish guidelines for the prevention of medication incidents according to the medication use process and patient age group.

Tues-72. Develop a risk model to predict QTc prolongation for cancer patients first use of BCR-ABL and vascular endothelial growth factor inhibitors.

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Introduction: Cancer patients treated with oral tyrosine kinase inhibitors (TKIs) might encounter higher incidences of QTc prolongation or even lead to severe cardiotoxicities, including Torsade de Pointes and sudden cardiac death.

Research Question or Hypothesis: Can we identify an appropriate risk prediction model of QTc prolongation for those patients treated with oral TKI using real-world data in a clinical setting?

Study Design: This is a retrospective cohort study conducted to assess those patients who were initially prescribed with the listed five TKIs, i.e., BCR-ABL inhibitors (imatinib, nilotinib and dasatinib) and VEGF inhibitors (sunitinib and sorafenib) between January 2016 and December 2020 at China Medical University Hospital (CMUH).

Methods: Of those assessed cancer patients, the QTC prolongation was defined as ≥ 450 millionsecond (ms) for male and ≥ 470 ms for female using Bazett's formula. Their demographics, diseases, laboratory findings, and co-medications were collected to explore the appropriate models. Splitting data as 70% training and 30% validation datasets, logistic regression through standardized backward elimination approaches were performed to construct prediction models using SPSS version 25. The AUROC (Area Under Receiver Operating Characteristics Curve) obtained from training dataset, and the accuracy obtained from validation dataset were used to evaluate the performance of prediction model.

Results: Among 400 patients included for further analysis, 42% occurred QTc prolongation after taking listed TKIs initially. Afterward, the risk model with 12 parameters (including QTc interval prolongation at baseline, serum calcium, serum potassium, ECOG, INR, polypharmacy and arrhythmia) were identified as the best model. The AUROC and accuracy were 0.9 and 0.84, respectively.

Conclusion: Given this is the first risk prediction model identified from real-world clinical data in Taiwan, it is necessary to verify in the future and explore its potential to apply on wearable devices to prevent cancer outpatients from occurrence of severe cardiotoxicity in the future.

Nephrology

Mon AM-90. Daptomycin Dosing Recommendations in Patients Receiving Home Hemodialysis using Monte Carlo Simulation.

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Introduction: Daptomycin is used commonly in patients with end stage kidney disease receiving dialysis. Home hemodialysis (HHD) is gaining popularity due to convenience and clinical benefit but is performed more frequently and uses different treatment durations, frequencies, and dialysate flow rates, compared to standard thrice-weekly hemodialysis. Optimal daptomycin doses might need to be different for patients receiving HHD, but no dosing data exists. This study's purpose was to predict optimal daptomycin dosing regimens in patients receiving common HHD treatment.

Research Question or Hypothesis: What are the predicted optimal daptomycin dosing regimens for patients receiving various HHD regimens?

Study Design: *In-silico* Monte Carlo simulations

Methods: Pharmacokinetic models were developed using internal outpatient dialysis patient demographic information and pertinent published pharmacokinetic data to predict daptomycin exposure in 5,000 virtual patient cohort receiving 10 different HHD regimens. Monte Carlo simulations were performed to evaluate target attainment for one week of various daptomycin doses in 10 different HHD settings (Table). All daptomycin doses were simulated to be infused post-dialysis. The target was the interquartile range (IQR) of 24-hour area under the curve (AUC24h) 465-1422 mg*h/L. An "optimal" daptomycin regimen was considered to be the dose that met predicted IQRs of AUC24h fell within the target in most simulated patients.

Results: Table. Optimal initial daptomycin in ten HHD settings

Conclusion: Every other day HHD regimens are best dosed 6 mg/kg post-HHD, but "asymmetric" HHD regimens require supplemental doses to hit pharmacodynamic targets. These dosing recommendations should be clinically validated.

Mon PM-81. Risk Factors for Mortality in the Patients Requiring Continuous Renal Replacement Therapy with Infectious Diseases.

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Introduction: Renal failure can be found in patients with infectious diseases and in reverse, deteriorate infection-related outcomes. For hemodynamically unstable patients with renal failure, continuous renal replacement therapy (CRRT) is preferred. Despite high mortality rates in the patients who received CRRT and high relevance of infection, mortality risk factors in these patients with infectious diseases have not been well studied.

Research Question or Hypothesis: What are the mortality risk factors in the patients with infectious diseases who received CRRT?

HHD Regimen			
Duration (Hours/session)	Frequency (Days/week)	Dialysate Volume (L/session)	Optimal Daptomycin Dose
3	5 (M-T-W-Th-F)	20	4 mg/kg post-HHD, with 2 mg/kg supplemental dose on the 3rd day of 3-day interdialytic period
		30	
3	4 (M-T-Th-F)	30	
		40	
		50	
7	5 (M-T-W-Th-F)	30	
		60	
7	3.5 (M-W-F-Sun)	30	6 mg/kg post-HHD
		50	
		60	

Study Design: A case-control study using the Korean national health insurance database

Methods: We used Health Insurance Review and Assessment Service-National Inpatient Sample (HIRA-NIS) in 2017 and 2018, respectively. Adults admitted with infectious diseases (sepsis, pneumonia, and urinary tract infection (UTI)) and who received CRRT were selected, and only their first admission was extracted with three-month washout periods. The study outcome was in-hospital mortality, and its associated factors were analyzed by a multivariate logistic regression model. For independent variables, we selected variables that were significant in Student's t-test or chi-squared test.

Results: Mortality in the patients with infectious diseases received CRRT were 62.9% (N=372 for non-survivors and N=219 for survivors). When adjusting vasopressor use, risk factors for mortality were found to be age ≥ 75 (OR 2.40, CI 1.59-3.63, p-value < 0.001), sepsis and pneumonia-related admission (OR 11.59, CI 2.93-45.81, p-value < 0.001), pneumonia-related admission (OR 3.92, CI 2.02-7.62, p-value < 0.001), sepsis-related admission (OR 2.46, CI 1.29-4.69, p-value = 0.006), moderate and severe liver diseases (OR 3.85, CI 1.42-10.38, p-value = 0.008) and diabetes (OR 0.58, CI 0.36-0.93, p-value = 0.024).

Conclusion: Age ≥ 75, sepsis and/or pneumonia-related admission, and moderate and severe liver diseases were related to higher mortality in the patients with infectious diseases who received CRRT, and diabetes was related to lower mortality in these patients.

Mon PM-70. Clinical outcomes of Ceftolozane/Tazobactam in infected patients utilizing renal replacement therapies, a case series observational study.

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Introduction: Ceftolozane/Tazobactam (CEF/TAZ) recommended dosing in patient utilizing Renal Replacement Therapies (RRT) is lacking clinical outcomes.

Research Question or Hypothesis: We hypothesize that the evaluation of the clinical outcomes of CEF/TAZ dosing in patients on RRT should orient clinicians towards more effective care.

Study Design: This is a retrospective observational study.

Methods: Charts of all patients on RRT and concurrent CEF/TAZ were retrospectively reviewed between 2018 and 2021. We assessed patients for clinical and microbiologic cure, 30-days recurrence and 30-days all-cause mortality.

Results: Of 27 patients, meeting the inclusion criteria, 17 (63%) were males, the median age was 69 (62-82) years, and the median weight 67 (57-79) kg. Pneumonia diagnosis was present in 19 (70.4%) subjects representing the majority of infections, followed by bacteremia 5 (18.5%). *Pseudomonas Spp*. was the causative organism of infection in 22 subjects (81.5%). Seventeen subjects (63%) achieved clinical cure while 10 (37%) did not. Of 14 patients who had repeated cultures, 10 achieved microbiologic cure while 4 did not (p=0.327). The 30 days recurrence occurred in 6 (29.6%) patients of the clinical cure group vs. 2 (20%) in the clinical failure one (p=.362) while mortality was evidently lesser in the clinical cure group 5 (29.4%) vs. 7 (70%) in the clinical failure group (p=0.049). APACHE II score did not significantly differ between both groups [97 (65-113) vs. 88.5 (62-97) respectively, p=0.37]. The most used doses of CEF/TAZ were 1.5 g IV q8h while patients utilizing CRRT and 0.75 g IV q8h in those utilizing hemodialysis. The median duration of therapy was 9 (4.5-13) days in clinically cured group vs. 5 (3.75-5.5) days in the clinical failure one (p=0.038).

Conclusion: CEF/TAZ doses in this study were higher than those approved by the FDA while clinical success remains uncertain. Larger outcomes and pharmacokinetics studies are needed to establish effective dosing in those patients.

Mon PM-69. Urinary tract infections in Hemodialysis patients - The controversy of antimicrobial urine concentrations.

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Introduction: Major infectious diseases societies recommend the use of antimicrobials that achieve high urinary concentrations to treat urinary tract infection (UTI), which is a concept of little relevance to the oliguric and anuric hemodialysis (HD) population. Outcome studies in this population are more relevant, but unfortunately scarce.

Research Question or Hypothesis: We hypothesize that, in light of the existing paucity of data investigating the optimal treatment of UTI in patients with oliguric and auric HD, outcome studies of different antimicrobials is of high interest in this population to effectively provide care. Thus, we sought to investigate the impact of the most used antimicrobials on clinical and microbiologic outcomes in HD dependent population.

Study Design: This is a retrospective observational study conducted at our quaternary care hospital.

Methods: A retrospective chart review was performed on all HD dependent adults diagnosed with UTIs between May 2015 and December 2019. We evaluated clinical and microbiologic cure as well

as 90-day recurrence and mortality in the aforementioned group of patients.

Results: Fifty-six patients were included in the study with 33 (58.9%) females, mean age of 69.9±11.6 years, and mean body mass index of 27.7 ± 7.8 kg/m^2. Thirty-six subjects of the total sample (64.3%) were anuric. Ninety-one percent of the patients achieved clinical cure. Out of those who had repeat cultures 90.7% achieved microbiologic cure. Clinical and microbiologic cure rates were not significantly different between the oliguric and anuric groups. The 90-day recurrence rate was 11.1% and mortality was 19%, none of both was related to UTI.

Conclusion: Our findings demonstrate high rate of clinical and microbiologic cure in the treatment of oliguric and anuric HD dependent patients. We suggest that drug development and treatment societies consider clinical and microbiologic outcomes in conjunction with achievable urinary concentration when making recommendations for the treatment of UTI.

Mon PM-64. Monte Carlo simulation to predict optimal ceftazidime/avibactam dosing regimens for critically ill patients receiving continuous renal replacement therapy.

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Introduction: Ceftazidime/avibactam, a cephalosporin/β-lactamase inhibitor combination agent, was to combat multidrug resistant gram-negative bacterial infections. Optimal ceftazidime/avibactam dosing regimens in critically ill patients receiving continuous renal replacement therapy (CRRT) is unknown. Monte Carlo simulation (MCS) can inform clinicians of the predicted optimal ceftazidime/avibactam doses attaining pharmacodynamic targets and aid dosing optimization.

Research Question or Hypothesis: What are the optimal dosing regimens of ceftazidime/avibactam in patients receiving CRRT at varying effluent rates?

Study Design: In-silico study using MCS

Methods: Literature search was performed to find relevant patient demographic and pharmacokinetic data to develop pharmacokinetic models that predict the plasma concentration of ceftazidime/avibactam in patients receiving continuous venovenous hemofiltration (CVVH) at effluent rates of 20, 30, and 40 mL/kg/h. Pharmacodynamic targets were >50% *f*T>MIC of 8 mg/L for ceftazidime assuming an *Enterobacterales or Pseudomonas aeruginosa infection*, and 50% *f*T>threshold of 1 mg/L for avibactam. Three dosing regimens (1.25 grams q12h or q8h; 2.5 grams q8h) infused over 2-hour were simulated to assess the probability of target attainment (PTA) in 5,000 virtual patients. The smallest doses with PTA>90% at each effluent rate during the initial 48 hours of therapy were considered optimal.

	20 mL/kg/h	30 mL/kg/h	40 mL/kg/h
Ceftazidime			
2g q8h	99.9%	99.9%	99.9%
1g q8h	99.8%	99.1%	99.0%
1g q12h	95.0%	89.8%	81.0%
Avibactam			
0.5g q8h	100%	100%	100%
0.25g q8h	100%	100%	100%
0.25g q12h	99.9%	99.9%	99.7%

Results: Table. PTA of 2-hour infusion ceftazidime/avibactam in CVVH at varying effluent rates

Conclusion: Ceftazidime/avibactam 1.25 g q12h was predicted to be optimal for patients receiving CVVH effluent rate of 20-30 mL/kg/hr and 1.25 g q8h for a higher effluent rate of 40 mL/kg/hr. Clinical validation study is needed to confirm these findings.

Mon PM-82. Ambulatory Care Pharmacists' Knowledge and Practice in Chronic Kidney Disease (CKD).

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Introduction: Pharmacists play a vital role in caring for patients with CKD in optimizing medication regimens to improve outcomes. With few post-graduate nephrology training programs available in the US, current CKD knowledge and practice expertise among ambulatory pharmacists is unknown.

Research Question or Hypothesis: Knowledge gaps regarding medication use in CKD exist among ambulatory care pharmacists.

Study Design: Cross-sectional survey of pharmacists on the American College of Clinical Pharmacy Ambulatory Care listserv.

Methods: Survey was developed by nephrology content experts assessing CKD knowledge gaps, interest areas, and educational preferences among practicing ambulatory care pharmacists. Items were primarily Likert-type and included comfort level and script concordance knowledge assessments using case vignettes. Topics included core elements of CKD management (e.g., blood pressure, anemia, and acute kidney injury). Demographic information was also collected. Survey data were collected securely and confidentially in REDCap™. Results were analyzed using descriptive statistics. This study was IRB-reviewed and deemed exempt.

Results: There were 137 respondents. The majority (57.7%) practiced in primary care, and a large percentage were residency program directors (30.7%) and/or preceptors (76.6%). Most (80.3%) respondents reported being current with CKD guidelines and literature. Preferred

educational topics were diabetes (12.4%), hypertension (8.1%), and CKD-MBD (8.1%). Over 50% of respondents reported being "comfortable/very comfortable" performing renal dose adjustments, conducting medication reviews in dialysis, staging CKD, managing diabetes, blood pressure, cardiovascular risk, providing medication counseling, and managing diuretics. Over 50% of respondents reported being "uncomfortable/very uncomfortable" managing dietary recommendations, anemia of CKD, and CKD-MBD.

Conclusion: There is a reported lack of comfort in ability to manage core elements of CKD care, as well as a reported desire for additional education. Managing diabetes in CKD was identified as top need for more education despite reported comfort in caring for patients with CKD and diabetes. These findings will drive the design of future educational activities for pharmacists.

Mon PM-65. Stability and compatibility of combined vancomycin and cefepime in two conventional peritoneal dialysis solutions.

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Introduction: The preferred method to treat peritoneal dialysis-related peritonitis (PDRP) is the intraperitoneal (IP) administration of antibiotics admixed with peritoneal dialysis solution (PDS). Vancomycin and cefepime combination therapy are used to treat PDRP, but the stability and compatibility of these agents combined in PDS is unknown, limiting IP administration.

Research Question or Hypothesis: Are vancomycin and cefepime when combined in a PDS stable and compatible under varying temperatures over time?

Study Design: In-vitro study

Methods: Vancomycin (0.5 mg/mL) and cefepime (0.5 mg/mL) were added to PDS (2.5% glucose Dianeal or Extraneal) and stored at either 4^0C (refrigeration), 25^0C (room temperature) or 37^0C (body temperature) for 7 days. Each admixture was prepared in triplicate for each storage temperature. Aliquots were obtained at baseline and predefined time points up to 168 hours. Stability was determined by stability-indicating high-performance liquid chromatography and was defined as the drug retaining ≥90% of the initial concentration. Physical compatibility was determined by visual inspection, pH, and absorbance.

Results: Vancomycin and cefepime concentrations declined over time but cefepime degradation occurred at a faster rate. Vancomycin retained ≥90% of its initial concentration for 7 days at all temperatures in both PDS, except in Extraneal stored at 37^0C which was <90% after 5 days. Cefepime retained ≥90% of the initial concentration for 7 days at 4^0C and 25^0C, and 1 day at 37^0C in 2.5% Dianeal; and 7, 3, and 1 days at 4^0C, 25^0C, and 37^0C respectively in Extraneal. Visual inspection observed no precipitation, but exhibited a yellow hue at 37^0C in all PDS after 2 days. Absorbance and pH remained unchanged.

Conclusion: Our in-vitro findings suggest that vancomycin and cefepime can be combined in either 2.5% Dianeal or Extraneal for 7 days at 4^0C and 1 day at 37^0C. At 25^0C, the admixture was stable and compatible for 7 days in 2.5% Dianeal and 3 days in Extraneal.

Mon PM-83. Microbiologic outcomes of Ceftazidime/Avibactam in patients with bacteremia or pneumonia utilizing renal replacement therapies, a retrospective cohort study.

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Introduction: Ceftazidime/Avibactam (CEF/AVI) dosing in patients with multidrug resistant organisms utilizing Renal Replacement Therapies (RRT) is not yet validated in clinical outcome studies

Research Question or Hypothesis: We hypothesize that the evaluation of clinical outcomes of the recommended CEF/AVI dosing in pneumonia or bacteremia in patients utilizing RRT should result in effective care in this specific context

Study Design: This is a retrospective observational study

Methods: A retrospective chart review of all patients on RRT and concomitant CEF/AVI was performed between 2017 and 2021. Patients were assessed for microbiologic cure, clinical cure, 30-day recurrence and 30-day all cause mortality

Results: Fifty-six patients met the inclusion criteria, 36 (64.3%) were males, the median age was 69 (59.5-79.3) years, and the median weight was 69 (60-83.8) kg. Pneumonia represented 34 (60.7%) of infections. Microbiologic cure was achieved in 32 (57.1%) subjects and failure in 24 (42.9%) subjects. Clinical cure was reached in 23 (71.9%) patients in the microbiologic cure group vs. 12 (50%) in their microbiologic failure counterparts (p=.094). The thirty-days recurrence occurred in 2 (6.3%) patients in the first group vs. 3 (12.5%) patients in the second group (p=.673). Further, the 30 days all-cause mortality was 18 (56.3%) vs. 10 (41.7%) in both groups respectively (p=.28). *Pseudomonas aeruginosa* was more predominant in the microbiologic failure group, while *Enterobacterales* were more prevalent in the microbiologic cure one (p=.003). The most commonly used dose in patients utilizing CRRT was 1.25 g q8h, while was 1.25 g q24h in those utilizing hemodialysis. Multivariate logistic regression analysis indicated that bacteremia [OR 41.5 (3.77-46)], *Pseudomonas* [OR 0.185 (.04-.95)], and the daily dose [OR 2.33 (1.15-4.72)] were independently associated with microbiologic cure.

Conclusion: Utilized CEF/TAZ doses were most likely effective to reach clinical outcomes, However, unresolved infections still present with high proportions. Larger outcomes and pharmacokinetics studies remain necessary to determine effective dosing in this specific population.

Sun-88. Characterization of Glomerular Filtration Rate (GFR) in Post-Orthotopic Liver Transplant (OLT) Chronic HBV (CHB) Patients Treated with Tenofovir Alafenamide (TAF) or Tenofovir Disoproxil Fumarate (TDF): Post Hoc Analysis from a Phase 2 Randomized Study.

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Introduction: In post-OLT patients with CHB and CKD, the renal safety and nephrotoxicity of TAF vs TDF have not been well characterized. This phase 2 study evaluated changes in estimated glomerular filtration rate (eGFR) using three validated GFR methods to compare renal function of TAF vs TDF.

Research Question or Hypothesis: Using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) creatinine (Cr) equation as reference, how do other validated methods perform in post-OLT patients with CKD and CHB treated with TAF or TDF?

Study Design: Renal data generated from 51 patients (TAF 26; TDF 25) enrolled in Study GS-US-320-3912 (NCT02862548), a randomized, open-label phase 2 study in post-OLT patients with ≥Stage-2 CKD, were included in the analysis. Patients were randomized to continue TDF prophylaxis or switch to TAF for 48 weeks, after which all received TAF through Week 192 (TAF-TAF and TDF-TAF groups).

Methods: Serial GFR by Cockroft-Gault (CG), and CKD-EPI cystatin C (CysC), were calculated and compared with CKD-EPI Cr by assigned treatment group.

Results: Groups were well matched with mean(SD) age 60(10.8) years, 75% male, and 78% current calcineurin-inhibitor use. Baseline GFR values (median [Q1,Q3]) were: CKD-EPI Cr 49.7 (44.8,59.9) mL/min/1.73m^2, CKD-EPI CysC 68.0 (47.0,79.7) mL/min/1.73m^2, and CG 61.8 (45.1,74.0). Change in GFR (median [Q1,Q3]) from baseline at weeks 48 and 192 are summarized in the table:

	Week 48: TAF-TAF; TDF-TAF	Week 192: TAF-TAF; TDF-TAF
CKD-EPI, Cr (mL/min/1.73m^2)	4.4(-3.5,8.6); 0.2(-1.8,7.6)	2.5(-1.4,8.2); 1.1(-6.0,9.3)
Cockcroft-Gault (mL/min)	3.8(-4.1,12.4); 0.7(-3.8,5.7)	2.8(-1.5,12.3); 0.2(-9.0,7.7)
CKD-EPI, CysC (mL/min/1.73m^2)	1.9(-11.8,8.3); -4.1(-13.1,4.7)	4.2(-6.7,9.1); -4.5(-10.6,3.7)

CG results were similar to CKD-EPI Cr, while those for CKD-EPI CysC, a non-Cr-based equation, were more disparate. Overall, improved GFR was seen in the TAF-TAF group over 192 weeks.

Conclusion: In post-OLT patients with CKD and CHB, results for GFR change over 4 years differed by method. Overall, modest changes in median GFR were observed with TAF treatment or TDF followed by TAF.

Mon AM-89. Association of Vancomycin Pre-Hemodialysis Concentrations with Clinical Outcomes.

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Introduction: Recent guidelines recommending a target vancomycin AUC/MIC of 400-600mgxh/L are not established in hemodialysis patients. Conventional approaches in this high-risk population include pre-dialysis concentration monitoring with a target of 15-20mg/L. Limited data exists regarding the relationship between clinical outcomes and this approach.

Research Question or Hypothesis: Do vancomycin pre-dialysis concentrations correlate with clinical infectious outcomes in hemodialysis patients?

Study Design: Single-center, retrospective, cohort

Methods: Chart review of chronic hemodialysis patients that were >18 years old, treated with vancomycin for >72 hours, had at least one pre-dialysis vancomycin concentration and a positive culture or clinically confirmed infection between 2012-2021 was conducted. The institutional vancomycin protocol was consistent over this period, targeting a pre-dialysis concentration of 15-20mg/L. The primary endpoint was a composite of 30-day mortality and treatment failure. Endpoints were independently adjudicated. Descriptive statistics, appropriate hypothesis testing, and a multivariable logistic regression model were used to analyze the relationship between pre-dialysis concentrations and clinical outcomes using SASv9.4. A sample size of 182 subjects was needed to provide 80% power with alpha=0.05.

Results: This study included 199 hemodialysis patients: age 59 ±13 years, 45% female, 68% Black, median Charlson comorbidity score of 6, 75.9% medical ward, 14.6% ICU, 9.6% outpatients. Vancomycin loading dose was 14.7±4.8mg/kg resulting in pre-dialysis concentration of 17.4±6.6mg/L. Vancomycin maintenance dose was 10.5 ±3.8mg/kg with pre-dialysis concentration of 18.5±4.5mg/L. Of

835 vancomycin concentrations, 36.3% were at target of 15-20mg/L, with 70.4% above 15mg/L. The vancomycin pre-dialysis concentration was 18.3±5.8mg/L in the 64 patients (32%) that achieved the primary endpoint compared to 18.6±4.6mg/L in the 135 (67.8%) that did not achieve the primary endpoint (P=0.421). After adjustment for confounders, the relationship between the primary endpoint and vancomycin pre-dialysis concentration was not significant (P=0.483).

Conclusion: Vancomycin pre-dialysis concentrations had no association with clinical infectious outcomes in this cohort. Additional research is needed to identify the optimal target for vancomycin in hemodialysis patients.

Tues-74. Evaluation of Vancomycin Pharmacokinetics in Patients Receiving High-Flux Intermittent Hemodialysis.

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Introduction: Guidelines recommend a vancomycin 24-hour area-under-the-concentration-time curve (AUC) target of 400-600mgh/L for most patients except the hemodialysis population. A vancomycin pre-dialysis concentration of 15-20mg/L is suggested which may achieve a similar AUC target. The pharmacokinetics of vancomycin have not been well described in high-flux intermittent hemodialysis despite widespread use.

Research Question or Hypothesis: What are the inter-dialytic clearance and removal of vancomycin with high-flux hemodialysis?

Study Design: Pharmacokinetic sub-study of a single-center, retrospective, cohort study.

Methods: Chart review of chronic hemodialysis adult patients from 2012 to 2021 was conducted. Intravenous vancomycin was prescribed greater than 72 hours, and at least two vancomycin concentrations were collected during the course of the treatment. Individual concentration profiles were used to estimate inter-dialytic clearance via first-order pharmacokinetic equations. Volume of distribution was calculated by population-based estimation derived from a hemodialysis population. Furthermore, high-flux hemodialysis removal was estimated by percent change in drug concentrations obtained within 12 hours prior to and after each hemodialysis procedure. Descriptive statistics were used to characterize the data using SASv9.4.

Results: This study included 72 vancomycin courses in 51 hemodialysis patients. The median elimination constant, half-life, and inter-dialytic clearance of vancomycin were 0.00528h^{-1} [interquartile range: 0.00326, 0.01067], 131.33h [64.94, 212.78], and 0.39565L/h [0.19513, 0.76683], respectively. The median percentage removal of vancomycin was 18.33% [14.56, 32.34].

Conclusion: This study evaluated the pharmacokinetics of vancomycin in patients receiving high-flux intermittent hemodialysis. Description of inter-dialytic clearance and hemodialysis removal of vancomycin provided justification for patient specific approach to dosing and therapeutic drug monitoring given the variable nature of clearance observed. Removal via hemodialysis was lower than expected and should be evaluated in future studies. These pharmacokinetic parameters may lay the foundation for an AUC-based estimation and dosing approach in hemodialysis patients to improve their clinical outcomes.

Neurology

Tues-76. Transition from Alteplase to Tenecteplase for Acute Ischemic Stroke: Assessment of Door to Needle Time.

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Introduction: As management of acute ischemic stroke (AIS) continues to evolve, recent stroke guidelines suggest tenecteplase as an alternative to alteplase for fibrinolysis. There are several theoretical benefits of tenecteplase for time to administration, however limited studies exist evaluating door to needle time between these agents.

Research Question or Hypothesis: The primary objective of this study is to determine if tenecteplase or alteplase provides a shorter time from ED presentation to fibrinolysis for AIS. Secondary outcomes include symptomatic ICH, discharge disposition and mortality.

Study Design: This a health system-wide, retrospective, study comparing adult patients receiving tenecteplase or alteplase for AIS within the ED.

Methods: Transition from alteplase to tenecteplase across the health-system occurred in February 2021. Consecutive patients who received tenecteplase from February-June 2021 were included and matched to historic patients who received alteplase between January-December 2020. Patients were matched on last known normal (< 180 minutes or 180-270 minutes), NIH stroke scale, requirement of antihypertensives, and ED location (academic medical center or community site).

Results: Of 62 tenecteplase patients meeting inclusion criteria, 56 were matched to alteplase patients. Patients had similar baseline characteristics with median age 75 years, 55% of patients being male, and a median NIHSS 5-6. For the primary outcome there was no difference in time from ED presentation to fibrinolytic administration for alteplase vs tenecteplase (67 vs 63.5 min, p=0.48). However, considering the onset of action for each drug, time from ED presentation to

fibrinolytic completion is significantly shorter with tenecteplase (128 vs 63.5 min, p<0.001). There was no difference between groups for symptomatic ICH, discharge disposition, or mortality.

Conclusion: Utilization of tenecteplase as an alternative for acute ischemic stroke did not result in shorter door to needle time but did result in a 65-minute shorter time to fibrinolytic completion. This has therapeutic implications with the potential for earlier fibrinolysis restoring blood flow to ischemic tissue.

Nutrition

Tues-81. The potential risk of vitamin B12 deficiency with the concomitant use of metformin and proton pump inhibitors in patients with type 2 diabetes mellitus.

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Introduction: Although metformin (MET) or proton pump inhibitors (PPI) alone have been reported to decrease serum vitamin B12 level, studies on the additive effect of PPI on vitamin B12 deficiency in patients with type 2 diabetes mellitus (T2DM) are lacking.

Research Question or Hypothesis: Does concomitant use of PPI with MET in patients with T2DM increase the risk of vitamin B12 deficiency?

Study Design: A retrospective cohort study using the National Inpatient Sample (NIS) database presented annually by the Health Insurance Review and Assessment Service (HIRA) in Korea.

Methods: We analyzed the HIRA-NIS data from 2017 to 2020, which includes 10% of all the hospitalized patients in Korea. Among patients aged ≥30 years with T2DM, we included those who used MET for at least 30 days as MET users. Participants were grouped into MET-only and MET+PPI users based on the use of PPI. Study outcomes were prevalence and the risk of vitamin B12 deficiency, which was defined with disease codes and use of vitamin B12 supplements. In this propensity score-matched cohort, the prevalence of vitamin B12 deficiency was compared between MET-only users vs. MET+PPI users. In addition, multivariate logistic regression was performed to examine if the concurrent use of MET and PPI was associated with the risk of vitamin B12 deficiency.

Results: We included 25,736 MET-only users and 77,208 users of both MET and PPI. The prevalence of vitamin B12 deficiency was not significantly different between MET-only vs. MET+PPI users (2.19% vs. 2.28%, p=0.43). After adjusting for age, sex, duration of MET use, and H_2 receptor antagonist use, concomitant use of PPI with MET was not associated with the risk of vitamin B12 deficiency (aOR 1.05, 95% CI 0.96-1.16).

Conclusion: We found that concomitant use of PPI with MET was not associated with the increased risk of vitamin B12 deficiency in hospitalized patients with T2DM.

Mon PM-84. Temporary, Emergent Use of a High-Protein Multichamber Parenteral Nutrition Formula in Adult Patients.

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Introduction: Parenteral nutrition (PN) is integral for patients unable to meet nutritional needs orally/enterally. Commercially prepared PNs are used less frequently in the US and are often critiqued for lower protein content, which can make meeting protein targets without overfeeding challenging. A high protein two-chamber bag (HP2CB; 8% protein, 14% dextrose per liter) is newly available, but little data regarding US use exists. Our institution's compounding facility underwent major renovation in 2021, necessitating an emergent shift to 2CBs. This study evaluated the HP2CB in terms of meeting ASPEN recommended targets.

Research Question or Hypothesis: We hypothesized HP2CBs would provide adequate protein in adults without overfeeding.

Study Design: Single-center, retrospective review.

Methods: PN recipients from January-May 2021 were screened. Those who received non-HP2CBs, were pregnant, or <19 years were excluded. Nutrition targets were 25-30 kcal/kg/day and 1.2-2 g/kg/day protein for non-obese patients and 22-25 kcal/kg ideal body weight (IBW)/day and 2-2.5 g/kgIBW/day protein for obese patients. The primary outcome was target energy and protein compared with ASPEN recommendations. Also evaluated were energy and protein received per kg, supplemental electrolytes and insulin. Descriptive statistics were used.

Results: Sixteen patients received HP2CBs, including eight obese patients. 50% of obese patients met energy and protein targets, while 75% of non-obese patients met energy targets and 88% met protein targets. Obese patients received 22.2 kcal/kg/day (SD+/- 2.4) and 2.4 kg/kg/day protein (SD+/- 0.3). Non-obese patients received 25.7 kcal/kg/day (SD+/- 1.5) and 1.5 g/kg/day protein (SD+/- 0.2). All patients required supplemental electrolytes and 56% required supplemental insulin.

Conclusion: ASPEN-recommended nutritional targets were met in most non-obese patients but were slightly below targets in obese patients. These data suggest HP2CB PNs can meet nutritional needs and may be a useful alternative to custom compounded PN bags in times of medication shortages and/or loss of compounding facilities, though use of supplemental electrolytes and insulin must be considered.

Oncology

Mon AM-41. Effectiveness of a restrictive injectable calcitonin protocol dosed on ideal body weight for hypercalcemia of malignancy resolution in hospitalized patients: A dual-institution retrospective analysis.

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Introduction: Hypercalcemia of malignancy (HCM) is an oncologic emergency commonly treated with hydration, bisphosphonates (BPN), and calcitonin. There is a lack of data guiding clinicians on which weight, ideal (IBW) or actual (ABW), should be used to optimize efficacy while balancing high acquisition costs.

Research Question or Hypothesis: Assess if an IBW calcitonin dosing protocol resulted in similar HCM resolution compared to ABW.

Study Design: Multi-center, retrospective, pre/post quasi-experimental study.

Methods: Adult patients who received calcitonin for the treatment of HCM were included in the analysis for the pre-protocol group [2014-2016] and post-protocol group [2018-2020].The calcitonin IBW dosing protocol for use included (i) corrected calcium (CC) ≥ 12 mg/dL, (ii) subcutaneous or intramuscular administration, (iii) 4 units/kg IBW every 12 hours and (iv) maximum of four doses. Complete response (CR) was defined as CC < 10.8 mg/dL, partial response (PR) as CC 10.8 – 11.5 mg/dL and no response (NR) as CC > 11.5 mg/dL, at discharge. Descriptive statistics were performed followed by use of Fisher's exact test, student t-test, and Wilcoxon rank-sum tests to compare appropriate data points. An a-priori value of < 0.05 was utilized to assess statistical significance.

Results: 200 orders were included in the analysis: 73 in the pre- and 127 in the post-protocol. The mean baseline CC was similar between both cohorts, at approximately 14 mg/dL. The resolution of HCM was not statistically different between the pre- and post-protocol groups: CR (60.3% vs. 56.7%, P = 0.66), PR (19.2% vs. 21.3%, P = 0.86) and NR (20.6% vs. 22.1%, P = 0.86), respectively. Upon discharge, the average CC was 10.6 mg/dL in both the pre- and post-protocol groups. The post protocol estimated cost savings over 2 years was $520,700.

Conclusion: To our knowledge, this is the first study demonstrating that an IBW calcitonin dosing protocol resulted in similar HCM resolution and significant cost savings.

Sun-90. Prevalence of Neuropsychiatric Diagnoses in Long-Term Adolescent and Young Adults Cancer Survivors: An All-of-Us Study.

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Introduction: About 4.5% of new cancer cases affect adolescent and young adults aged between 15-39 years in the United States (US). However, whether long-term adolescent and young adult cancer (AYAC) survivors experience neuropsychiatric conditions has not been formally investigated.

Research Question or Hypothesis: Using the National Institutes of Health All-of-Us (AoU) database, we seek to determine the prevalence of neuropsychiatric conditions among long-term AYAC survivors compared to matched controls.

Study Design: Secondary data analysis of a nationwide prospective cohort study using the All-of-Us Controlled-Tier Dataset.v5.

Methods: Individuals diagnosed with cancer between 15-39 years old were identified via ICD-9 and 10 codes from electronic health records and verified using self-reported surveys. Non-cancer controls were identified from the same dataset and matched by age at survey, sex, race, ethnicity, education, and income levels at a 1:4 ratio utilizing an optimal matching algorithm. Prevalence of neuropsychiatric diagnoses was extracted from past medical history surveys, and residual differences in matched variables were controlled using multiple logistic regression. Effect sizes were presented as adjusted odds ratios (adjOR) and 95% confidence intervals (CI). Data was accessed with Google BigQuery and analyzed using R v4.1.2 in an integrated Jupyter Notebook environment.

Results: 481 AYAC patients and 1924 matched controls were included. At the time of survey, the mean age was 38 (SD:±9.0) years and AYAC survivors averaged 8.0 (SD:±7.0) years from initial cancer diagnosis. Prevalence of neuropsychiatric diagnoses ranged from 4.2%-41.8% among AYAC survivors and 3.3%-42.0% among matched controls. AYAC survivors were at higher odds to be diagnosed with peripheral neuropathy (adjOR = 3.13 [95%CI: 2.82-3.45; p<0.001]) and memory loss (adjOR = 2.66 [95%CI: 2.24-3.09; p<0.001]) than matched controls.

Conclusion: This large US population-based analysis is among the first to describe the prevalence of neuropsychiatric diagnoses in long-term AYAC survivors. Long-term follow up care is vital to monitor neurological function and mental health in AYAC survivors.

Mon AM-95. Comparative Effectiveness of Cetuximab and Panitumumab when Combined with FOLFIRI or FOLFOX in First-line Treatment of KRAS/NRAS Wild Type and Left-sided Metastatic Colorectal Cancers.

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Introduction: The ASCO, ESMO, and NCCN guidelines recommend left-sided metastatic colorectal cancer (mCRC) patients with KRAS/NRAS wild type that the systemic therapy options in the first-line treatment are including cetuximab or panitumumab (anti-EGFR monoclonal antibodies) plus FOLFIRI or FOLFOX. However, head-to-head comparisons of two agents still remained unclear in real-world clinical practices.

Research Question or Hypothesis: We compared the effectiveness of cetuximab or panitumumab plus FOLFIRI or FOLFOX on overall survival in left-sided metastatic colorectal cancer patients with KRAS/NRAS wild type.

Study Design: We conducted a retrospective cohort study using a multi-institutional electronic medical records database in Taiwan.

Methods: This retrospective cohort study enrolled new diagnosed mCRC patients who underwent first-line cetuximab- or panitumumab-based therapy between 2016 to 2019. We defined the first prescription of cetuximab or panitumumab as the index date. The primary outcome was overall survival rate from the use of cetuximab or panitumumab to the all-cause death or end of observation date based on the intention-to-treat analyses. Age, sex, Eastern Cooperative Oncology Group (ECOG) grade, and other clinical characteristics of the patients were collected. The Kaplan–Meier method was used to estimate the median overall survival (mOS).

Results: A total of 433 patients with were included in our study. 400 and 33 patients received cetuximab and panitumumab, respectively. The median follow-up periods for the all patients were 15.01 months. The mOS of cetuximab and panitumumab was 26.5 months and none reach, respectively.

Conclusion: According to the results of our real-world evidence study, there is no significant difference in effectiveness between cetuximab and panitumumab plus FOLFIRI or FOLFOX. However, more research is needed to confirm these results.

Mon AM-43. Evaluation of Unplanned Hospital Admissions in Oncology Patients who have Recently Received Chemotherapy: A Prospective, Single Center Study.

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Introduction: Centers for Medicare & Medicaid Services (CMS) developed the chemotherapy measure (OP-35) to improve the quality of care in cancer patients. OP-35 defines ten preventable reasons for admission in oncology patients who received chemotherapy treatment in the past 30 days; including anemia, dehydration, diarrhea, emesis, fever, nausea, neutropenia, pain, pneumonia and sepsis. OP-35 is now used to impact incentive and reimbursement payments, but rates of preventable admissions warrant further characterization.

Research Question or Hypothesis: This study aimed to investigate the prevalence of preventable admissions as defined by OP-35. Secondary objectives included identifying risk factors for preventable admissions and assessing supportive care utilization.

Study Design: Prospective, single-center, descriptive study

Methods: Patients were prospectively identified via an academic oncology service team admission list from July 2021-February 2022. Adult cancer patients with unplanned hospital admission within 30 days of receiving chemotherapy or immunotherapy were included. Percentages were used to report event rates and nominal data. A multivariate regression analysis was conducted to assess factors associated with preventable hospital admission.

Results: 354 encounters were screened, and 72 patients met inclusion in the final analysis. Nearly half of the unplanned admissions, 35 (48.6%) were considered preventable. The most common reasons for admission were pain (22.2%), nausea/emesis/diarrhea (15.3%), shortness of breath (11.1%), and febrile neutropenia (9.7%). The most common cancer type with unplanned admission was gastrointestinal cancer (43.1%), followed by lung (12.5%) and breast cancer (11.1%). Unplanned admissions occurred most with IV chemotherapy alone (58.3%), followed by IV chemotherapy plus immunotherapy (16.7%). Appropriate antiemetics were given to 100% of patients. Two of three patients at risk of febrile neutropenia appropriately received growth factor. Regression analysis did not yield any significant risk factors for admission.

Conclusion: This study demonstrates that despite appropriate pharmacotherapy prophylaxis for nausea/emesis and neutropenic fever, preventable admissions occurred. These findings highlight the need for OP-35 revisions by CMS.

Tues-83. Evaluation of hypersensitivity reactions with intravenous vs intramuscular pegaspargase after diphenhydramine premedication in leukemia patients.

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Introduction: Pegaspargase is a crucial agent in acute lymphoblastic leukemia (ALL) therapy in improving overall survival among pediatric and young adult patients. However its use is associated with severe hypersensitivity reactions, with varying incidences reported in previous studies. Identifying the incidence of hypersensitivity reactions has great implications, as true reactions warrant switching to an alternative asparaginase product or undergoing pegaspargase desensitization.

Research Question or Hypothesis: Compare the rate of hypersensitivity reactions and anaphylaxis between intravenous (IV) and intramuscular (IM) pegaspargase administration in the setting of universal diphenhydramine premedication.

Study Design: single center retrospective cohort study

Methods: This study evaluated patients with a diagnosis of ALL and treated per pediatric ALL protocol who received at least one dose of either IV or IM pegaspargase with diphenhydramine premedication between January 1, 2016 and March 1, 2022. The primary outcome investigated the difference in incidence of grade 3 or higher allergic

reactions or anaphylaxis between IV and IM pegaspargase. Secondary outcomes included incidence of grade 1 or 2 allergic reactions, and incidence of switching to an alternative asparaginase product or undergoing pegaspargase desensitization. A Fisher's exact test was utilized in analyzing categorical data and descriptive statistics were utilized where applicable.

Results: Out of 187 patients that received IV or IM pegaspargase within the study period, a total of 74 patients met inclusion criteria. From this group, 26 patients received IV pegaspargase and 48 patients received IM pegaspargase. Grade 3 or higher allergic reactions occurred in 19.23% (n = 5) of patients in the IV group, and 6.25% (n = 3) of patients in the IM group (p = 0.12).

Conclusion: There was no statistically significant difference in the incidence of grade 3 or higher allergic reactions between IV and IM administrations of pegaspargase with universal diphenhydramine premedication. Further adequately powered studies are needed to confirm differences in hypersensitivity reactions between administration methods.

Mon AM-93. Real-World Efficacy and Safety of Off-Label Use of Immune Checkpoint Inhibitors (ICI) in Cancer in Qatar: A Nationwide Retrospective Cohort Study.

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Introduction: Off-label use of ICI has been inevitable since their first FDA approval a decade ago. The evaluation of efficacy and safety of ICI in off-label indications is lacking. We aim to address this gap in literature and evaluate efficacy and safety of Off-label use of ICI. Primary objectives are to evaluate efficacy: Complete response (CR), Partial response (PR), Progression disease (PD), Stable disease (SD), and safety: number and severity of immune-related adverse events (irAEs).

Research Question or Hypothesis: In real-world practice, what are the efficacy and safety implications of the off-label use of ICIs?

Study Design: Nationwide retrospective cohort study in Qatar.

Methods: Our population included all adult cancer patients in Qatar who received one or more of the ICIs (Atezolizumab, Avelumab, Durvalumab, Ipilimumab, Nivolumab, Pembrolizumab) without FDA or EMA approved indication, between 01/01/2017 and 30/06/2021. Data were collected through electronic medical records and pooled in data collection sheet. Consequently, data were analyzed using SPSS.

Results: 836 cycles of ICI were evaluated for 103 patients. The most identified indications were colorectal cancer (12.6%) and hepatocellular carcinoma (12.6%). Pembrolizumab was the most often prescribed ICI with 47.6%. Clinical response outcomes: 4 patients CR (3.88%), 14 patients PR (13.59%), 13 patients SD (12.62%); and 57 patients PD (55.33%). Meanwhile, 35 patients experienced 38 irAEs: 19 severe (50%), 17 moderate (44.74%), 2 mild (5.26%). The most common irAEs were hepatic toxicities (23.68%) and hematological toxicities (10.53%).

Conclusion: ICI might be efficacious in more indications yet to be approved in cancer management. However, the use of ICI out of the approved indications might not be highly effective with high potential of irAEs. Further studies on extended use of ICI are needed.

Other

Mon AM-9. Stratification of Burnout in Health-System Pharmacists During the COVID-19 Pandemic: A Focus on the Ambulatory Care Pharmacist.

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Introduction: Burnout is defined as high emotional exhaustion and depersonalization, and low personal accomplishment from work. Prevalence of burnout among health-system (HSP) and ambulatory care pharmacists (ACP) is unknown during the COVID-19 pandemic.

Research Question or Hypothesis: ACP burnout prevalence will be higher than non-ambulatory HSP burnout.

Study Design: Cross-sectional cohort study

Methods: An electronic survey was sent to HSPs at two academic health systems in Chicago, IL. Demographics, risk of burnout based on two validated assessments (the Oldenburg Burnout Inventory [OLBI] and the Maslach Burnout Inventory [MBI]), burnout contributors, burnout mitigation strategies, and change in burnout due to COVID-19 were collected. Burnout was defined as meeting one criterion for high burnout on the following domains: exhaustion and disengagement on the OLBI, and emotional exhaustion and depersonalization on the MBI. The co-primary outcomes were the prevalence of burnout among HSPs, and the comparison of ACP burnout to that of non-ambulatory HSPs. Secondary outcomes were comparison of burnout between the OLBI and MBI assessments, HSP causes and contributors of burnout and mitigation strategies, and the self-perceived effect of COVID-19 on burnout severity.

Results: There were 113 pharmacists included in the study. Total HSP cohort burnout prevalence as defined above was 87.6%, ACP

burnout was 88.4%, and non-ambulatory HSP burnout was 87.1%. There was no statistical difference between ACP and non-ambulatory HSP burnout prevalence, either overall or in any specific burnout dimension. The OLBI and MBI captured similar rates of burnout. The most commonly reported burnout causes were staffing and scheduling issues, precepting requirements, and patient needs. Participants' most reported coping strategies were spending time with family/friends, sleep, exercise, and recreational/relaxation activities. A majority of HSPs (78.2%) reported higher levels of burnout due to COVID-19.

Conclusion: HSP burnout during COVID-19 pandemic is higher than cited in the pre-COVID literature. Individual coping strategies are poor buffers for work-related burnout.

Sat-3. Factors affecting job satisfaction among board certified pharmacists in Virginia.

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Introduction: Previous research found a positive relationship between board certification and job satisfaction. Identifying factors influencing board certified pharmacists' job satisfaction can assist employers in recruitment and retention.

Research Question or Hypothesis: What factors affect job satisfaction among board certified pharmacists in Virginia?

Study Design: Cross-sectional study using de-identified data from the 2018 Virginia Pharmacist Workforce Survey collected by the Virginia Department of Health Professions during annual license renewal.

Methods: Of the 13,962 pharmacists completing the survey (90.5% response rate), 1,284 were included for analysis. Respondents employed with an active Virginia license, who held board certification, worked within the United States, and reported their level of job satisfaction were included. Data were summarized using descriptive statistics. Logistic regression identified factors affecting job satisfaction, with the dependent variable collapsed as a binary outcome (satisfied vs dissatisfied).

Results: Respondents were female (66%) and residency trained [PGY-1 (63.9%), PGY-2 (31.6%)], with a mean (SD) of 10.5 (9.2) years of practice. Board Certified Pharmacotherapy Specialists were most widely represented (54.5%), followed by Geriatric Specialists (11.9%), and Ambulatory Care Specialists (11.0%). Most board certified pharmacists (93.7%) reported being very/somewhat satisfied with their current job. Board certified pharmacists who were 35-39 (OR 0.30, p=0.031) or ≥60 years of age (OR 0.06, p=0.014) were less likely to be satisfied compared to those 30-34, as were pharmacists earning an annual income of $100,000 - $149,000 (OR 0.17, p=0.039) compared to those earning >$150,000. Individuals receiving paid sick leave were more likely to report higher job satisfaction (OR 2.32, p=0.041) than those without paid sick leave.

Conclusion: A majority of board-certified pharmacists in Virginia reported high job satisfaction. Age, income, and paid sick leave were identified as factors affecting job satisfaction.

Sun-22. Analysis of bedside medication delivery service and readmission rates in high-risk patients.

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Introduction: Bedside medication delivery service offers a vital inpatient opportunity for patients receiving their discharge medications. This service enhances transitions of care, reduces 30-day hospital readmissions, and emergency visits.

Research Question or Hypothesis: What is the impact of a bedside delivery service on the rate of three-month readmissions for high-risk patients?

Study Design: Single center, retrospective review of patients admitted to a multi-specialty hospital from June 2020 – August 2020.

Methods: Patients were included if they were classified as high risk and opted into the bedside service before discharge. High risk was based on a scoring tool including factors such as age, high-risk pharmaceutical classes, and past hospitalizations over one year. Patients from outside hospitals or transfers were excluded. Two stratified groups were those who participated in bedside delivery, and those who did not. The primary outcome was the rate of readmission between the groups. Descriptive statistics were used to assess outcomes.

Results: One-hundred eighty high-risk patients were identified. Thirty-one (17%) participated in the bedside delivery service, while one-hundred seven patients (59%) declined. Of the thirty-one patients participating, ten patients were readmitted, compared to twenty-one patients who were not (32% vs. 68%). From the one-hundred seven patients who did not participate, sixty-five patients were readmitted, compared to forty-two patients who were not (61% vs. 39%). Of the one-hundred eighty high risk patients originally identified, a total of forty-five patients were readmitted within three months.

Conclusion: Patients at our institution who opted into the bedside delivery service had a reduction in readmissions for high-risk patients. Further utilization of the bedside delivery service could potentially reduce rates of readmission and healthcare related costs in high-risk patients.

Sat-22. Impact of Triciribine in retinal neurovascular injury in a mouse model of ischemic retinopathy.

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Introduction: Diabetic Retinopathy (DR) is the leading cause of blindness in working-age adults in the U.S. Standard therapies such as Bevacizumab treating late-stage vasculopathy can cause neuronal damage, presenting a need for neurovascular protective agents. We have demonstrated that Triciribine (TCBN), an Akt inhibitor, limits neovascularization in the oxygen-induced retinopathy (OIR) model that mimics late-stage DR. Here, we investigated the impact of TCBN on neuronal/glial injury in OIR.

Research Question or Hypothesis: TCBN treatment does not cause neurodegeneration and will reduce glial injury in OIR.

Study Design: Mice were divided into four groups: RA-Vehicle, OIR-Vehicle, OIR-TCBN, and RA-TCBN ($n \geq 5$/group). The OIR mice were maintained in 70% oxygen from postnatal day (P) 7 to 12 followed by normoxia until P17. During P14-P16, TCBN groups received TCBN (1 mg/kg body weight, intraperitoneally). Vehicle groups received saline injections.

Methods: Retinal images collected using Optical Coherence Tomography (OCT) at P30 were used for retinal thickness analysis. GFAP (glial fibrillary acidic protein) immuno-stained retinal sections were imaged by confocal microscopy. Fluorescence intensity was quantified using NIH ImageJ. Statistical analyses (one-way ANOVA) were performed using Graphpad Prism.

Results: TCBN significantly reduced OIR-induced neovascularization ($p<0.05$). Retinal thickness measurements showed significant thinning of the total retina and inner retinal layers, suggesting OIR-induced neuronal loss ($p<0.05$). No significant differences were observed with TCBN in the OIR group, indicating that TCBN did not cause damage to retinal neurons. Significant decrease in GFAP (a marker of gliosis) fluorescence was observed in the TCBN groups relative to control, indicating that TCBN reduces OIR-induced glial injury ($p<0.0001$).

Conclusion: Compared to vehicle groups, TCBN did not result in increased neuronal damage, and significantly decreased the degree of glial injury experienced in OIR. With efficacy in reducing neovascularization previously established, TCBN shows promise as a potential neurovascular-protective treatment option for late-stage DR.

Sat-8. Implementation of an Interprofessional COVID-19 Vaccine Hesitancy Program for High School Students.

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Introduction: The WHO SAGE Vaccine Hesitancy Matrix provides vaccine hesitancy solutions based on contextual influences, individual and group influences, and vaccine/vaccination-specific issues. There are limited studies about the impact of using this matrix on high school students to improve their COVID-19 vaccine hesitancy rates.

Research Question or Hypothesis: Can an interprofessional, interactive vaccine hesitancy program change high school student's knowledge of and attitudes for the COVID-19 vaccine?

Study Design: Pre-post interventional study.

Methods: An panel of healthcare providers, public health workers, teachers, and religious leaders implemented an interactive curriculum about scientific findings on COVID-19 vaccines, recognizing misinformation, and overcoming COVID-19 vaccine hesitancy for underrepresented high school students using matrix principles. Afterwards, participants designed two videos featuring different topics to improve vaccine confidence. Students also applied the principles learned at a COVID-19 pharmacy vaccination clinic event to address vaccine-related misconceptions in the community. Entry and exit surveys for the participants were collected on a 5-point Likert scale. The McNemar test was used to evaluate changes from non-preferred to preferred responses with an alpha of 0.05.

Results: Forty-five students (38% 10th grade, 40% 11th grade, 48% Caucasian, 33% African-American) participated in the 4-month program. Significantly more students agreed in post-tests, $\chi 2(1, N = 31) = 4.167$, $p = 0.0412$, that: "I have adequate knowledge about SARS-CoV-2 disease." More students agreed in post-tests, $\chi 2(1, N = 31) = 6.750$, $p = 0.0094$, that: "I have adequate knowledge about the SARS-CoV-2 vaccine." Overall, 25 students (64%) agreed that "I have talked to my peers about information I learned during the program". Finally, 20 students (51%) agreed that "I am comfortable serving as a SARS-CoV-2 vaccine ambassador where I can promote the SARS-CoV-2 vaccine to my community."

Conclusion: This program increased the knowledge and attitudes of underserved students in vaccine hesitancy while being actively engaged in the SARS-CoV-2 pandemic that was disproportionately affecting their community.

Tues-87. Evaluation of opioid prescribing patterns among various racial and gender groups at Erie County Medical Center.

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Introduction: Opioid prescribing practices may have contributed to the opioid crisis in the United States. Previous research suggests racial disparities, with an overall increase in opioid use and higher doses in White patients compared to Black patients.

Research Question or Hypothesis: To determine institution-specific opioid prescribing patterns based on race and gender.

Study Design: A single-center retrospective chart review.

Methods: Electronic medical records were reviewed for adult patients who received an opioid prescription from 2017 to 2021 upon discharge. Data collected included: opioid prescribed, doses, service provider, indication, age, race, and gender. Opioid doses were converted to morphine milligram equivalent (MME) with high doses considered > 90 MME/day. Descriptive statistics were used to summarize categorical data with total MME as the standardized unit of comparison.

Results: We identified a total of 16,578 opioid prescriptions from the EMR (n=9863, White; n=6715, Black). The median MME for all prescriptions was 90 MME. White patients were prescribed significantly more opiates based on mean MME (162.07 (+/-280.97) vs. 136.63 (+/-323.37) p = <0.001) compared to black patients. High doses of MME (>90 MME/day) were prescribed to 9965 patients (White 56.7%, Black 32.8%). High doses of MME were prescribed to 57.9% of males and 42.1% of females. The overall trend of MME prescribed decreased in all races throughout the study period, however, the rate of decrease was faster in white patients than non-white patients.

Conclusion: There has been an overall downward trend in opioid prescribing within ECMC, but there remains a high volume of patients receiving doses of opioids >90 MME/day. White patients overall received higher MME/day compared to Black patients. Higher MMEs are prescribed to male patients compared to female patients at this institution. For all patients included in the four-year review, less than 50% received doses below 90 MME/day. This information can guide institution-specific practice surrounding pain management.

Pain Management/Analgesia

Mon AM-99. Low dose naltrexone for management of chronic pain in adults.

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Introduction: Naltrexone is a mu-opioid receptor antagonist historically used for substance use disorders. It is increasingly being used as an analgesic at significantly lower doses, ranging from 1 to 5 mg daily, in painful conditions like fibromyalgia.

Research Question or Hypothesis: Is low dose naltrexone (LDN) efficacious for treating chronic pain in adults?

Study Design: Retrospective, observational cohort study

Methods: Adults receiving LDN, defined as doses <10 mg for ≥1 month, for chronic pain seen at an outpatient clinic within an academic medical center from January 1st, 2014 to April 1st, 2022 were included. The primary outcome was change in the Pain, Enjoyment of Life, and General Activity (PEG) score from baseline after starting LDN. Secondary outcomes included dosing, dosage form, discontinuation frequency, and side effects.

Results: Thirty-one patients were included. Mean age was 49 ± 14.8 years and 71% (22) were female. Median duration of pain at baseline was 5 years (5 – 12). Mean PEG composite scores were 7.27 ± 1.39 and 6.62 ± 2.04 at baseline and follow-up, respectively. The mean difference was 0.66 (95% CI [0.10-1.21], p=0.022). Median naltrexone dose was 1.5 mg (1.5 – 2) and 3 mg (2 – 5) at baseline and follow-up, respectively. All patients self-compounded, with one transitioning to professional compounding after stabilization. Eighty-seven percent (27) of patients discontinued LDN, 52% (16) for lack of benefit, 23% (7) for loss of benefit, and 13% (4) for other reasons. Of those discontinuing LDN, median duration of use was 4 months (3 – 7). Seven patients (23%) reported side effects, three of which cited them as leading to discontinuation.

Conclusion: LDN was associated with a statistically significant reduction in PEG in adult patients with chronic pain, however this may not be clinically significant as over 75% of patients discontinued LDN due to lack or loss of benefit.

Mon PM-86. Rate of 30-Day Hospital Readmissions and ED Visits in Rib Fracture Patients Discharged on Inadequate Morphine Milligram Equivalents.

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Introduction: Rib fractures account for 10% of injured trauma patients. They are associated with significant morbidity and mortality, including hypoventilation from pain. This can lead to retention of pulmonary secretions and pneumonia. Opioids remain a vital component in controlling pain, and controlling pain at discharge is imperative. Despite favorable outcomes associated with adequate analgesia, there is currently no standard approach to discharge opioid management. We sought to identify if inpatient and outpatient morphine milligram equivalent (MME) ratio impacted hospital readmissions and ED visits.

Research Question or Hypothesis: Inadequate pain control at discharge increases the risk of patient reevaluation, defined as readmission or ED visit within 30 days, following rib fracture injury.

Study Design: Single center, retrospective, cross-sectional study of patients ≥18 years old with rib fractures requiring opioid therapy for pain control between January 2018 and December 2019.

Methods: The primary outcome was to determine if the ratio of MME utilization over 72 hours prior to discharge to prescribed MMEs at discharge impacts rate of reevaluation. This was assessed by comparing the average opioid use over the 72 hours prior to discharge to the opioid prescription at discharge. Patients were grouped based on their

discharge prescription being more than, less than, or equal to their 72-hour MME utilization. Secondary outcomes included the incidence of patients returning due to pain, opioid-related adverse events, pneumonia, or other.

Results: 748 patients were included. Of these, 111 returned seeking medical attention; 37.8% (n=42) due to a pain related complaint. Among these patients, 47.6% (n=20), 45.2% (n=19), and 7.1% (n=3) were discharged on more than, less than, and equal to their 72-hour average, respectively. This result was not significant (p=0.65).

Conclusion: Our results indicate that differences in the 72-hour average MMEs and discharge prescription do not impact 30-day reevaluation in rib fracture patients. Further investigation into risk factors for pain related reevaluations is warranted.

Sun-94. Evaluating gabapentin tolerance, naivete, and the incidence of respiratory depression during the perioperative period.

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Introduction: There is conflicting data regarding the incidence of gabapentin associated respiratory depression (GARD) in the perioperative period. While GARD risk factors such as advanced age, history of respiratory illness, and concomitant use of other respiratory depressants have been identified, there are no studies that correlate perioperative GARD with gabapentinoid naivete or tolerance.

Research Question or Hypothesis: The incidence of postoperative GARD is higher in gabapentinoid naïve patients who receive gabapentinoids during orthopedic surgeries than in gabapentin tolerant patients.

Study Design: retrospective case control study

Methods: A randomized retrospective chart review of 300 orthopedic surgeries conducted from 1/1/2020-12/31/2020 was reviewed. Orthopedic surgeries that included perioperative gabapentinoid administration as part of a multi-modal analgesia surgical care plan were analyzed. Chi-square and relative risk were calculated to determine the impact of gabapentin naivete versus tolerance on perioperative GARD. The time between gabapentin administration and the hypoxic event was also measured. Hypoxia was defined as oxygen desaturations <90%. Patients were categorized as gabapentinoid tolerant if there was a gabapentinoid prescription on the home medication list during the pre-admission assessment. Naïve patients had no outpatient gabapentinoid prescription.

Results: There was no statistically significant difference in hypoxia rates between gabapentinoid naïve or tolerant patients [$x^2(3, N=300)=5.82$, p=0.122]. Patients who received gabapentinoids perioperatively and experienced oxygen desaturations (N=63) were predominantly female (68%), >60 years old (57%), opioid naïve (84%), and had a history of respiratory illness (65%). Oxygen desaturations primarily occurred on post operative day 0, approximately 6 hours after the gabapentin dose (average 5.89 hours, median 6.02 hours). There was a 0.58 relative risk of hypoxia in gabapentin naïve patients compared to gabapentinoid tolerant patients when gabapentinoids were administered perioperatively.

Conclusion: Prior gabapentinoid exposure does not influence hypoxia when gabapentinoids are given perioperatively.

Sun-95. Communication regarding opioid prescriptions among patients discharged from the hospital to nursing homes.

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Introduction: Patients are frequently prescribed opioids on discharge from the hospital to nursing homes (NHs). Clear communication regarding these prescriptions is critical to optimize pain management and minimize opioid-related harms.

Research Question or Hypothesis: What is the frequency of missing communication regarding opioid prescriptions among patients discharged from the hospital to a NH?

Study Design: Retrospective cohort study utilizing a 10% random sample of adults (age ≥18 years) admitted to a NH from an acute care hospital with an opioid prescription between January 1, 2016, and December 31, 2018. We included data from a for-profit chain of 17 NHs in Oregon, California, and Nevada.

Methods: Two student pharmacists manually reviewed NH electronic health records including patients' discharge summaries from the index hospital admission. Our primary outcomes were documentation of the opioid indication and follow-up instructions regarding continuation, discontinuation, adjustment, or tapering in the patients' discharge summary.

Results: Among 303 initially identified patients, 93 (31%) were excluded because they were missing a discharge summary (n=62) or lacked an opioid prescription in their discharge summary (n=31). The final sample size was 210 patients who received 272 opioid prescriptions on discharge from the hospital to a NH. Mean (standard deviation) age was 75 (11.2) years and 62.1% were female. The most frequently prescribed opioids were oxycodone (43%), hydrocodone (21%), and tramadol (11.7%). Overall, 159 (58.4%) of opioid prescriptions did not have a documented indication on the discharge summary and 147 (70%) of 210 patients had documentation of follow-up instructions. Among the 147 patients with documented follow-up instructions, only 9 (6.1%) had explicit information regarding opioid continuation, discontinuation, adjustment, or tapering.

Conclusion: Less than half of the opioids prescribed on discharge from the hospital to a NH had a documented indication in their discharge summary and 30% did not have documented follow-up instructions.

Pediatrics

Sat-20. Dynamics of Urinary Biomarkers to Detect Acute Kidney Injury in Critically Ill Children Receiving Vancomycin.

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Introduction: Vancomycin is frequently associated with acute kidney injury (AKI). Standard-of-care for detecting AKI is change in serum creatinine (SCr) and urine output, which are limited in children. Urinary kidney injury molecule-1 (KIM-1) and neutrophil gelatinase-associated lipocalin (NGAL) have been successful in identifying drug-induced kidney injury in other populations. The purpose of this study was to evaluate the dynamics of urinary KIM-1 and NGAL in critically ill children receiving vancomycin.

Research Question or Hypothesis: In critically ill children receiving vancomycin, there is a difference in the dynamics of urinary NGAL or KIM-1 concentrations between those that did and did not develop AKI.

Study Design: Single-center prospective, cohort study.

Methods: Children aged 0 (corrected gestational age 42 weeks) to 18 years, admitted to the pediatric intensive care unit, and who received vancomycin were eligible. Three urine specimens were collected: baseline (between 0 and 6 hours of first vancomycin dose), second (18-24 hours after the baseline) and third (36-48 hours after the baseline). Concentrations of KIM-1, NGAL and urinary creatinine (UCr) were assessed in each urine sample using ELISA. AKI was defined as a ≥50% increase in SCr from baseline. Hypothesis tests compared changes in urinary biomarker concentrations from baseline to peak between AKI and no-AKI groups using SASv9.4 with alpha=0.05.

Results: Forty-eight children (52.1% male; median age=6.4 years) were included. Eight (16.7%) developed AKI. Change in mean KIM-1 concentrations were greater in children with AKI (6060 ± 11165 pg/ml) versus no-AKI (340 ± 542 pg/ml; p=0.0015). Change in mean NGAL concentrations were greater in children with AKI (713196 ± 1216474 pg/ml) versus no-AKI (16101 ± 37812 pg/ml; p=0.0004). UCr was not different between groups.

Conclusion: KIM-1 and NGAL increased significantly more among children with AKI during the first 48 hours of treatment with vancomycin compared to those with no-AKI and therefore may be useful as prospective markers of AKI.

Sat-2. Observational analysis of off-label drug use in a pediatric palliative care (PPC) service: different perception between clinical pharmacists and pediatricians.

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Introduction: Off-label drug use is defined as drugs prescribed and used outside their licensed indications (Summary of Product Characteristics) with respect to dosage, age, indication or route. Due to the lack of drugs specifically designed and marketed for children, off-label drug use is very common in pediatric drug treatment, with the highest percentage of undocumented drugs' prescriptions. Rates of off-label use vary widely within the same setting of care, and even within the same country. One reason for this to happen may be related to different definitions and perception of "off-label".

Research Question or Hypothesis: In a cohort of children from PPC, is there any difference in perception and judgement between clinical pharmacists and physicians on off-label use?

Study Design: Retrospective observational study

Methods: Each prescription referred to the PPC in 2021 was evaluated separately by a team of three pediatricians and a team of two pharmacists. The two groups, independently and based on their own knowledge, had to indicate for each prescription whether the drug was used on or off-label. For appropriate evaluation, each group could consult the patient's medical records, international guidelines and SmPCs of the various prescribed drugs. Data were anonymized and subsequently analysed through R software.

Results: 924 different prescriptions were reviewed from 169 patients. The group formed by physicians indicated 319 off-label uses (34.5%), while the pharmacists' group 456 (34.5% vs 49.3%, p<0.001). Physicians specified all uses for different indications than reported in SmPC, while pharmacists also highlighted off-label uses by age (n=102), route (n=33) and dosage (n=167).

Conclusion: Our study showed that there is a different approach among health care providers: physicians seem to rely more on international guidelines and literature data, while pharmacists mostly refer to SmPCs. There appears to be an increasing need for a multidisciplinary approach to ensure the right drug to the right patient, especially in the setting of PPCs.

Mon AM-101. Respiratory Syncytial Virus Hospitalization in Preterm Infants Following the 2014 AAP Palivizumab Guidelines.

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Introduction: In 2014, the American Academy of Pediatrics published a revised policy statement further restricting the use of respiratory syncytial virus immunoprophylaxis (RSV-IP) with palivizumab. RSV-IP is no longer recommended for preterm infants born at 29-34weeks' gestational age (wGA) without chronic lung disease mainly due to ongoing concerns about the cost-effectiveness of RSV-IP. Although other studies have sought to evaluate the impact of these updated recommendations, the reports were limited by the use of administrative health claims data only.

Research Question or Hypothesis: The purpose of this study was to compare RSV hospitalization (RSVH) rates and their associated costs before and after the updated 2014 statement.

Study Design: Retrospective, cohort study of preterm infants born between 2012-2017 and qualified according to the 2012 recommendation were included.

Methods: Post-policy changes in RSVH rates were assessed in covariate-adjusted difference-in-differences (DID) models with robust standard errors.

Results: The study included 341 infants born less than 35wGA. Among this, 176 infants were born at 29-34wGA; 70 from Cohort 1 (2012-2014) and 106 from Cohort 2 (2014-2017). No difference was observed in RSVH rates between Cohorts 1 and 2 (2.9% versus 2.8%, P=0.998). There was a trend towards an increase in RSVH among the 341 infants between Cohorts 1 and 2 (2.3% versus 7.4%, DID +5.1%, P=0.23). No deaths occurred in either cohort. The overall mean RSV-associated cost per at-risk patient was significantly lower in Cohort 2 ($1059, 95% CI $-323-2441) versus Cohort 1 ($10,756, 95% CI $8,890-12,622), P<0.001, resulting in a total cost savings of $378,280 per year.

Conclusion: The 2014 statement did not result in an increase in RSVH in infants born 29-34wGA. The overall drug and hospitalization cost per at-risk patient decreased significantly without increased in morbidity and mortality. This was primarily driven by the reduced drug costs that would have been invested in those infants not qualifying based on 2014 statement.

Tues-90. Implementing a Pharmacy-Led Sexual Education Risk Avoidance Workshop for Adolescents.

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Introduction: Making a Difference (MAD) is an evidence-based curriculum that provides young adolescents with the knowledge and skills necessary to reduce their risk of STDs, HIV, and pregnancy. Limited studies have studied the MAD curriculum impact among adolescents in a medically underserved area.

Research Question or Hypothesis: Does a pharmacy-led MAD curriculum change promote safer sexual practices among youth?

Study Design: Pre-post interventional study.

Methods: One pharmacist and 3 pharmacy students implemented the MAD curriculum at two afterschool programs in Somerset County for adolescents aged 11-16. A total of 24 modular lessons were covered in the curriculum including self-esteem, personal boundaries, STDs, HIV, pregnancy, and the benefits of both sex and abstinence. Changes in a 5-point Likert survey before and after the curriculum was used to determine program efficacy. The survey questions assessed participant's likelihood to perform risky behaviors, decision making, emotional behaviors, ability to seek help, long term goals, and program performance. Descriptive statistics and paired student T-test with an alpha of 0.05 was collected.

Results: Fifty-one youth aged 12 ± 0.71 years completed the 2-week program, 90.2% of whom were Black/African American and 68.6% female. All participants stated that they were interested in the program and 50 youth (98.0%) felt that the discussions and activities helped them learn. After completion, all participants improved their understanding about what made a relationship healthy (P = 0.02) and 96% stated they were able to resist sexual pressures (P = 0.04). All participants were more likely to talk to a trusted adult if their partner made them uncomfortable or pressured (P = 0.04). Finally, the majority of youth stated that they were able to manage their emotions in healthy ways (92.1%) and think about the consequences before making decisions (98.0%).

Conclusion: The MAD curriculum taught by pharmacy staff appears to have some positive effects in educating adolescents about sexual behavior in relationships.

Sat-17. Impact of injectable lipid emulsion choice on rates of *Staphylococcus* spp. catheter-related bloodstream infections in pediatric patients receiving parenteral nutrition and biofilm formation in coagulase-negative staphylococci.

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Introduction: Administration of soybean-oil injectable lipid emulsion (SO-ILE) is associated with bloodstream infections, likely due to impaired immune function and promotion of bacterial biofilm formation. The impact of mixed-oil ILE (MO-ILE) on catheter-related bloodstream infections (CR-BSI) and staphylococcal biofilm formation is unknown.

Research Question or Hypothesis: Do staphylococcal CR-BSI rates and in-vitro biofilm formation differ between MO-ILE and SO-ILE?

Study Design: Retrospective cohort study of pediatric patients at Le Bonheur Children's Hospital from January 2015 to July 2019; crystal violet assay for biofilm quantitation of coagulase-negative staphylococcal (CoNS) isolates.

Methods: Patients that received at least 7 days of SO-ILE or MO-ILE with PN were included. Number of positive blood cultures during ILE therapy requiring at least seven days of antimicrobials were recorded. Mixed-effects, multivariable Poisson regression assessed differences in infection rates. For biofilm assessment, crystal violet staining was

	Infection Rate/1000 Lipid Days		Incidence Rate Ratios	
Category	MO-ILE	SO-ILE	IRR (95% CI)	Sig
CoNS*	0.87	2.71	0.28 (0.15-0.43)	< 0.0001
MRSA	0.50	0.36	1.33 (0.61-2.90)	0.4761
MSSA*	0.23	0.66	0.31 (0.11-0.92)	0.0355

From CoNS isolates tested, ILEs did not support biofilm formation of *S. capitis*, *S. haemolyticus*, or *S. lugdunensis* compared to TSB controls. For *S. epidermidis* (NRS101) and *S. hominis* (KL243), biofilm formation was reduced in MO-ILE compared to SO-ILE, though not a statistically significant difference.

performed following growth in varying concentrations of SO-ILE and MO-ILE added to trypticase soy broth (TSB).

Results: 761 SO-ILE and 457 MO-ILE exposures were reviewed totaling 39,135 and 21,887 days of therapy, respectively. Infection rates between the two formulations are listed:

Conclusion: Receipt of MO-ILE was associated with lower rates of CoNS and MSSA CR-BSIs. Among the studied isolates, a significant difference in biofilm formation was not found between the two formulations. Rate differences may be due to specificity of infection-associated species or isolates.

Sat-7. Improving precision of vancomycin dosing in neonates based on clinical outcomes and population pharmacokinetics.

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Introduction: Neonatal sepsis is commonly treated with vancomycin in the neonatal intensive care unit (NICU). Vancomycin dosing remains a challenge due to significant pharmacokinetic variability and unclear vancomycin target range in neonates.

Research Question or Hypothesis: What is the target range for vancomycin trough concentration or area-under-the-concentration-time-curve-over-24-hours (AUC_{24h}) associated with lowest risk of persistent/recurrent infections and mortality or acute kidney injury in neonates admitted to the NICU?

Study Design: Retrospective, quantitative cohort study

Methods: A population pharmacokinetic (popPK) model was derived and validated from vancomycin concentrations drawn from neonates receiving intravenous vancomycin using nonlinear mixed effects modelling method (NONMEM). The associations between vancomycin trough concentrations and persistent/recurrent infections and mortality or acute kidney injury were assessed using logistic regression and classification and regression tree (CART) analyses in R. Monte Carlo simulations (MCS) were performed to derive optimal dosing regimens.

Results: A one-compartment popPK model best described the observed data from 655 vancomycin courses in 448 neonates. A strong association between time to reach target range and composite outcomes was demonstrated (p=0.005). A vancomycin trough concentration of ≥10 mg/L was associated with lower odds of persistent/recurrent infections (adjusted odds ratio: 0.3, 95% confidence interval (CI): 0.09-0.86, p=0.023) and >15 mg/L was associated with increased risk of acute kidney injury (adjusted hazard ratio of 2.94, 95% CI: 1.10-7.90, p=0.003). A linear relationship between trough concentration and AUC_{24h} was observed (p<0.0001). CART-derived AUC_{24h} of 417-639 mg*h/L appeared to be associated with lowest risk of outcomes (p=0.02). MCS-derived vancomycin dosing regimens based on popPK model showed significant improvement in target attainment.

Conclusion: A vancomycin trough target range of 10-15 mg/L was associated with most optimal outcomes in treating neonatal sepsis, which supports using vancomycin trough concentrations for therapeutic drug monitoring in neonates. A vancomycin dosing guideline using loading dose was derived to increase probability of target attainment and time at target in neonates.

Sun-96. Reducing Fluid Overload in Pediatric Patients Through a Revised To Keep Open Protocol.

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Introduction: There is no established evidence-based guidance for appropriate to- keep open (TKO) rates in pediatric patients. Higher TKO rates may lead to increased fluid burden which is associated with increased morbidity and mortality in pediatric patients.

Research Question or Hypothesis: Evaluate the impact of a modified TKO protocol on overall fluid overload in hospitalized pediatric patients.

Study Design: Retrospective cohort study

Methods: A retrospective chart review was performed to identify pediatric patients hospitalized at an academic medical center from 2017 to 2019. Patients were aged 1 month to 18 years and received TKO fluids for at least 24-hours. Pre-protocol TKO rate was 20 ml/hr, and post-protocol rate was 5-10 ml/hr. Patients were characterized as high-risk for fluid overload if TKO fluids provided greater than 10% total maintenance fluids. Secondary outcomes evaluated line patency and replacement, clinical edema, and need for diuresis.

Results: A total of 99 subjects were included in the analysis, 49 in the pre-protocol cohort and 50 in the post-protocol cohort. Patients in the pre-protocol group were more likely to have received >10% maintenance fluids through TKO compared to those in the post-protocol group (83.7% vs. 62%, p=0.0155). Secondary analyses revealed similar rates of line replacement (20.4% vs 14%), alteplase use (20.4% vs. 10%) clinical edema (38.8% vs. 34%) and need for diuresis (20.5% vs. 16%) between pre- and post-protocol cohorts.

Conclusion: Implementation of lower TKO rate of 5-10 ml/hr decreased the risk of fluid overload without further complications of line occlusion or replacement.

Peri-Operative Care

Tues-51. Effectiveness of post-operative pain management among surgical patients in Namibia.

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Introduction: Effective management of post-operative pain improves patient outcomes and quality of life. Although internationally validated pain scales have been implemented for evaluation of post-surgical pain, most patients who undergo surgery in both high-income and low- and middle-income countries continue to experience ineffective management of acute pain.

Research Question or Hypothesis: To assess effectiveness of post-operative pain management among surgical ward patients at a public hospital in Namibia.

Study Design: Prospective cohort

Methods: A prospective cohort design was utilized to assess post-operative pain at 24 hours and 48 hours using two different pain assessment tools: visual analogue scale (VAS) and numeric pain scale (NPS). Data related to prescribing patterns of pain medications and demographics were collected from patient's clinical records using a standardized data collection tool. Effectiveness was determined by comparing the proportion of patients with moderate to severe pain at 24 hours (24h) and 48 hours (48h) post-operatively.

Results: A total of 75 participants were enrolled; 48 (64.0%) were male. The mean age was 37.41± 11.13 years. Most (74.7%) experienced moderate-severe pain at 24h post-operatively (median VAS 6.50±2.46; NPS 5.00±2.32) which reduced to 41.3% with moderate-severe pain by 48h (median VAS 3.50±2.22; NPS 3.00±2.23). The most prescribed analgesics were paracetamol injection (68%), strong opioids (54%), and weak opioids (23%) while adjuvants and NSAIDs accounted for 8% each, respectively. Only 47 (62.7 %) followed WHO pain ladder for pain management.

Conclusion: Well over 5% of the study participants experienced moderate-severe pain at 48h post-operatively compared to a UK target of less than 5%, showing inadequate management of pain. There is a need to more frequently assess patient's level of pain after surgery to ensure effective pain management. Further, pharmacists have a role in ensuring appropriate use of the WHO pain ladder to ensure that post-operative pain is more effectively controlled.

Pharmacoeconomics/Outcomes

Sun-100. Agreement of and Disparities in ICD-10 Medication Nonadherence Coding among Veterans with Uncomplicated Diabetes.

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Introduction: While some misalignment in ICD-10 medication nonadherence coding has been observed, the extent to which bias exists in the use of these codes is not fully understood.

Research Question or Hypothesis: To what extent is racial bias evident among patients coded for nonadherence to oral antidiabetic medications according to ICD-10 codes?

Study Design: Retrospective cohort study

Methods: Patients were identified using the US Veterans Affairs Corporate Data Warehouse from 2002-2018. To be included, patients must have been coded nonadherent in outpatient encounter data (ICD-10: Z91.1-Z91.13, Z91.14, Z91.19), had a primary diagnosis for uncomplicated diabetes, and at least two oral antidiabetic medication fills plus 12 months continuous enrollment before and after the nonadherence diagnosis. Tests of proportion, chi-squared tests, McNemar's tests, generalized linear models, and logistic regression examined characteristics related to diagnosis agreement and changes in adherence (by proportion of days covered [PDC]) before and after the initial nonadherence code.

Results: A total of 1,924 patients coded nonadherent were identified, among which 988 (51.4%) had PDCs prior to the nonadherence code that would deem them adherent. The odds of being correctly labeled nonadherent when claims also indicated nonadherence decreased with age (OR: 0.98; 95% CI: 0.968-0.987) but was more likely among minority veterans compared to Whites (OR: 1.79; 95% CI: 1.454-2.194). PDCs and the proportion adherent increased slightly following the nonadherent code (all p<0.0001). Those more likely to be adherent after the nonadherence diagnosis included minorities (OR: 1.30; 95% CI: 1.043-1.624), those on a sulfonylurea (OR: 1.36; 95% CI: 1.050-1.758), and those adherent before the diagnosis (OR: 4.94; 95% CI: 4.017-6.065).

Conclusion: Veterans with diabetes are often misclassified as nonadherent when their oral medication use meets acceptable thresholds. Direct observation of why providers deem patients nonadherent will

be necessary to more clearly interpret the racial bias observed in these data.

Sat-24. Medication Regimen Complexity as a Predictor of Diabetes Outcomes in Underserved Non-Hispanic Black Adults Living with Diabetes.

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Introduction: Diabetes mellitus is a public health issue that disproportionately affects the African American community. The pathophysiology of diabetes consists of many factors and the progressive nature of the condition often requires use of multiple medications from different anti-hyperglycemic therapeutic classes. The medication regimen complexity index (MRCI) is a tool used to measure medication regimen complexity (MRC) by accounting for all medications that the patient is taking. This study aims to identify associations between diabetes MRC, glycemic (HbA1c), low-density cholesterol (LDL-C), and blood pressure (BP) control.

Research Question or Hypothesis: What is the relationship between diabetes MRC and HbA1c, LDL-C, and BP control?

Study Design: Single center, cross sectional, retrospective chart review conducted January 2010 to June 2021

Methods: Medication regimens, sociodemographic, and health-related data of 470 patients were collected from the electronic health record and analyzed with the MRCI tool. Chi squared tests were applied to categorical predictor variables (MRC groups: low, moderate, high) and dichotomous clinical outcomes (HbA1c, LDL-C, and BP control). Multiple logistic regression was performed to identify predictors of HbA1c, LDL-C, and BP control. Data were analyzed with SPSS v25 and p-value <0.05.

Results: Diabetes MRC was associated with HbA1c and LDL-C control in all groups (p<0.001). However, diabetes MRC was not associated with BP control in any groups. Adjusting for sociodemographic and health-related covariates, when compared to patients with low diabetes MRC, patients with moderate and high diabetes MRC were almost 6 times and 21 times more likely to lack glycemic control, respectively (p<0.05). Finally, patients with moderate MRC were 48% less likely to have uncontrolled LDL-C (p<0.05).

Conclusion: High and moderate diabetes MRC predict poor glycemic control indicating that medication regimens of lower complexity and additional interventions might be needed to achieve glycemic control. Future research should investigate community partnered approaches to glycemic control with Non-Hispanic Black adults living with diabetes.

Pharmacoepidemiology

Sun-102. Relationship between initial opioid exposure and healthcare utilization among those with alcohol use disorder.

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Introduction: Alcohol use disorder (AUD) in the United States is a highly prevalent problem, particularly since alcohol is an accessible substance of abuse. Co-utilization of alcohol and opioids is well-documented and associated with poor health outcomes. However, investigation into opioid use among those with AUD is sparse, specifically the relationship between initial opioid exposure and healthcare utilization (HCU) and mortality in the following 12 months.

Research Question or Hypothesis: We hypothesize that initial opioid exposure among AUD patients is associated with increased HCU and mortality within 12 months.

Study Design: This was a retrospective cohort analyzing merged data from the NYS Office of Addiction Services and Supports (OASAS) Client Data System and the NYS Department of Health Medicaid Data Warehouse.

Methods: Subjects aged 18 to 65 with primary AUD were identified from OASAS certified treatment programs between 2005 and 2018. Exposure was a first opioid prescription claim following initial OASAS treatment. Outcomes included HCU (emergency department [ED] visits and hospitalizations) and all-cause mortality within 12 months after exposure. Incidence rates per 100 persons were calculated for HCU. Poisson and logistic regression models were used to analyze HCU and all-cause mortality, respectively, whilst adjusting for differences between groups (IBM SPSS version 27).

Results: A total of 151,210 subjects were identified with 64,087 subjects exposed to opioids. Overall HCU incidence rate after 12 months was higher in the opioid group vs. controls (300.3 vs 92.8 per 100 persons, p<0.001). In adjusted models, opioid use was associated with increased risk of HCU (aIRR, 3.19; 95% CI, 3.15-3.23; p<0.001), hospitalizations (aIRR, 4.16; 95% CI 4.01-4.33, p<0.001), and ED visits (aIRR, 3.42; 95% CI 3.36-3.48, p<0.001). Opioid exposure was associated with 2-fold higher risk of mortality within 12 months (aOR, 2.01; 95% CI 1.49-2.71, p<0.001).

Conclusion: These results suggest opioid exposure among AUD patients is associated with increased risk of HCU and mortality.

Mon PM-91. Health equity of monoclonal antibody usage at a tertiary institution: a descriptive study.

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Introduction: Health inequities in COVID-19 have led to disproportionate access to care and health outcomes.

Research Question or Hypothesis: To describe the demographics of patients accessing COVID-19 monoclonal antibodies (mAb) at an urban, tertiary medical center.

Study Design: A retrospective descriptive study.

Methods: Patients ≥18 years of age with a positive SARS-CoV-2 viral test and received bamlanivimab or casirivimab/imdevimab at the University of California San Francisco (UCSF), between December 3, 2020, and October 3, 2021. Patients were stratified by race/ethnicity and geographic area. Covariates included sex, age, days of symptoms, vaccination status/type, hospitalization, and length of hospital stay. For comparison, data describing race/ethnicity, COVID-19 cases, death, and the California Healthy Places Index (HPI) and Healthcare Access (HA) scores associated with zip codes were obtained from the City and County of San Francisco and the Public Health Alliance of Southern California. Statistical significance was determined at $p < 0.05$. This study was approved by the UCSF Institutional Review Board.

Results: Of 559 patients who received mAb, 45.5% were White/Caucasian, followed by Latinx (16.2%), Asian (14.4%), and Black/African American (10.4%). Compared to White/Caucasian, Latinx patients were significantly younger, unvaccinated, and predominantly female. Asian patients were more likely to receive mAbs in the Emergency Department; Black/African American patients were more likely to be unvaccinated. More than half of the cohort who received mAb were from higher HPI and HA areas. There was a significant positive correlation between HPI score and White/Caucasian population (R^2=0.21, $p< 0.05$). Significantly less Latinx, Asian, and Black/African American who received mAb were observed in the higher HPI and HA score groups compared with White/Caucasian ($p < 0.05$). The rate of hospitalization was significantly higher in Asian patients (18.6%) compared to White/Caucasian patients (6.7%) ($p < 0.001$).

Conclusion: Imbalances in the racial/ethnic makeup, HPI and HA scores highlight potential inequities to mAb utilization and subsequent clinical outcomes.

Mon PM-90. Patterns of hypoglycemic agents use in hospitalized patients with type 2 diabetes mellitus and non-alcoholic fatty liver disease: An analysis of National Inpatient Sample database in Korea.

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is a rapidly growing disease worldwide and closely related to type 2 diabetes mellitus (T2DM). Optimal hypoglycemic therapy in patients with NAFLD and T2DM is important to slow the progression of disease and improve long-term patient outcomes.

Research Question or Hypothesis: What are the patterns of hypoglycemic agents use in patients with T2DM according to NAFLD?

Study Design: A cross-sectional study with the National Inpatients Sample (NIS) database compiled by the Health Insurance Review Agency (HIRA) in Korea.

Methods: We analyzed the HIRA-NIS database from 2017 to 2020, and hospitalized patients aged over 30 diagnosed with T2DM were included. We examined the usage patterns and trends for hypoglycemic agents other than metformin in patients with T2DM according to NAFLD. Also, we analyzed the use of monotherapy, dual, and triple or more combination therapy of hypoglycemic agents.

Results: A total of 360,097 patients with T2DM were included. Throughout the study period, dipeptidyl peptidase-4 inhibitors (DPP4-inhibitors) were the most frequently prescribed agent (49.2-51.3%), followed by sulfonylureas (29.5-33.8%) among hypoglycemic drugs in addition to metformin. The use of sodium-glucose cotransporter-2 inhibitors (SGLT-2 inhibitors) and glucagon-like peptide-1 receptor agonists (GLP-1 RAs) tended to increase from 2017 to 2020, in both those with or without NAFLD. In addition, metformin-based triple or more combination therapy was most common (45.0-45.6%), followed by dual therapy (37.7-38.6%) and monotherapy (16.2-17.3%).

Conclusion: The use of SGLT-2 inhibitors and GLP-1 RAs were increased over time in the patients with or without NAFLD. Our findings may help to understand the overall patterns of hypoglycemic agents use in patients with T2DM according to NAFLD.

Pharmacogenomics/Pharmacogenetics

Sat-37. Comparison of 3-, 6-, and 12-month Genotype-Guided Antiplatelet Therapy Clinical Outcomes and P2Y12 Antiplatelet Prescribing Trends Following Percutaneous Coronary Intervention.

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Introduction: Clopidogrel remains widely prescribed with dual antiplatelet therapy (DAPT) following percutaneous coronary intervention (PCI). However, extensive *CYP2C19* variation may reduce clopidogrel effectiveness. Suboptimal DAPT per *CYP2C19* genotype may increase the risk of major adverse cardiovascular events (MACE). Although previously published post-hoc trial data suggest potential benefit in the early phase of DAPT, the impact of genotype-guided antiplatelet therapy on the timing of MACE and bleeding events remain unclear.

Research Question or Hypothesis: To compare MACE and bleeding outcomes at 3, 6, and 12 months and $P2Y_{12}$ antiplatelet prescription trends in patients prescribed pharmacogenetically (PGx)-optimal versus PGx-suboptimal DAPT.

Study Design: Retrospective cohort observational study

Methods: Medical records of adults 18 years and older who underwent PCI and received genotype guided $P2Y_{12}$ antiplatelet therapy between January 2017 and May 2021 were reviewed and included. Primary outcomes included MACE and any bleeding at 3-, 6-, and 12-months following index PCI. Secondary outcomes included the proportion of $P2Y_{12}$ antiplatelet agents prescribed per year. Data were analyzed using Kruskal-Wallis and Chi-Square tests.

Results: A total of 690 patients were included (65% male, median age 64 years, 79% non-European, 48% with acute coronary syndromes). Of these patients, 87% were prescribed PGx-optimal DAPT. There were no differences in 3 (7% vs 9%), 6 (4% vs 5%), and 12 (8% vs 10%) month MACE or 3 (3% vs 2%) and 6 (1% vs 3%) month bleeding between the PGx-optimal and PGx-suboptimal groups except for 12-month bleeding (4% vs 9%, p=0.031). Clopidogrel (71%) was most commonly prescribed, followed by ticagrelor (21%) and prasugrel (8%). There was no difference in proportion of $P2Y_{12}$ antiplatelet agents prescribed from year to year.

Conclusion: In this predominantly non-European population, genotype guided DAPT did not appear to have a temporal impact on MACE. Further study is needed to evaluate baseline factors that contribute to long-term bleeding risk in patients receiving PGx-suboptimal DAPT.

Sat-36. Public attitudes toward pharmacogenomic testing and establishing a statewide pharmacogenomic data shelter in Minnesota.

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Introduction: Pharmacogenomics (PGx) represents an opportunity to improve patient care and advance precision medicine. Accumulating consensus guidelines and FDA labeling support utilizing PGx information for some drugs in clinical care, but uptake beyond academic medical centers remains limited. As an initial step in a statewide PGx implementation and research initiative in Minnesota, we engaged community members to identify opportunities and barriers.

Research Question or Hypothesis: To determine public attitudes about PGx testing and establishing a statewide PGx data shelter for clinical and research use.

Study Design: Cross-sectional

Methods: Data was collected at the 2021 Minnesota State Fair from adults using a 53-item survey of sociodemographics, health-related characteristics, health literacy, and opinions regarding PGx testing and research. Associations between the acceptability of developing a statewide PGx data shelter and participants' characteristics were examined with pairwise correlation and logistic regression.

Results: Among 808 respondents, the majority were females (63.2%), non-elderly (87.8%), White (84.3%), and had attained some college education (90.1%). Most took ≥1 prescription medication (64.5%), with those taking ≥3 expressing more concerns about side-effects and effectiveness. Most (84%) respondents felt comfortable getting a PGx test for clinical care. Although 44% acknowledged worry about data privacy, the majority trusted healthcare professionals (78.2%) and researchers (73.0%) to keep their PGx data private. Most were in support of a statewide PGx database for clinical (69.1%) and research use (72.1%). Younger age, higher education, higher health literacy, having health insurance, and having prior genetic testing were associated with acceptability of the statewide PGx data shelter.

Conclusion: Most of this sample of Minnesotans expressed acceptability of PGx testing and data sharing for clinical and research use. Community support and engagement are needed to advance PGx implementation and research. The approach to engaging community member stakeholders may serve as a model for other states interested in pursuing statewide PGx initiatives.

Sat-46. An Evaluation of a Pharmacist-led Pharmacogenomic Testing Workflow in post-STEMI Patients.

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Introduction: Pharmacogenomic testing tailors drug therapy to maximize efficacy and reduce adverse effects using patient genetics. Pharmacist-driven testing programs for CYP2C19 and P2Y12 inhibitor therapy have been championed but little data exist on pharmacist effort and cost impact of such programs.

Research Question or Hypothesis: To characterize the clinical process and financial estimates of a pharmacist-led pharmacogenomics clinic that focuses on CYP2C19 genetic testing in ST-segment elevated myocardial infarction (STEMI) patients post-percutaneous coronary intervention (PCI).

Study Design: Retrospective, observational study at a large academic medical center.

Methods: STEMI patients who received PCI and P2Y12 inhibitor at discharge were included. The primary endpoint was estimated pharmacist time per patient. Secondary endpoints included percentage of patients who participated in testing, mean cost of pharmacist time and cost differences associated with changes in drug therapy. Safety endpoints included net adverse clinical events (NACE; death from any cause, recurrent MI, definite stent thrombosis, stroke, or major bleed) within 30 days of the index event or therapy change.

Results: Twenty-one (15.3%) out of 137 patients completed testing. Population was mostly male (71.7%) with a mean age 60.45 ±13.29 years. Majority had Medicare (28.3%) or Medicaid (26.3%) and were discharged on ticagrelor (49.5%) or clopidogrel (47.5%). Estimated time spent by pharmacists averaged 110 minutes (1.83 hours) per patient with estimated cost $106.14 per patient. Phenotypes were ultra-rapid (n=1), rapid (n=8), normal (n=2), intermediate (n=9), and poor (n=1). Total of five out of seven (71.4%) indicated patients were switched from ticagrelor to clopidogrel with estimated drug cost savings of $17,415. There were four NACE (death [n=1], recurrent MI [n=2], major bleed [n=1]). No NACE occurred in patients who switched therapy.

Conclusion: Genotype-guided therapy for P2Y12 inhibitors led by pharmacists may potentially provide an opportunity to save costs for both payers and patients.

Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

Tues-96. Does Left-Lateral Decubitus (LLD) Posture Affect Theophylline Absorption?: Exploratory Analysis of a Prospective, Randomized, Steady-State Study in Stable Adult Asthmatic/COPD Patients..

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Introduction: Plasma-[theophylline]-concentrations are significantly lower while supine-versus-standing (Warren, 1983,1985). Theophylline, a Biopharmaceutics Classification System I drug-(BCS 1) is well-absorbed, highly permeable (Lindenberg, 2004).

Research Question or Hypothesis: We explored whether left lateral decubitus-(LLD) posture, which slows gastric emptying (Burn-Murdoch,1980) influences steady-state serum [theophylline$_{ss}$] concentrations in stable asthma/COPD patients, vs. sitting.

Study Design: We retrospectively examined data from a previously-conducted prospective study.

Methods: Our IRB-approved-study (all signed consent) compared serum [theophylline$_{ss}$] absorption profiles under two randomized conditions: recumbent-LLD- vs. sitting-posture. Stable, theophylline-treated adult asthmatic/COPD patients on individualized-milligram-dose theophylline were admitted (clinical-research-center) x7 consecutive days. On Day#1, patients were converted to an equivalent total daily mg immediate-release aminophylline Q6H (8A-2P-8P-2A) orally, with 150mls lukewarm water. Daily mealtimes were: 9:30AM-12:30PM-6PM&11PM-snack; caffeine was restricted during sampling. Starting Day#2, 12 blood samples were collected at 0,4,8,12,18,24,30,38,48,60,75&90-min post-8A&8P dose, frozen (-20°C) until analyzed (RIA). When sitting x5-days, the first 90-min was compared to a singular day's LLD-position x90 min (randomized separately for AM&PM among 6 sampling-days). Metrics included steady-state Cmax(mg/L), Tmax(min), AUC:$_{0\text{-}30min}$, AUC:$_{0\text{-}90min}$[mg●-min/L], via linear-trapezoidal-method for both 8AM&8PM profiles. Each parameter was analyzed via paired-t-test, α=0.05 (Excel).

Results: Seventeen patients (14F; mean age=51 years [37-77]; 12 African Americans) participated, yet 1 quit early (Table 1). Mean AM serum [theophylline] sitting Cmax=13.6 mg/L (SD=5.64), significantly differing from LLD=11.8 (SD=5.31), a 13.24% decrease (p=0.029), (Table 2). No change was noted for AM sitting Tmax=46.4 (SD=13.87) minutes vs. LLD at 56.4 (SD=26.9) (NS, p=0.24); nor for AM sitting AUC:0-90 min, at 958.1 (SD=403.1) vs. LLD at 844.5 (SD=384.9), (NS, p=0.093). AM AUC:0-30 min wasn't different, nor were the absorption metrics for PM dosing for sitting vs. recumbency. No common nor serious adverse effects occurred.

Conclusion: AM serum [theophylline] Cmax was mildly (13.2%) but significantly lowered by the LLD-posture vs. sitting; its' clinical significance for airway disease is likely negligible, but LLD-posture may add to unrecognized variability in pharmacokinetic studies.

Mon PM-96. A Pharmacokinetic Analysis of Levetiracetam Prophylaxis in Critically Ill Patients with Severe Traumatic Brain Injury.

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Introduction: Limited evidence exists supporting the optimal dosage of intravenous levetiracetam (LEV) for seizure prevention in neurocritically ill patients. Previous modeling suggests LEV 1000 mg every 8 hours (LEV8) best achieves target trough concentrations 6-20 mg/L, but this regimen has not been prospectively evaluated.

Research Question or Hypothesis: What are the population pharmacokinetics and optimal dosing of LEV prophylaxis in patients with severe traumatic brain injury (sTBI)?

Study Design: Prospective, pharmacokinetic-pharmacodynamic study.

Methods: Five, post-dose serum LEV concentrations were collected following ≥6 consecutive doses. Patients receiving LEV8 had samples collected at 0.5, 1, 4, 6 and 8 hours. Patients receiving LEV 1000 mg every 12 hours (LEV12) had samples collected at 0.5, 1, 6, 8 and 12 hours. A pharmacokinetic model was developed and Monte Carlo simulations (MCS) were conducted to determine probability of target attainment (PTA) of trough concentrations 6-20 mg/L. Presence of augmented renal clearance (ARC) was evaluated using the Augmented Renal Clearance in Trauma Intensive Care (ARCTIC) score.

Results: Ten sTBI patients were enrolled (5, LEV8; 5, LEV12). All patients were male with median age 36 (IQR: 25.5, 44.8) years. Median estimated creatinine clearance at sample collection was 213.9 (154.4, 246.4) mL/min; all patients exhibited ARC (ARTIC ≥6). A one-compartment model demonstrated: median clearance (CL) 5.07 (4.49, 5.99) L/hr, elimination half-life (t1/2) 4.64 (4.62, 5.2) hours, and predicted trough concentration (Css_{min}) 8.95 (5.78, 13.52) mg/L. Css_{min} were higher in LEV8 compared to LEV12 (14.8 [9.7-16.7] vs 5.4 [5.1, 6.9] mg/L, p=0.016). MCS predicted 1000 mg every 8 hours had the highest PTA of trough concentrations 6-20 mg/L.

Conclusion: Observed LEV CL and t1/2 were similar to previously evaluated neurocritically ill populations. LEV 2000-3000 mg/d demonstrated median Css_{min} within the target range. MCS predicted a dosing regimen of 3000 mg/d may be required to increase the PTA trough concentration 6-20 mg/L in sTBI patients as ARC is common.

Sat-38. Utility of Proteomics for Identifying Circulating Pharmacodynamic Biomarkers of IFNβ-1 Biologics.

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Introduction: Biosimilar development and approval often requires comparative clinical studies that are costly and time consuming. Application of proteomics-based longitudinal pharmacodynamic biomarkers may negate the need for such studies and streamline development by contributing to the totality of evidence for demonstrating biosimilarity.

Research Question or Hypothesis: To evaluate the utility of proteomics for identifying interferon beta-1a (IFNβ-1a) pharmacodynamic biomarkers.

Study Design: A pilot was conducted using plasma samples from 36 healthy subjects from a placebo-controlled randomized clinical trial FDA conducted with IFNβ-1 biologics (IFNβ-1a and pegIFNβ-1a).

Methods: Using the SOMAscan® assay v4.1 (SomaLogic), we measured 7288 analytes at baseline/pre-treatment in all subjects, and at 9 timepoints, over 6 days in the IFNβ-1a group (n=12 [30μg]), and at 11 timepoints, over 13 days in the pegIFNβ-1a group (n=12 [125μg]) and placebo-specific groups (n=6 each). We conducted ANOVA on linear-mixed effect models regressing protein level changes with treatment*time interaction. Analytes with *Bonferroni*-corrected p-values<6.8x10E-6 were considered differentially expressed. We further prioritized top signals based on biological relevance, peak change, and baseline adjusted area under the effect curve (BAUEC) for both products. Analysis was conducted in R (v4.1.2).

Results: We identified 248 and 528 analytes differentially expressed over treatment and time by IFNβ-1a and pegIFNβ-1a respectively, compared to placebo. Thirty-one analytes showed a ≥2-fold change from baseline at peak response and a significant difference (t-test p-value<1.6E-03) in BAUEC from placebo. We identified previously reported pharmacodynamic biomarkers such as B2M, Mx1, IP-10, and IL-1RA as well as potential new candidates (e.g., I-TAC, C1QC, LAG3, and FGL1). Upstream regulator analysis (Ingenuity) of the differentially expressed analytes showed early activation of the same regulators (e.g., IFNB1, TNF, IL1B, and IFNG) by each product suggesting a direct link between each product and these upstream regulators.

Conclusion: Using proteomics, we identified several plasma proteins as potential pharmacodynamic biomarkers of IFN-β1 biologics for further investigation to support biosimilar development programs.

Mon PM-98. Serum Bilirubin as a Substrate of UDP-Glucuronosyltransferase 1A1 (UGT1A1) for the Evaluation of Drug-Drug Interaction (DDI) Potential by Plinabulin.

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Introduction: Bilirubin, a catabolic product of heme metabolism, is conjugated by UGT1A1, as are several drugs. Strong inhibition of

UGT1A1 may increase drug exposure and toxicity. Plinabulin is a novel tubulin-binding anti-cancer agent in phase 3 trials for NSCLC and for the prevention of chemotherapy-induced neutropenia. In preclinical studies, plinabulin has weak inhibitory effects on UGT1A1 (R_1 of 1.016), indicating low potential of DDI.

Research Question or Hypothesis: Monitoring serum bilirubin as a substrate of UGT1A1 could serve for the clinical evaluation of potential UGT1A1 inhibition by plinabulin.

Study Design: Serum bilirubin samples (total=1,167 and direct=1,135) were collected at >8 timepoints over 4 chemo cycles from patients with (n=204) or without (n=132) plinabulin from the phase 2/3 breast cancer study PROTECTIVE-2 (BPI-106; NCT03294577). Dose-response modeling and simulation was undertaken using the variables of plinabulin dose (total, BSA-, and body weight-normalized). A binary plinabulin treatment effect (with or without plinabulin) was also evaluated.

Methods: Plinabulin doses were 10, 20 or 30 mg/m^2, or 40 mg fixed (equivalent to 20 mg/m^2). All patients received docetaxel 75 mg/m^2, doxorubicin 50 mg/m^2, cyclophosphamide 500 mg/m^2 and pegfilgrastim for 4 cycles. In patients with and without plinabulin respectively, UGT1A1 genotypes of *28*28 was obtained in 3 and 4 patients, *1*28 in 19 and 11 patients, and *1*1 in 16 and 6 patients.

Results: Serum total bilirubin was no different with or without plinabulin over the 4 cycles. No evidence for dose-response with plinabulin on bilirubin was observed. UGT1A1 genotype impacted baseline bilirubin levels, which for *28*28 genotype was 3.4 μmol/L higher than the *1*1 wild type (p=0.01). No effect of plinabulin on bilirubin in any UGT1A1 genotypes was observed.

Conclusion: Bilirubin levels were UGT1A1-genotype-dependent, thus the model was sensitive to UGT1A1 activity and inhibition. Plinabulin had no effect on serum bilirubin, suggesting low clinical potential of DDI with UGT1A1.

Mon PM-97. Pharmacokinetic and Pharmacologic Characterization of the Dihydrotetrabenazine Isomers of Valbenazine and Deutetrabenazine.

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Introduction: Valbenazine and deutetrabenazine are vesicular monoamine transporter 2 (VMAT2) inhibitors approved for tardive dyskinesia. The clinical activity of valbenazine is primarily attributed to its sole dihydrotetrabenazine (HTBZ) metabolite, [+]-α-HTBZ. Deutetrabenazine is a deuterated form of tetrabenazine and is metabolized to 4 deuterated HTBZ metabolites: [+]-α-deuHTBZ, [-]-α-deuHTBZ, [+]-β-deuHTBZ, [-]-β-deuHTBZ.

Research Question or Hypothesis: What are the HTBZ metabolite profiles after administration of deutetrabenazine compared to valbenazine?

Study Design: Open-label, crossover study characterized the pharmacokinetic profile of [+]-α-HTBZ and deuHBTZ metabolites; in vitro binding studies evaluated potency/selectivity of these metabolites.

Methods: Plasma concentrations of [+]-α-HTBZ and individual deuHBTZ metabolites after valbenazine (40mg) or deutetrabenazine (24mg) administration to 18 healthy adults were quantified using validated bioanalytical methods. Pharmacokinetic parameters were determined using non-compartmental analysis. VMAT2 inhibition and off-target interactions of [+]-α-HTBZ and deuHTBZ metabolites were evaluated using radioligand binding.

Results: The only valbenazine HTBZ metabolite, [+]-α-HTBZ, was a potent VMAT2 inhibitor in vitro (K_i=1.4nM), with negligible affinity (K_i>1000nM) for off-target dopamine, serotonin, and adrenergic receptors. Following deutetrabenazine administration, [-]-α-deuHTBZ represented 66% of circulating deuHTBZ metabolites and was a poor VMAT2 inhibitor (K_i>2695nM) with appreciable affinity for off-target dopamine (D_2, K_i=184nM; D_3, K_i=290nM) and serotonin (5-HT_{1A}, K_i=140nM; 5-HT_{2B}, K_i=177nM; 5-HT_7, K_i=58nM) receptors. [+]-β-deuHTBZ was the most potent deuHTBZ metabolite (K_i=12.4nM), but it represented only 29% of total circulating deuHTBZ metabolites. Mean half-life of [+]-α-HTBZ (22.2 hours) was ~3x longer than that of [+]-β-deuHTBZ (7.7 hours).

Conclusion: Similar to tetrabenazine, deutetrabenazine is metabolized to 4 deuHTBZ stereoisomers, the most abundant of which has negligible interaction with VMAT2 in vitro and appreciable affinity for several off-target receptors. In contrast, valbenazine's single HTBZ metabolite is a potent VMAT2 inhibitor in vitro with no discernible off-target activity. Determination of effects of intrinsic/extrinsic variables on deutetrabenazine's safety/efficacy profile should incorporate assessment of effects on all deuHTBZ metabolites.

Tues-97. Mechanisms Underlying Changes in CYP2D6 Activity During Pregnancy and Postpartum in CYP2D6 Extensive Metabolizers.

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Introduction: CYP2D6 is considered not inducible by classic mechanisms of enzyme induction. However, CYP2D6 activity is markedly increased during pregnancy, but the underlying mechanism is unknown. Dextrorphan (DX)/Dextromethorphan (DM) metabolic ratio (MR) has been used as a marker of CYP2D6 activity.

Research Question or Hypothesis: What is the relationship between retinoids, bile acids, malondialdehyde, and cytokines plasma levels, and CYP2D6 activity during pregnancy and postpartum?

Study Design: This was a prospective, parallel-group study evaluating the correlation of retinoids, bile acids, malondialdehyde and cytokines, and CYP2D6 activity during pregnancy.

Methods: Pregnant CYP2D6 extensive metabolizers were assessed on three study days (25-28 weeks gestation, 28-32 weeks gestation, and ≥ 3 months postpartum). Participants were randomly assigned to no treatment (control) or vitamin A (10,000 IU/day orally for 3-4 weeks) group after study day 1. Following a 30 mg oral dose of DM on each study day, urine samples were collected for four hours. Dextromethorphan, dextrorphan, bile acids, and retinoid concentrations were determined utilizing LC/MS-MS methods. Luminex cell-based multiplex assay was employed for cytokines measurements, and malondialdehyde concentration was measured using ELISA assays. The relationship between the markers and DM/DX urinary metabolic ratio was assessed using Pearson's correlation coefficient. Statistical significance is reported as $p < 0.05$.

Results: Forty-seven women (age: 32.6 ± 3.8 years; height: 166.4 ± 7.0 cm; pre-pregnancy weight: 64.7 ± 10.3 kg; and races: 5 Asian, 2 Black, 38 White, 1 Hawaiian and 1 Pacific Islander) completed the study. Seventeen had an activity score of 1.0, seven had 1.5, and twenty-one had 2.0. Two had activity scores between 1-2, but inconclusive specific genotypes. Interleukin 2 ($r=0.2$, $p=0.02$); all *trans* retinoic acid ($r=0.2$, $p=0.004$); 13-*cis*-retinoic acid ($r=0.2$, $p=0.01$); total retinoic acid ($r=0.3$, $p=0.001$); and malondialdehyde ($r=0.2$, $p=0.01$) were significantly correlated with CYP2D6 activity.

Conclusion: Induction of CYP2D6 activity during pregnancy is likely a result of multiple factors.

Sun-106. Non-invasive Skin Swabs Detect Drugs in Pharmacy Staff.

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Introduction: The skin is complex with multiple layers serving protective, regulatory, and detective functions. The skin displays chemicals based on what we consume or what our body synthesizes. It also hosts chemicals from our environment. This information can help determine someone's daily routine or their level of safety in a work environment.

Research Question or Hypothesis: Is there transference of medications to pharmacy staff while working in a pharmacy and can we detect that using non-invasive skin swabs?

Study Design: This study was a prospective controlled 2 group-comparison

Methods: Skin swabs were collected from 25 healthy pharmacy staff members including pharmacists, interns, and technicians at the conclusion of their shift as well as 25 healthy individuals who did not live in the same household as someone who worked in a pharmacy. Each individual's palms of the hands, back of the hands, and forehead were swabbed for 30 seconds. The swabs were then analyzed via non-targeted liquid chromatography-mass spectrometry (LC-MS). Global Natural Products Social Molecular Networking (GNPS) was used to compare the MS spectra with a reference MS spectra to determine the chemical annotation.

Results: There were 437 different chemicals detected. Drugs that were detected more frequently ($p < 0.05$) on pharmacy staff skin included gabapentin, ketamine, propranolol, trimethoprim, and lisinopril. Both groups had individuals with environmental exposures to chemicals such as N,N-di-ethyl-meta-toluamide (DEET).

Conclusion: Noninvasive skin swabs can be utilized to detect drug contamination on the skin of individuals working in a pharmacy. Chemical transference from handling drugs likely occurs as an occupational exposure.

Sat-39. Quantitative Immuno-PCR Detection of Plasma IP-10 Levels Over Time: Candidate Pharmacodynamic Biomarker of INFβ-1 Biologics.

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Introduction: Clinical pharmacodynamic similarity data can contribute to the totality of evidence supporting approval of biosimilars and can guide the need for subsequent clinical testing. Proteomic analysis of plasma samples from a clinical trial FDA conducted identified IP-10 as a candidate pharmacodynamic biomarker of IFNβ-1 biologics (interferon beta-1a [IFNβ-1a] and pegylated IFNβ-1a [pegIFNβ-1a]).

Research Question or Hypothesis: To evaluate a quantitative immuno-PCR assay for the technical replication of plasma IP-10 levels.

Study Design: We used plasma samples from 36 healthy subjects from the placebo-controlled randomized clinical trial carried out with IFNβ-1a and pegIFNβ-1a.

Methods: A commercial assay (ProQuantum, ThermoFisher Scientific) was used to measure IP-10 at 10 timepoints over 6 days in the IFNβ-1a group (n=12 [30μg]), at 12 timepoints over 13 days in the pegIFNβ-1a group (n=12 [125μg]) and placebo-specific groups (n=6 each). Concentrations were extrapolated from a standard curve analysis. For differential expression, we conducted ANOVA on linear-mixed effect models. F-test, Pearson's correlation, and baseline adjusted area under effect curve (BAUEC). Results were compared to previous proteomics findings (SOMAscanÒ Assay v4.1, SomaLogic). Analyses were conducted in R (version 4.1.2).

Results: Median concentration of IP-10 in baseline plasma samples was 20.8 pg/ml. Assay sensitivity was 0.064 pg/ml, with 4 log-fold dynamic range and good reproducibility (CV<25%). F-test *p*-values of 2.9E-28 and 4.9E-30 for IFNβ1-a and pegIFNβ-1a products,

respectively, were observed. At 0.33 days, IP-10 showed a 38-fold and 28-fold increase from baseline for IFNβ1-a and pegIFNβ-1a, respectively. A strong difference compared to placebo was observed for BAUECs for IFNβ-1a (t-test p=1.04E-04) and pegIFNβ-1a (p=8.6E-04). The pattern of IP-10 response for both products over time was concordant with previous proteomic analysis of the same plasma samples (*rho*=0.87, p=3.9E-122).

Conclusion: Results suggest that the IP-10 assay is a sensitive and reproducible method and further technically replicates previous findings supporting IP-10 as a potential pharmacodynamic biomarker for IFNβ1-a products in healthy subjects.

Mon PM-95. Gender-affirming testosterone effects on CYP3A activity in transmasculine adults.

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Introduction: Transmasculine individuals undergo testosterone treatment for gender-affirming care. The effect of testosterone on CYP3A activity *in vivo* is unknown.

Research Question or Hypothesis: Testosterone increases apparent CYP3A activity in transmasculine adults compared with testosterone-naïve baseline activity.

Study Design: This is a prospective, longitudinal study evaluating the effects of testosterone treatment on CYP3A activity utilizing 2 mg oral midazolam as the probe substrate. Participants completed 2 study days (1. prior to and 2. in the presence of gender-affirming testosterone).

Methods: Participants received oral midazolam at ≤90 days before and after 12 weeks of testosterone treatment. Sample collections included: plasma at 0 (pre-dose), 0.25, 0.5, 0.75, 1, 1.5, 2, 4 and 6 hours post-midazolam dose along with a 24-hour urine collection. Midazolam and 1'-hydroxymidazolam concentrations were determined using an LC/MS assay. We estimated midazolam single-dose, non-compartmental, pharmacokinetic parameters by area under the plasma concentration-time curve (AUC) using linear trapezoidal rule extrapolated to infinite time using linear regression, apparent oral clearance (CL/F) as dose/AUC and formation clearance for 1'-hydroxymidazolam ($CL_{formation}$) as $Ae_{1'\text{-hydroxymidazolam}}/AUC_{midazolam}$. Parameters are reported as mean ± SD. Statistical comparisons utilized Wilcoxon signed-rank test with p<0.05 considered significant. Power analysis to detect a 38% difference in midazolam CL/F with 80% power and α=0.05 required 6 participants.

Results: Six participants (mean age: 25±4 years; weight: 87±28 kg; and race/ethnicity: 66.7% white, 16.7% Asian,16.7% Hispanic) participated in the study. Four took weekly testosterone 40-80 mg injections and 2 applied transdermal testosterone 2 mg patch or 25 mg topical cream daily. Mean testosterone concentrations were 27 ±7 ng/dL at baseline and 444±261 ng/dL on treatment. Mean midazolam CL/F (1.6±0.3 L/min vs. 1.4±0.5 L/min) and 1'-hydroxymidazolam $CL_{formation}$ (2.7±1.7 L/min vs 1.5±1.2 L/min) were numerically, but not significantly lower with testosterone therapy.

Conclusion: In this small pilot study, gender affirming testosterone did not significantly affect CYP3A activity.

Psychiatry

Sun-109. Impact of a Pharmacy Appointment-Based Adherence Packaging and Consultation Program on Secondary Care Utilization in a Behavioral Health Population.

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Introduction: Psychiatric medication adherence is subpar compared to other chronic disease treatment. There is little evidence evaluating the impact of pharmacy medication adherence packaging programs on psychiatric disease treatment compliance and utilization of emergent healthcare resources. The "Pillminder" program is an adherence packaging program where participants attend appointments with pharmacists who provide medication and lifestyle consultation, address questions and foster participatory care.

Research Question or Hypothesis: Routine pharmacist intervention combined with medication adherence packaging will improve psychiatric medication adherence and reduce emergency department (ED) visits and hospital admissions for individuals with persistent chronic mental illness.

Study Design: Retrospective, cross-sectional pilot in a community health setting.

Methods: A convenience sample of adults with chronic mental illness requiring a minimum of one psychiatric oral drug, enrolled for at least 9 months in the "Pillminder" program was obtained. Subjects with a greater than 30-day continuous gap in expected medication pick-up were excluded. Spearman's rank sum and the signed-rank test evaluated total and psychiatric hospitalizations and ED visits at 9 months, and chronic psychiatric medication adherence. Statistical significance was established at $p < 0.05$.

Results: 9-months following program initiation, a significant reduction in total ED visits by 53% ($p < 0.001$) and total hospitalizations by 68% (p=0.003) was realized. A greater number of psychiatric medication changes was associated with a decrease in total hospitalizations (p=0.039). Total composite outcomes (medication adherence, medical and psychiatric ED visits and hospitalizations) within

9 months of program participation were reduced by 58% ($p < 0.001$).

Conclusion: A Community pharmacy adherence packaging program with routine pharmacist consultation effectively reduced adverse health outcomes. There was limited value in increasing the number of visits per subject with the clinical pharmacist.

Mon AM-109. Impact of Social Determinant of Health on Medication Management in a Mental Health Clinic During the COVID-19 Pandemic.

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Introduction: Social determinants of health (SDOH) including income inequality, discrimination, social exclusion, and underemployment can lead to disproportionally poor health outcomes in patients with severe mental illness. In combination with the COVID-19 pandemic, these patients are at higher risk for mental health decompensation such as stress and anxiety, which may further worsen the clinical outcomes of patients with existing chronic mental illness.

Research Question or Hypothesis: 1) Did the COVID-19 pandemic and SDOH impact medication adherence and patient outcomes? 2) Is the COVID-19 pandemic correlated with higher rates of psychiatric emergency services (PES) use, hospitalization, and a new substance use disorder (SUD) diagnosis?

Study Design: Single-center, IRB-approved, retrospective chart review.

Methods: Data collected on 36 psychiatric patients age ≥18 enrolled in the concentrated and integrated programs from June 1, 2019 to February 28, . Demographic variables, prescription fill history, and Clinical Global Impression (CGI) scores were compared. Nominal data was analyzed using Chi-squared test and continuous data using unpaired t-test.

Results: Average change in CGI-I scores slightly increased during the April 2021 - July 2021 period for the concentrated program versus April 2020 - July 2020 and April 2021 - July 2021 periods for the integrated program (P=0.13). Ten patients in the concentrated program compared to thirteen patients in the integrated program got worse at any point during the study period (P = 0.45). Of those that got worse, no significant differences in their SDOH were seen compared with stable patients (P > 0.05). There were no PES use or hospitalizations; however, two patients had a new SUD diagnosis.

Conclusion: This first-time study showed neither SDOH and the COVID-19 pandemic had an impact on medication adherence or patient outcomes nor correlated with higher rates of PES use, hospitalization, or a new SUD diagnosis.

Mon AM-108. Use of unlicensed cannabidiol products in children with neurodevelopmental disorders in the United States.

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Introduction: Data from online platforms suggest that use of cannabidiol (CBD) in children diagnosed with neurodevelopmental disorders is common despite a lack of literature. There is a critical need to quantify parental use of CBD in children with neurodevelopmental disorders, including attention-deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and generalized anxiety disorder (GAD).

Research Question or Hypothesis: What is the frequency of use of CBD products in pediatric patients with ADHD, ASD, and GAD, and what factors are associated with CBD use in this population?

Study Design: Cross Sectional Survey

Methods: A survey to analyze the perceptions and usage patterns of CBD was designed and sent to pediatric healthcare professionals for pretesting. The survey consisted of 14 demographic items and 10 items quantifying CBD usage patterns. Following testing, the survey was distributed using Qualtrics Panels to a representative sample of parents of children 7-18 years of age with ADHD, ASD, and/or GAD across the United States. Descriptive statistics were analyzed for the primary outcome and inferential statistics were analyzed for the secondary outcome (Chi-squared, Mann-Whitney U).

Results: 528 parents completed the survey. 30.9% (n=162) reported using CBD products in children with ADHD, GAD, and/or ASD. Only 4.84% of parents reported CBD-related adverse effects in their child. There were no significant differences in use based on parental characteristics such as race, educational status, religious affiliation, or parental mental disorders. Parents in western states were more likely to administer CBD to a child while those in the northeast were less likely (p=0.01).

Conclusion: The use of CBD in children with ADHD, ASD, and GAD is common and varies based on geographic region. More education and research are needed regarding the efficacy, safety, and usage patterns of CBD products in children with neurodevelopmental disorders.

Pulmonary

Mon PM-104. Implementation and impact of a pulmonary clinical pharmacist's interventions for patients hospitalized for an acute exacerbation of COPD..

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Introduction: Acute exacerbation of chronic obstructive pulmonary disease (COPD) is associated with high healthcare costs due to hospital readmissions. There are limited studies on outcomes related to a pharmacist's review of medications during a COPD exacerbation.

Research Question or Hypothesis: What are the clinical and economic impacts of a pharmacist medication review for patients admitted for an acute exacerbation of COPD?

Study Design: Single-center observational cohort.

Methods: Patients aged were retrospectively identified via a report of interventions among patients hospitalized for confirmed or suspected acute exacerbation of COPD from 12/1/2022 to 6/1/2022. All patients included received a medication review and inhaler teaching by a pharmacist. Patient demographics, spirometry, medications, inspiratory function, and pharmacist interventions were collected. Results were analyzed via descriptive statistics. The 30-day COPD readmission rate was calculated. Healthcare costs were obtained from the Maryland Health Information Exchange which analyzes all COPD-related healthcare costs for ED visits and hospitalizations in Maryland 30 days before and after admission.

Results: Fifty-eight patients were included in the analysis. One patient was GOLD 1, 10 were GOLD 2, 19 were GOLD 3, and 12 were GOLD 4. Sixteen patients had no spirometry results available. The pharmacist optimized 39 (67%) patients to COPD guideline-directed inhaled medications. Twenty-three (40%) patients had incorrect inhaler technique and were counseled. Thirty-nine (67%) patients had inhalers optimized based on inspiratory function. Of the twenty-nine patients with COPD-related cost data available from state-wide hospitals, health care expenses related to COPD were decreased by 92% (30 days before admission-$691,234, 30 days after admission-$84,207). The cohort's 30-day readmission rate was 10.3%.

Conclusion: Clinical pulmonary pharmacist medication review is associated with COPD medication optimization and reduced healthcare utilization. Readmission rates in this cohort were lower than national estimates for COPD (19.4%). Future studies will evaluate whether these effects are sustained long term and whether the impact is demonstrated in a larger cohort.

Sun-48. Examining the impact of an implementation package on clinical pharmacists' perceptions of readiness to implement a program to improve coordinated care transitions for Veterans with Chronic Obstructive Pulmonary Disease .

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death globally, with no care delivery model that consistently improves patient outcomes when scaled. COPD CARE is a transitions of care service that integrates pharmacists as prescribers to collaborate within primary care teams to deliver COPD best practices to Veterans. To address challenges to scaling this program, the COPD CARE Academy (Academy) is a comprehensive, educational, implementation package to support Veterans Affairs (VA) sites implementing COPD CARE. Comprised of 5 hour-long weekly synchronous sessions, the Academy provides guided implementation, informatics tools, clinical training, and team-based support to guide implementation.

Research Question or Hypothesis: This quality improvement evaluation examined what effect the Academy had on clinician and site readiness to implement COPD CARE.

Study Design: A mixed-methods approach was used to obtain feedback from Academy participants about perceptions of the Academy on implementation readiness.

Methods: Thirteen VA sites participated in the Academy from 2020-2021. One week after the Academy, clinicians completed an online questionnaire which contained both fixed-choice and open-ended questions. Descriptive statistics were calculated for all quantitative survey items and thematic analysis was used to summarize the qualitative open-ended items through an inductive approach. To assess changes in self-reported capability, the non-parametric Wilcoxon signed-rank test was used for the 10 Likert scale items.

Results: Clinicians reported significant increases in their capability to complete implementation efforts after participation in the Academy across all ten items ($p<0.05$). Clinicians reported the greatest change in their capability to launch the COPD CARE service at their site ($p<0.001$). Themes related to clinicians' ability to overcome implementation barriers further substantiated quantitative fundings, with the Academy viewed as providing the necessary tools and resources to increase clinician confidence with implementation.

Conclusion: The findings suggest the Academy was effective at providing the necessary resources and improving clinician's confidence contributing to their readiness to implement COPD CARE.

Mon PM-103. Pharmacist-led intervention to optimize inhaler therapy upon hospital discharge.

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Introduction: One in five patients hospitalized for an acute exacerbation of chronic obstructive pulmonary disease are readmitted within

30 days. Chronic inhaler selection should be guideline-directed and affordable for the patient to facilitate adherence and reduced re-hospitalization risk

Research Question or Hypothesis: How frequently does a pharmacist review of prescribed chronic inhalers in patients admitted to the hospital prior to discharge identify inappropriate prescribing, as defined by alignment with clinical guidelines and insurance coverage?

Study Design: Prospective single-center cohort study

Methods: Patients admitted to Vanderbilt University Medical Center between September 2019 to September 2021 on a long-acting inhaler or prescribed one while admitted were reviewed by an outpatient pulmonology clinical pharmacist for clinical appropriateness per guidelines and insurance coverage. If a prescribed inhaler was either not clinically appropriate per guidelines and/or covered by insurance, the pharmacist submitted a consult to the inpatient hospital pharmacist who recommended the inhaler orders for discharge to the provider. The primary outcome was number of inappropriate inhalers identified by pharmacist review.

Results: The pharmacist reviewed 553 inhalers for 349 patients. Forty-one percent of patients (n=228 inhalers) had at least one inappropriate inhaler either based on insurance coverage or guideline recommendation. 13% of inhalers were guideline appropriate but not covered by insurance, 21% were not guideline appropriate, but were covered by insurance, and 7% were neither guideline appropriate nor covered by insurance. The pharmacist placed a consult to recommend a change in therapy for 57% (n=198) of patients.

Conclusion: A pharmacist-led review of prescribed chronic inhalers for admitted patients prior to discharge can improve patient care by effectively identifying opportunities for treatment optimization based on clinical guideline appropriateness and insurance coverage

Sun-49. Exploring the impact of an implementation package on clinical pharmacist-led implementation of a new service to improve care transitions for Veterans with Chronic Obstructive Pulmonary Disease.

Edward Portillo, Pharm.D.[1], Martha Maurer, Ph.D, MPH, MSSW[2], Jordyn Kettner, Pharm.D.[3], Sonia Bhardwaj, Pharm.D.[4], Ziting Zhang, Pharm.D Candidate[1], Sarah Will, Pharm.D., BCPS, BC-ADM[3], Michelle Chui, Pharm.D., Ph.D.[1] and M. Shawn McFarland, Pharm.D., FCCP, BCACP[4]; [1]University of Wisconsin - Madison School of Pharmacy, Madison, WI [2]William S. Middleton Veterans Affairs Hospital, Madison, WI [3]Department of Veterans Affairs Clinical Pharmacy Practice Office, Washington, DC [4]Kansas City Veterans Affairs Medical Center, Kansas City, MO

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death globally, with no care delivery model that consistently improves patient outcomes when scaled. COPD CARE is a transitions of care service that integrates pharmacists as prescribers to collaborate within primary care teams to deliver COPD best practices to Veterans. To address challenges to scaling this program, the COPD CARE Academy (Academy) is a comprehensive, educational, implementation package to support Veterans Affairs (VA) sites implementing COPD CARE. Comprised of 5 hour-long weekly synchronous sessions, the Academy provides guided implementation, informatics tools, clinical training, and team-based support to medical centers to guide implementation.

Research Question or Hypothesis: This quality improvement evaluation examined what effect the Academy had on the successful implementation of COPD CARE 8-12 months after the Academy.

Study Design: A mixed-methods approach was used to obtain feedback from Academy participants about barriers, facilitators, and adaptations to implementing COPD CARE.

Methods: Thirteen VA sites participated in the Academy from 2020-2021. Within twelve months after the Academy, clinicians from 12 VA sites participated in structured interviews, containing both fixed-choice and open-ended questions. Descriptive statistics were calculated for all quantitative items and thematic analysis was used to summarize the qualitative open-ended items and identify emerging themes.

Results: Eighty-two percent of sites reported successfully implementing COPD CARE at the time of the interview. Seventy-five percent of sites reported that they agreed, strongly agreed, or very strongly agreed that the Academy was critical for their site to implement COPD CARE. Identified themes describe barriers (e.g., challenging to integrate COPD CARE clinical note templates into workflow), facilitators (e.g., site identified reducing COPD readmissions as priority) and adaptations (e.g., pharmacists involving respiratory therapists instead of primary care nurses) that affected implementation.

Conclusion: The Academy was effective in supporting successful implementation of COPD CARE. Similar approaches can be considered for national scale-up of pharmacy services.

Rheumatology

Tues-101. Cardiovascular Risk of Janus Kinase Inhibitors Compared to Biological Disease-Modifying Antirheumatic Drugs in Patients with Rheumatoid Arthritis: A Nationwide Cohort Study.

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Introduction: Although inflammation control by disease-modifying antirheumatic drugs (DMARDs) may be helpful in managing the increased cardiovascular risk in patients with rheumatoid arthritis (RA), increasing evidence suggests that Janus kinase (JAK) inhibitors may not be suitable for patients at risk for thromboembolic events or cardiovascular diseases.

Research Question or Hypothesis: The study aims to analyze the major adverse cardiovascular events (MACEs) of JAK inhibitors compared with biologic DMARDs (bDMARDs) in Korean patients diagnosed with RA without baseline cardiovascular diseases.
Study Design: A retrospective nationwide cohort study
Methods: Patients newly diagnosed with RA without history of cardiovascular diseases were identified by using the National Health Insurance Service database. A cohort was followed up for the development of MACE until the end of 2019. Hazard ratios (HRs) for MACE such as myocardial infarction, stroke or death of any cause were estimated by Cox proportional hazard regression in a propensity score-matched cohort.
Results: A total of 4,230 matched patients with RA were included (846 JAK inhibitors users and 3,384 bDMARDs users). The crude incidence rate per 1,000 patient-year for MACE was 12.23 (95% confidence interval (95% CI) 8.78-16.59) for bDMARDs users and 10.06 (95%CI, 4.05-20.74) for JAK inhibitors users. There was no statistically significant difference in the risk of MACE for JAK inhibitors compared to bDMARDs with an adjusted HR of 1.25 (95% CI, 0.53-2.96). The risk increased statistically significantly in patients aged over 65 years old with HR of 2.37 (95% CI, 1.03-5.44).
Conclusion: Compared with bDMARDs, the use of JAK inhibitors was not associated with occurrence of MACEs in Korean patients with RA without history of cardiovascular diseases.

Substance Abuse/Toxicology

Mon PM-108. Evaluation of phenobarbital vs. benzodiazepines using the Clinical Institute Withdrawal Assessment (CIWA) for alcohol withdrawal in trauma patients.

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Introduction: Phenobarbital is an attractive alternative regimen to benzodiazepines for alcohol withdrawal based on its activity at NMDA and GABA receptors. Phenobarbital is effective and safe in surgical-trauma patients for alcohol withdrawal however, there is no direct comparison to CIWA.
Research Question or Hypothesis: Is fixed-dose phenobarbital a safe and effective alternative to CIWA in the management of alcohol withdrawal in surgical-trauma patients?
Study Design: A retrospective chart review of surgical-trauma patients who received a fixed-dose phenobarbital taper or CIWA protocol for alcohol withdrawal. Patients were excluded if they were younger than 18 years old, Child-Pugh Class C cirrhosis, if they received CIWA treatment for greater than 24 hours prior to the phenobarbital protocol.
Methods: The primary outcome is to assess unplanned admissions or readmissions to the ICU after therapy initiation. Secondary outcomes include new delirium tremens (DTs) after therapy initiation and the occurrence of seizures. Additional data collected: demographic data, length of stay, mechanical ventilation, incidence of bradycardia, and incidence of increased oxygen requirements. An alpha of 0.05 was used and data was analyzed using descriptive statistics, Fisher's Exact or X2, Mann-Whitney U, and student's t-test.
Results: The patient demographics between the phenobarbital (n=87) and CIWA (n=23) groups were not different except for male sex (82.8% vs. 60.9%, p=0.024). For the primary outcome, the phenobarbital group had fewer unplanned ICU admissions or readmissions (3.4% vs 17.4%, p=0.015). The incidence of new DTs after treatment initiation was significantly lower in the phenobarbital group (0 vs 21.7%, p=0.0001). The occurrence of seizures was significantly higher in the CIWA group (1.1% vs. 13%, p=0.007).
Conclusion: Fixed-doses of phenobarbital are a safe and effective treatment option for alcohol withdrawal in trauma patients and may reduce the risk of adverse outcomes compared to a CIWA regimen.

Mon PM-107. Pharmacist, prescriber, and drug policy expert opinions on gabapentinoid misuse: a qualitative study.

Jordan Covvey, Pharm.D., PhD, BCPS[1], *Kirk E. Evoy, Pharm.D.*[2], Reshmi Singh, PhD, MS, BPharm[3], Michelle Blakely, PhD, MEd[3] and Alyssa M. Peckham, Pharm.D., BCPP[4]; [1]Duquesne University, Pittsburgh, PA [2]The University of Texas at Austin College of Pharmacy, San Antonio, TX [3]University of Wyoming, Laramie, WY [4]Otsuka Pharmaceuticals, Princeton, NJ

Introduction: Gabapentinoids are widely used in clinical practice but evidence indicates increasing misuse risk. As healthcare providers and policymakers consider strategies to promote harm reduction, it is important to understand stakeholder viewpoints.
Research Question or Hypothesis: What are prescriber, pharmacist, and drug policy expert awareness, opinions, and experiences regarding gabapentinoid misuse?
Study Design: Semi-structured interviews and "data-near" qualitative, descriptive analysis.
Methods: Purposive sampling of prescribers (physicians, physician assistants, or nurse practitioners) and pharmacists practicing in outpatient, ambulatory, or community-based healthcare settings and individuals with drug policy expertise was conducted in February and April 2021. Qualtrics (Provo, UT) and Zoom (San Jose, CA) were used for quantitative and qualitative data collection. Data were coded and organized into themes via NVivo (QSR International; Burlington, MA) using thematic analysis steps.
Results: Forty-three individuals participated in this study, including 18 pharmacists, 13 physicians, seven nurse practitioners, four drug policy experts, and one physician assistant. Descriptive analysis

was organized along four identified themes: (1) experiences in gabapentinoid use; (2) gabapentinoid misuse awareness; (3) solutions to gabapentinoid misuse and (4) contributing barriers in pain management. Responses emphasized the connectedness of gabapentinoid misuse to broader issues of healthcare access barriers and disparities and drug use criminalization. Many concerns and potential solutions identified were not focused on gabapentinoids themselves, but toward an overhaul of how society conceptualizes healthcare, pain management, and substance misuse. Calls for access to pain treatment and the application of a public health-based approach for substance misuse and use disorders align with participant viewpoints.

Conclusion: Gabapentinoid misuse was identified as an important area for caution among healthcare professionals and policy experts. However, a greater emphasis should be given to the need for change in the larger landscape of the healthcare system and the management of substance use and pain.

Mon AM-110. Student pharmacist perceptions of community overdose response training.

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Introduction: Overdose deaths continue to escalate driven primarily by illicit fentanyl. Pharmacists provide naloxone, yet persons at highest overdose risk may not frequent a pharmacy. As our university is located in a county with high overdose rates, it is imperative to train student pharmacists to become community responders. Our interprofessional team offered student pharmacists basic community overdose response training. We evaluated perceptions of student pharmacist preparedness using a post training survey.

Research Question or Hypothesis: Community overdose response training will prepare student pharmacists to respond to an opioid overdose and administer naloxone.

Study Design: Survey study

Methods: The University IRB approved the study as exempt. First through third year pharmacy students were encouraged to attend a 45-minute virtual training provided by the Center for Urban Studies AmeriCorps members during January-February 2022. Training included identification of an opioid overdose, calling 911, hands only CPR, and administration of naloxone nasal spray in a pre-hospital setting. Upon completion, students received a take home naloxone nasal spray kit at no charge. Students were invited to complete a voluntary 10-item electronic de-identified survey regarding their perceptions of preparedness for opioid overdose response and experiences with opioid overdose.

Results: Of 112 students trained, 99 completed the survey (88.4% response). The majority (83%; 82/99) perceived being fully prepared to recognize signs of opioid overdose, with 87% (86/99) fully prepared to administer nasal naloxone spray. Ten percent (9/99) reported having a previous encounter with an individual experiencing an opioid overdose. Responses of first, second and third year students did not differ ($p>0.05$).

Conclusion: Community overdose response training prepares pharmacy students to identify opioid overdose and administer naloxone. Students may encounter overdose situations in the community. Our pharmacy program is incorporating the training for incoming first year students. Limitations include one university, responder bias, self-assessed competency and small sample.

Transplant/Immunology

Tues-15. Vitamin D Deficiency and SARS-COV-2 Outcomes in Cardiothoracic Transplant Recipients.

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Introduction: Vitamin D (25(OH)D) deficiency has been identified more commonly in patients with poor outcomes following SARS-COV-2 infection. 25(OH)D deficiency is common in transplant recipients, and SAR-COV-2 hospitalization and death is more common in transplant recipients than the general population.

Research Question or Hypothesis: The impact of 25(OH)D deficiency in cardiothoracic transplant recipients (CTRs) with SARS-COV-2 infection is herein investigated.

Study Design: All CTRs with a positive SARS-COV-2 PCR from 1/1/2020-4/1/2022 at a single center were evaluated via retrospective chart review.

Methods: Transplant demographics, underlying comorbidities, and most recent 25(OH)D levels were collected. Assessment of those who required hospitalization and those who died during SARS-COV-2 were compared to those who remained ambulatory. Descriptive statistics were utilized to compare CTRs with SARS-COV-2 mortality vs. CTRs who survived.

Results: 97 CTRs (n=60 heart, n=37 lung) were identified; 40 (41%) required hospitalization, 13 (13.3%) died secondary to SARS-COV-2. Hospitalization was more common in lung transplant recipients (54% vs. 33.3%, $p=0.04$) but no difference in mortality was observed (13.3% vs. 13.5%). 25(OH)D level <20ng/mL was uncommon, and was not more commonly seen in those with SARS-COV-2 mortality (15.4% vs. 13.1%) or hospitalization (12.5% vs. 14%). The only baseline characteristic associated with SARS-COV-2 mortality was median age

(60 vs. 49 years, p=0.04); no differences in time from transplant (7.7 vs. 7.6 years, p=0.84), male gender (53.8% vs. 60.7%, p=0.64), hypertension (76.9% vs. 80.9%, p=0.87), diabetes (53.8% vs. 46.4%, p=0.62), eGFR <30mL/min (30.8% vs. 22.6%, p=0.52), or BMI (27.1 vs. 27.1 kg/m2, p=1.0) were seen.

Conclusion: Hospitalization and mortality secondary to SARS-COV-2 in CTRs in our cohort was high, with 25(OH)D deficiency not associated with poor outcomes. Age was the only risk factor associated with SARS-COV-2 mortality among this cohort, with significant comorbidities present among all CTRs.

Sun-112. Reduced dosing versus standard dosing valganciclovir for prophylaxis of cytomegalovirus in high-risk abdominal transplant recipients.

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Introduction: Cytomegalovirus (CMV) is a common infection in immunocompromised abdominal transplant recipients (ATRs), requiring effective prevention in the highest risk population (CMV IgG donor +/recipient -). For this population, the Third International Consensus Guideline on the Management of CMV in Solid Organ Transplantation recommend prophylaxis with valganciclovir 900 mg daily for six months post-transplant (standard dosing). One reduced dosing approach not yet studied in this population is valganciclovir dosing of 900 mg daily for three months, followed by 450 mg for three months post-transplant (reduced dosing).

Research Question or Hypothesis: In high-risk CMV ATRs, does the efficacy or safety differ in the reduced dosing regimen from the standard dosing regimen?

Study Design: Single-center, retrospective cohort study of adult ATRs who received transplant from January 2017 to February 2021 (reduced dosing ATRs 2017-2019 and standard dosing ATRs 2019-2021), excluding multivisceral organ transplant (except pancreas/kidney and liver/kidney transplant) and CMV at time of transplant.

Methods: The primary endpoint was incidence of CMV DNAemia. Secondary endpoints included incidence of CMV disease, neutropenia, leukopenia, biopsy proven rejection, graft loss, and mortality. Endpoints analysis was a two-tailed Fishers' Exact test or an unpaired t test to compare two means.

Results: Reduced dosing (n=35) and standard dosing (n=33) had no differences in demographics. Incidence of CMV DNAemia or disease was not statistically different between reduced dosing and standard dosing groups (6% vs 12%, p=0.42; 29% vs 27%, p=1). Incidence of leukopenia and neutropenia were not statistically different (94% vs 97%, p=1; 77% vs 70%, p=0.59), as well as biopsy proven rejection, graft loss, and mortality. A difference was found in time to efficacy endpoints with an association of delayed diagnosis of CMV DNAemia or CMV disease in the standard dosing regimen by an average of 57 days (p<0.05).

Conclusion: There was no difference in the efficacy and safety of the standard vs reduced dosing regimen.

Mon PM-111. Pharmacist-led Dosing Reduces Tacrolimus Intrapatient Variability in Lung Transplant Recipients.

Anita Yang, Pharm.D.[1], Roxanne McKnight, Pharm.D.[1], Alyson Prom, Pharm.D.[1], Megan Byrne, Pharm.D. Candidate[2], Rickey Evans, Pharm.D.[3] and Christina Doligalski, Pharm.D., BCPS, CPP[1]; [1]Department of Pharmacy, University of North Carolina Health, Chapel Hill, NC [2]Eshelman School of Pharmacy, Chapel Hill, NC [3]Department of Pharmacy Services, University of Kentucky Healthcare, Lexington, KY

Introduction: In solid organ transplant recipients, high tacrolimus intrapatient variability (IPV) has been associated with donor specific antibody (DSA) formation, acute cellular rejection (ACR), and graft loss, with an IPV >30% associated with poor outcomes in lung transplant recipients (LTRs).

Research Question or Hypothesis: We sought to evaluate the impact of pharmacist-led tacrolimus dosing on tacrolimus IPV within the first post-transplant year.

Study Design: A retrospective analysis of LTRs transplanted from 1/1/2015-12/31/2019 was conducted. LTRs transplanted from1/1/2015-12/31/2017 (Cohort 1) had tacrolimus dose adjustments made by physicians or nurse practitioners, and were seen in clinic by a clinical pharmacist on an adhoc basis. LTRs transplanted from 1/1/2018-12/31/2019 (Cohort 2) had tacrolimus adjustments made by a dedicated clinical pharmacist who saw LTRs at each of their routine clinic visits in conjunction with the multidisciplinary team.

Methods: Pediatric and LTRs who did not survive to discharge were excluded. Tacrolimus IPV was calculated by coefficient of variation for all ambulatory levels within the first post-transplant year. Transplant demographics and 1 year patient/graft outcomes were assessed. Chi-squared and t-tests analyses were used to compare cohorts.

Results: Thirty-nine LTRs in Cohort 1 and 24 LTRs in Cohort 2 were included; no differences in baseline demographics or concurrent immunosuppression were observed. 25.6% of Cohort 1 and 29.2% of Cohort 2 received a transplant for cystic fibrosis (CF). At 1 year, median tacrolimus IPV was significantly lower in Cohort 2 (35.7% vs. 30.3%, p=0.02) and significantly more LTRs in Cohort 2 had a tacrolimus IPV <30% (20.5% vs. 45.8%, p=0.03). LTRs with CF in Cohort 2 also demonstrated significantly improved tacrolimus IPV (39.1% vs. 28.9%, p=0.007). No differences in ACR, DSA formation, or mortality at 1 year were observed.

Conclusion: The integration of dedicated ambulatory transplant pharmacist improved tacrolimus IPV 1-year post-transplant, including LTRs with CF.

Mon PM-110. Early Outcomes Of Single Dose Eculizumab For ABO-Incompatible Living Donor Renal Transplantation.

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Introduction: ABO-incompatible (ABOi) donors increase access to living donor renal transplantation (LDRT). Conventional desensitization with plasmapheresis (PLEX) allows safe transplantation when pre-transplant anti-ABO antibody titers are ≤1:8. We previously reported excellent outcomes using a 9-week eculizumab (ECU) course replacing standard desensitization. We recently abbreviated our protocol to a single, pre-operative dose of ECU 900mg (SDE protocol).

Research Question or Hypothesis: Does SDE protocol allow safe ABOi LDRT?

Study Design: Retrospective chart review.

Methods: Patients received rabbit anti-thymocyte globulin induction (rATG), tacrolimus, mycophenolate, and maintenance corticosteroids (CS). Patient and allograft outcomes were evaluated for 9 patients who received SDE protocol from January - December 2021.

Results: Eight of 9 patients had a pre-transplant antibody titer > 1:8. Seven patients had an eGFR >60 1.73ml/min/m^2 at latest follow-up. Three were treated for rejection with improvement in creatinine. Patient 5 developed severe pyelonephritis following antibody-mediated rejection (AMR) treatment and eventually recovered with worse renal function. All other infections were mild.

Conclusion: SDE protocol allows successful ABOi LDRT despite initial high antibody titers.

Sun-114. Single-center Experience of Donor-Derived Cell-free DNA (AlloSure) in Obese Renal Transplant Recipients.

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Introduction: AlloSure is a donor-derived cell-free DNA assay that has been demonstrated to discriminate active rejection in renal transplant (RT) recipients. However, it has not been validated in obese RT recipients.

Research Question or Hypothesis: The purpose of this study is to assess AlloSure testing in obese RT recipients when assessing for acute rejection.

Study Design: Single-center retrospective chart review

Methods: This study was a single-center retrospective chart review evaluating obese RT recipients who received AlloSure monitoring. Adult patients were included if they received an isolated RT between 1/1/2018 – 12/31/2018, had a BMI ≥ 30 kg/m2, and had at least one documented AlloSure value. AlloSure values were averaged for each

Table 1. Patients and Outcomes

Patient	(Age/Race/Sex)	PRA Class I/II	Baseline DSA	Baseline ABO-Titer	Rejection Events	eGFR at Last Follow-Up (1.73ml/min/m^2)
1	66/H/M	0/3	Negative	1:512	None	70 (12 months)
2	39/W/M	0/0	Negative	1:512	Empiric treatment w/IV-CS POD12	92 (12 months)
3	54/H/F	59/59	Moderate Class II	1:16	None	63 (12 months)
4	23/AA/F	0/0	Negative	-	None	47 (9 months)
5	45/AA/M	0/0	-	1:4	Biopsy-proven AMR POD15 treated w/rATG, bortezomib, and PLEX	20 (9 months)
6	31/H/M	2/0	-	1:32	None	78 (9 months)
7	30/H/F	0/0	-	1:32	None	97 (9 months)
8	31/H/F	0/0	-	1:16	ACR (Banff 1B) month-4 treated w/IV-CS	77 (6 months)
9	54/H/M	0/0	Weak Class I	1:32	None	70 (6 months)

PRA, panel reactive antibody; DSA, donor specific antibody; POD, post-operative day; ACR, acute cellular rejection

patient. Rejection was defined as biopsy-proven acute rejection or empiric rejection treatment in the absence of a biopsy.

Results: A total of 27 patients were analyzed. Patients were predominantly male (63.0%) with mean age of 50.9 $\pm$ 13.5 years old. Over half (59.3%) received a deceased donor renal transplant. The mean BMI was 38.5 + 7.7 kg/m^2. Seven patients (25.9%) experienced rejection within 12 months' post-transplant. Five patients (71.4%) had biopsy-proven acute rejection and two (21.6%) had empiric rejection treatment in the absence of a biopsy. The median AlloSure was numerically higher in those who experienced rejection compared to those who did not (2.1% [IQR 4.1] vs 0.4% [IQR 0.4], p=0.614). A backward stepwise logistic regression model was created to determine predictors of rejection. Odds of rejection increased by 2.15 times for each 1% increase in AlloSure (OR 2.15 95% CI 1.02 – 4.53, p=0.044).

Conclusion: AlloSure testing has not been validated in obese RT recipients. There is a 2-fold increase in likelihood of rejection if AlloSure values are increased. Further studies are warranted assessing AlloSure utility in obese RT recipients.

Mon PM-112. Research Publication Rates, Characteristics, and Perceptions of Solid Organ Transplant Pharmacy Residency Training: A Survey Of Program Directors.

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Introduction: Pharmacists are integral members of the multidisciplinary solid organ transplant (SOT) team and play a vital role in advancing the profession and improving patient care through research. However, publication rates and characteristics associated with publication have not been described for post-graduate year 2 (PGY2) SOT pharmacy residents.

Research Question or Hypothesis: What is the publication rate of post-graduate year 2 (PGY2) transplant pharmacy residents and the landscape surrounding resident research?

Study Design: International survey study

Methods: An international, electronic survey of all PGY2 SOT residency programs was distributed. An invitation for survey participation was sent by email to the residency program directors (RPDs), and information related to the program, director, preceptor, resident, and each project was gathered for residents graduating between 2016 and 2019. Descriptive statistics were used to assess research experiences and publication demographics. Factors influencing resident publication success were assessed with multivariate logistic regression modeling.

Results: A total of 38 RPD responses were analyzed (67.8% response rate). All PGY2 programs were ASHP accredited, 92% were at academic medical centers, and more than 80% of programs have been active over 6 years with a median of 10 (IQR 5-13) graduated residents. 36.1% of SOT PGY2 research projects were published, 22.7% intend to submit or have a manuscript under revision, and 39.2% will not pursue publication. RPDs commonly rated their programs as "effective" or "extremely effective" (50.0%) in enabling publication. Of published projects, 81% were in medical journals and 19% in pharmacy journals. Median impact factor was 2.9 (IQR 1.5-2.9). Programs active for more than 10 years (OR 4.0, p=0.009) as well as utilization of additional resources (OR 4.2, p=0.022) were independently predictive of publication.

Conclusion: Despite program confidence to achieve publishable research, publication rates were only 36.1%. Maximizing additional resources helps to accomplish publication within these training programs.

Tues-103. The safety and efficacy of concomitant sodium zirconium cyclosilicate and tacrolimus use in heart transplant recipients..

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Introduction: Hyperkalemia is a life-threatening complication in heart transplant recipients (HTRs). Literature characterizing the co-administration of sodium zirconium cyclosilicate (ZS-9) with tacrolimus (TAC) is limited.

Research Question or Hypothesis: Evaluate concomitant use of ZS-9 and TAC in HTRs.

Study Design: Single centered, retrospective cohort study.

Methods: HTRs were evaluated from 1/8/2020 to 9/1/2021. Patients on TAC immediate-release immunosuppression and ZS-9 inpatient were included. Concomitant administration was defined as ZS-9 within two hours of TAC for at least 48 hours. TAC trough concentrations were evaluated two days before (Day -2 and -1) and after ZS-9 use (Day 1 and 2). The primary outcome was a change in TAC serum

levels stratified by receipt of concomitant or non-concomitant ZS-9. Secondary outcomes included potassium and serum creatinine (SCr) levels during ZS-9 therapy. A repeated-measures ANOVA with Greenhouse-Geisser correction was utilized to account for mixed effects.

Results: Of the 35 patients included, 27 (77%) were concomitantly administered ZS-9 and TAC. The median time to start ZS-9 was 11 days post-transplant (IQR, 8-17). TAC trough concentrations were not different between groups (P=0.912) or throughout the time points studied (P=0.717) nor in a group-by-time interaction (P=0.517). Potassium levels (mmol/L) decreased from a median of 5.5 (IQR, 5.3 – 5.6) on Day 0 to a median of 5 (IQR, 4.8 – 5.5) on Day 2 after ZS-9 administration (p= 0.002). SCr levels (mg/dL) were higher at every time point in the concomitant group (P=0.031). The change in SCr over time (P=0.194) and the group-by-time interaction (P=0.102) were not significantly different. When concomitantly given, 11.1% and 7.4% of patients experienced gastrointestinal upset and edema, respectively.

Conclusion: ZS-9 lowered potassium levels in HTRs and did not impact TAC serum concentrations. Studies are needed to address ZS-9 use with other immunosuppressants.

Tues-16. Identification and Resolution of Medication Therapy Problems in Heart and Lung Transplant Clinics.

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Introduction: Clinical pharmacist integration into the ambulatory multidisciplinary team early post-transplant is well described in abdominal transplant clinics.

Research Question or Hypothesis: This study will assess the benefits of clinical pharmacist services for heart transplant recipients (HTR) and lung transplant recipients (LTR) beyond the early post-operative period.

Study Design: Since 2018, all HTRs/LTRs at a single center are seen by a pharmacist at each routine post-transplant visit for the first post-transplant year, and annually thereafter. Pharmacist visits are conducted by a PGY2 transplant-trained clinical pharmacist practitioner (CPP) with prescriptive authority under a collaborative practice agreement. From 7/1/2020-5/1/2021, all medication therapy problems (MTPs) identified during CPP visits were recorded.

Methods: MTPs were categorized by type of problem and by medication involved/disease states addressed. Time following transplant and organ transplanted were collected to determine if these factors affected the frequency of MTPs identified.

Results: During the study period, 186 face-to-face visits in 37 HTR and 37 LTRs were conducted. 519 MTPs were identified; 512 were resolved within the visit. 96.8% of visits identified at least one MTP. There were no differences in the number of MTPs identified between LTRs and HTRs (3.1 vs. 2.7, p=0.08), or for visits occurring at various times post-transplant (Table).MTPs were identified across a number of disease states including immunosuppression (n=67,12.9%), infection treatment/prophylaxis (n=47,9.1%), diabetes (n=47,9.1%), fluid/electrolytes (n=46,9%) and hypertension (n=43,8.2%). Categories of MTPs included needing additional therapy (n=128,24.7%), unnecessary medications (n=90,17.3%), doses too low (n=87,16.8%) or too high (n=77,14.8%).

Conclusion: Pharmacist visits were useful in identifying and resolving MTPs at all time points post-transplant in both HTR and LTRs. These findings underscore the importance of routine pharmacist involvement in ambulatory visits for transplant recipients regardless of time post-transplant or organ transplanted.

Sat-15. Impact of proton pump inhibitor utilization on infectious adverse events after kidney transplantation.

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Introduction: Kidney transplant recipients are at an increased risk for gastrointestinal (GI) events post-transplantation. High dose proton pump inhibitor (PPI) therapy has been linked to increased rates of *Clostridioides difficile* infection (CDI) and pneumonia. The purpose of this study was to evaluate the safety of PPI therapy in kidney transplant recipients.

Research Question or Hypothesis: What impact does the use of PPIs post-kidney transplant have on infectious adverse events?

Study Design: This was a single-center, retrospective chart review.

Methods: Adult patients who received a solitary kidney transplant at Emory Transplant Center between July 1, 2015 and February 28, 2020 were included in this study. Patients were placed into two study arms: those on PPI for at least 4 weeks within 3 months post-transplant versus patients receiving histamine-2 receptor antagonist (H2RA) or no acid suppressant therapy. The primary outcome was a composite of infectious adverse events, including CDI and pneumonia, at 18-months post-transplant. Secondary outcomes included incidence of CDI, pneumonia, GI ulcer, GI bleed, and gastritis.

Results: Of the 1,221 patients screened, 1,079 patients met inclusion criteria with 434 patients in the PPI group and 645 in the non-PPI

	0-90 days	90-180 days	180-365 days	1-5 years	>5 years
Pharmacist visits, n	36	32	49	41	18
MTPs identified, mean	3.05	3.19	2.61	2.66	3.67

group. Baseline characteristics were similar between groups. Patients in the PPI group experienced higher rates of infectious adverse events (24.9% vs. 17.8% in the non-PPI arm; p=0.005) which was driven by pneumonia (20% vs. 13.8%, p=0.006). Rates of CDI were similar between groups (7.8% PPI vs. 5.4% non-PPI, p=0.113). More patients in the PPI group experienced GI events compared to those not on PPI therapy: GI ulcer 2.3% vs. 0.3% (p=0.002), GI bleed 5.5% vs. 0.6% (p<0.001), and gastritis 5.5% vs. 0.9% (p<0.001), respectively.

Conclusion: Efforts should be made to limit the duration and prescribing of PPIs in kidney transplant recipients without a clear indication.

Tues-104. Effectiveness of Adjuvanted Hepatitis B Vaccine After Liver Transplantation.

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Introduction: Adjuvanted hepatitis B vaccine (Adj-HBvax) has shown superior seroprotective response (SPR; HBs Ab ≥10 mIU/mL) in shorter duration in patients known to have a poor response with standard hepatitis B vaccines. We assessed the effectiveness of Adj-HBvax after liver transplantation (LT).

Research Question or Hypothesis: Adj-HBvax effectively induces SPR after LT.

Study Design: Observational study

Methods: Patients who underwent solitary LT between January 2019 and December 2020 without SPR were included in this study. However, patients who were not medically stable for vaccination were excluded. Diagnosis of liver diseases, immunosuppression, tacrolimus trough levels and body mass index (BMI), were collected. Adj-HBvax (Heplisav-B) 20mcg/0.5mL was administered intramuscularly at 0 and 4 weeks. The primary endpoint was the rate of SPR four weeks after vaccination completion.

Results: Of the sixty-seven patients eligible for vaccination, twenty-two patients (63% male) completed vaccination from March 25 to May 18, 2022. The average time elapsed from LT to vaccination was 1.9 years. The mean age was 57.6 years, and the average BMI was 29.9 kg/m^2. The most common diagnosis for LT was alcohol related and non-alcoholic fatty liver disease (12/22; 54%). The mean tacrolimus trough level was 5.7mcg/L and 68% of recipients were on tacrolimus monotherapy. As of 6/13/2022, HBs Ab results were available for 19 patients and 2 of them (2/19; 10.5%) developed SPR. These two responders were on tacrolimus monotherapy, with a mean tacrolimus level and BMI of 3.75 mcg/L and 28.8 kg/m^2 respectively.

Conclusion: Our result suggests that completion of standard dose Adj-HBvax provides a suboptimal SPR after LT. Chronic immunosuppression, high BMI, and our predominately male cohort may have contributed to the low immune response. Further studies with new regimen strategies of adjuvanted HBvax for LT recipients are warranted.

Mon PM-109. Effectiveness of an Opioid Stewardship Guideline in Renal Transplant Recipients post-discharge at UC Davis Health (UCDH).

Ellen Berkley, Pharm.D.; Department of Pharmacy Services, University of California, Davis Heath, Sacramento, CA

Introduction: A quality improvement (QI) study conducted in renal transplant recipients found that patients did not use over 85% of prescribed opioid tablets. Based off these findings, multidisciplinary transplant and opioid stewardship teams developed a guidance document.

Research Question or Hypothesis: There will be no difference in opioid refill requests nor patient reported pain control, with a decrease in the number of opioid tablets prescribed post-guidance document.

Study Design: Single center pre-, post- study

Methods: Both cohorts included patients 18 years of age or older who received a renal transplant at UCDH between January 1, 2021, and April 30, 2021 (n=64), and between October 18, 2021, and February 8, 2022 (n=63), respectively. Patients were asked the same standardized interview questions, and to recall medication use from their transplant diaries from within seven days post-discharge. Refill requests and analgesic medications prescribed were also captured from the electronic medical record (EMR). Statistical analyses were performed using SAS 9.4.

Results: Compared to the pre-guidance cohort, the post-guidance cohort had no detectable difference in refill requests ($p = 0.365$) nor pain control (89.1% vs 95.2%, $p = 0.324$) after discharge. In the post-group, there was a significant reduction in opioid tablets prescribed at discharge (22 tablets vs 10 tablets, $p = <0.0001$), while the number of patients who were prescribed acetaminophen ($p = 0.005$) and lidocaine patches ($p = <0.00001$) at discharge was significantly increased. Overall, both groups used a mean of three opioid tablets in the first week after discharge, therefore, a significantly lower percentage of opioid tablets were left unused in the post-group (88.8% vs 74.4%, $p = 0.0046$).

Conclusion: The implementation of a pain management guidance document resulted in a reduction in the number of opioid tablets and an increase in acetaminophen and lidocaine patches prescribed at discharge with no detectable difference in pain control nor refill requests after renal transplant.

Women's Health

Mon AM-113. Pharmacist Prescribed Hormonal Contraception: Georgia Community Pharmacist Perceptions in Metropolitan versus Nonmetropolitan Counties.

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Introduction: Since 2014, select states have allowed pharmacists to prescribe hormonal contraception (HC), but this authority is not yet permitted in Georgia. Documentation of pharmacist perspectives on this issue have aided legislation permitting pharmacist prescribed HC in other states.

Research Question or Hypothesis: Do Georgia community pharmacists feel interested and prepared to provide pharmacist-prescribed HC in metropolitan (M) vs. nonmetropolitan (NM) counties?

Study Design: Prospective, cross sectional, electronic survey

Methods: An online survey was emailed to 2592 pharmacists via Georgia Pharmacy Association (GPhA) and Georgia Society of Health System Pharmacists (GSHP) membership lists. Pharmacists were grouped into M and NM counties based on the 2013 National Center for Health Statistics (NCHS) code. Descriptive statistics and dichotomized likert scale responses were reported, Chi squared testing identified differences between groups.

Results: 333 pharmacists (12.8%) completed the survey: 144 (43.2%) worked in community pharmacy (72.9% M vs 27.1% NM) and are included in analysis. A majority were interested in prescribing HC (61.0% M vs 69.2% NM, p=0.65), believe pharmacy access to HC would be a valuable service (81.9% M vs 69.2% NM, p=0.10), and believe it would improve access and adherence (83.8% M vs 74.4% NM, p=0.20). Metropolitan pharmacists were more likely to agree that pharmacists are well-trained and educated to prescribe HC (66.7% M vs 48.7% NM, p=0.049), and were more likely to agree that provision of HC services is within their scope of practice (78.1% M vs 61.5% NM, p=0.045).

Conclusion: Overall, community pharmacists in Georgia are interested in prescribing HC and many believe it would have a positive impact on patient care. Differences between M and NM pharmacists were minimal; however, M pharmacists may feel more prepared to prescribe HC than NM pharmacists.

Sat-41. Does Availability of Obstetric Care Affect Patient Support of Community Pharmacist Provided Maternal Health Services?.

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Introduction: In 2016, Georgia ranked 50th (last) in the United States maternal mortality ranking. Contributing factors include insufficient access to healthcare coverage and increased closure of labor and delivery facilities. Novel strategies are needed to improve access to maternal healthcare.

Research Question or Hypothesis: Does availability of obstetric care services impact patients' interest in receiving maternal health services from community pharmacists?

Study Design: Prospective, cross sectional, electronic survey.

Methods: A sample of 25 Georgia community pharmacies were selected, stratified by availability of OB services as defined in previous literature, and dichotomized in this analysis as adequate (ADQ = adequate) or inadequate (INA = at risk, deficit, none). Participants were recruited in two community pharmacy chains and received a $10 gift card for completion of a 10-minute survey of open-ended, multiple-choice, and likert scale questions. Descriptive statistics, chi-square, and student's t-tests were conducted using SPSS v28.

Results: Of 103 women, 79 completed the survey and were included in data analysis. There were no significant differences in responses between women in ADQ and INA obstetric service areas. A majority agreed that women's health care should be available to everyone (94% ADQ vs 96.6% INA, p=0.62), supported pharmacist provision of women's health care services (92% ADQ vs 82.8% INA, p=0.21), were comfortable with pharmacist prescribed contraception (72% ADQ vs 65.5% INA, p=0.43), and supported pharmacist provided maternal health screenings such as for gestational diabetes (54% ADQ vs 65.5% INA, p=0.18)

Conclusion: Regardless of availability of OB services in their county, women supported the idea of community pharmacists providing maternal health services. As Georgia strives to improve maternal and fetal outcomes, pharmacists may be well positioned to help improve maternal health outcomes.

Sun-4. Gender perspectives in pharmacists' prescriptive authority of contraception.

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Introduction: In New Mexico, pharmacists can prescribe contraception. However, patient preferences for pharmacist gender in prescribing contraception is unknown.

Research Question or Hypothesis: The purpose of this study was to evaluate perceived comfort and confidence of female patients when a male pharmacist prescribes contraception, as well as the comfort and confidence of practicing pharmacists and pharmacy students in their ability to prescribe contraception.

Study Design: Cross-sectional study

Methods: Pharmacist and pharmacy student surveys assessed comfort and confidence in their ability to prescribe contraception. They were recruited via New Mexico Pharmacists Association (NMPhA) email listserv, NMPhA's Mid-Winter Meeting, and school emails. Pharmacists actively practicing in New Mexico were eligible for the study. Undergraduate students were recruited via Panhellenic listservs and community outreach. Students identifying as females of childbearing age were included. Students were asked to rate how comfortable they are with pharmacists prescribing contraception, gender preference,

and if they were aware pharmacists could prescribe contraception. A Wilcoxon Signed Rank Test was utilized for data analysis. Each survey was left open until 75 responses were received.

Results: Pharmacists reported being "somewhat comfortable" counseling on contraception, were "neutral" about prescribing, and perceived their patients' comfort as "neutral" or "somewhat comfortable." Pharmacists were less confident about prescribing contraception to contraceptive-naive patients and perceived these patients as less confident in the pharmacist's abilities. Pharmacy students felt "somewhat comfortable" prescribing and counseling on contraception. Undergraduate students felt more comfortable and confident with female pharmacists counseling and prescribing contraception ($p<0.001$, $r=0.486$). 31% of undergraduate students surveyed were unaware of the prescriptive authority of pharmacists; they felt "neutral" about this.

Conclusion: Female patients prefer female providers over male providers when being prescribed contraception. Notably, there was a large portion of our study population who did not know pharmacists could prescribe contraception, indicating the need to improve awareness of these pharmacist provided services.

Sun-11. Implementation of a pharmacist-led contraceptive prescribing service in a campus community pharmacy.

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Introduction: In the United States, college-aged people have the highest rates of unintended pregnancy (59%). In 2021, 10-15% of college students reported having vaginal sex without contraception. As of December 2021, 20 states/jurisdictions allowed pharmacists to prescribe contraceptives without a collaborative practice agreement/drug therapy management (CPA/CDTM) protocol. Indiana does not currently have permissive legislation.

Research Question or Hypothesis: The implementation of a pharmacist contraceptive prescribing service in a campus community pharmacy in Indiana will have a high degree of uptake.

Study Design: Retrospective, chart review (August 1, 2020 – May 30, 2022).

Methods: Utilizing a CDTM with the campus student health service, Purdue University Pharmacy created a pharmacist contraception prescribing service for students. The service follows established contraception prescribing protocols and charges a consultation fee. Data was retrospectively collected for consultations (age, blood pressure, United States' Medical Eligibility Criteria for Contraceptive Use category 3/4 conditions, interacting medications, method prescribed [pills, patches, rings, injections, gels, emergency contraception], time to complete appointment). Descriptive statistical analyses were completed via Excel.

Results: 364 consultations occurred, resulting in 351 (96.4%) prescriptions. Of these, 265 (75.5%) were for combined oral pills, 17 (4.8%) were for progestin only pills, 15 (4.3%) were for patches, 11 (3.1%) were for rings, 42 (12%) were for injections, and 1 (0.3%) was for a gel. The number of encounters increased from 126 (year 1) to 238 (year 2). The average age of participants was 21 years (range: 18-35), and appointments took an average of 21 minutes (range: 10-65). Nine (2.5%) people had a category 3/4 condition and 8 (2.2%) participants were on an interacting medication. The encounters resulted in $9,100 of revenue.

Conclusion: The prescribing service at the Purdue University Pharmacy is a unique approach to expand access to contraception for young people. Few external resources are required to implement this service, and most patients were eligible to receive hormonal contraception.

Mon PM-113. Temporal Access to Contraceptive Prescribers in Georgia Safety Net Clinics: An Argument for Pharmacist Prescribed Hormonal Contraception.

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Introduction: Improving access to hormonal contraception (HC) may improve women's health while decreasing costs and complications. Safety net clinics provide HC for many low income women, but typically require an appointment. Over 20 states allow pharmacist prescribed HC, although Georgia does not. Pharmacies often offer extended hours and do not require appointments for consultation.

Research Question or Hypothesis: What is the average wait time for a contraception appointment at a safety net clinic, and are there differences between metropolitan (M) vs non-metropolitan (NM) counties in Georgia?

Study Design: Prospective, cross sectional, telephone-based survey.

Methods: A list of Georgia safety net clinics providing HC was compiled, including Title X clinics, Federally Qualified Health Centers, Health Departments, Rural Health Clinics, and Planned Parenthood clinics. The 2013 National Center for Health Statistics Code designated M versus NM counties. Two researchers posed as mystery caller patients between January and December 2021. Descriptive statistics, t-test, and chi square tests were completed using SPSS v 28.

Results: Of the 405 clinics included, 381 met eligibility criteria and were called, and 236 (61.9%) provided complete information (49.6% M vs. 50.4% NM). On average, M clinics had longer appointment wait times (M 14.7 +/- 14.9 vs. NM 6.8 +/- 8.4 days, $p<0.01$). NM clinics more frequently offered same day appointments (41.0% M vs. 54.6%

NM, p=0.05). There were no differences in availability of walk-in (35.0% M vs. 46.2% NM, p=0.11) or telehealth appointments (31.6% M vs. 22.0% NM, p=0.13).

Conclusion: Time to first available contraceptive appointment for women using safety net clinics averaged one week in NM and 2 weeks in M Georgia counties. If pharmacist prescribed HC was permitted in Georgia, pharmacists could potentially facilitate more timely access to HC.

R&S ACADEMY ORIG RESEARCH

Education/Training

Sun-2. Impact of clinical documentation incorporation on student performance of the Pharmacists' Patient Care Process.

Alexandra Hintz, Pharm.D., BC-ADM, Emily Wicker, Pharm.D. and Aleda Chen, Pharm.D., MS, PhD ; Cedarville University School of Pharmacy, Cedarville, OH

Introduction: Best practices for integration of the Pharmacists' Patient Care Process (PPCP) into pharmacy education are still being explored; clinical documentation development (e.g., SOAP or FARM notes) could enhance PPCP integration due to its alignment, but the impact of clinical documentation incorporation on student performance of the PPCP is unknown.

Research Question or Hypothesis: Does incorporation of clinical documentation training positively impact student pharmacist performance of the PPCP?

Study Design: retrospective, single cohort, non-experimental post-interventional analysis to evaluate student progression in PPCP components

Methods: Second-year student pharmacists (N=43) in the fall semester were given a clinical documentation lecture and then completed three multidisciplinary clinical documentation assignments across three separate disease-based modules with formative and summative feedback. To assess the impact of documentation assignments, PPCP components from mapped summative documentation rubric items and exam questions in those courses were extracted and assessed separately. Data were compared (alpha=0.05) between courses using ANOVA and across the semester using repeated measures ANOVA.

Results: There were significant differences between the first and third modules for the Assess (p=0.002) and Plan (p=0.003) PPCP components within the clinical documentation assignments and between the first and second modules for the Follow-Up component (p=0.032). Longitudinally, clinical documentation assignments significantly improved for the Plan component (p=0.019). There were no significant changes in exam scores longitudinally within each module or across modules for any PPCP components (p>0.05), with the exception of significant decreases in the Plan component within the second module.

Conclusion: Incorporation of clinical documentation had a positive impact on student performance of the PPCP in documentation scores but not in exam scores. The results demonstrate the value of incorporating multidisciplinary documentation activities into pharmacy education but not as an exclusive approach to teaching the PPCP.

Infectious Diseases

Sun-1. Characterizing obese patients treated with standard doses of micafungin for proven invasive candidiasis.

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Introduction: Pathophysiologic changes in obese patients can alter the pharmacokinetics of antifungals. Pharmacokinetic analyses in obese patients suggest standard doses of micafungin may not provide adequate plasma concentrations. However, the benefit of higher doses is unclear due to limited clinical data evaluating treatment failure rates among obese patients.

Research Question or Hypothesis: How do clinical outcomes among obese patients treated with micafungin for proven invasive candidiasis (IC) compare to those described in the Agency for Healthcare Research and Quality (AHRQ) surveillance data?

Study Design: This was a single-center, retrospective case series.

Methods: Adult patients treated with micafungin 100-150 mg daily for ≥3 days from 1/1/2020 through 12/31/2021 were evaluated. Patients were included if their BMI was >30 kg/m^2. Pertinent demographic, clinical, microbiologic, and treatment data were collected. Clinical outcomes, including length of stay (LOS) and all-cause inpatient mortality were evaluated.

Results: Eleven patients were included. The mean BMI was 38.7 kg/m2 (SD 7.9). Seven patients (63.6%) were candidemic. *Candida glabrata* (35.7%) and *C. parapsilosis* (28.6%) were most commonly identified. Ten patients (90.9%) were in sepsis/septic shock and 6 patients (54.5%) required an ICU stay. Compared to AHRQ data, our patients had longer LOS (33 versus 21 days) and higher rates of mortality (27.3% versus 22%). Mortality among those with candidemia was also higher (42.9% versus 25-28%). Overall, 42.9% of candidemic patients had positive blood cultures for ≥5 days, compared to 13-21% of persistent candidemia described in recent literature.

Conclusion: Compared to AHRQ surveillance data, obese patients treated with standard doses of micafungin for IC were more likely to have persistently positive blood cultures, longer LOS, and higher rates of mortality. Larger comparative studies are needed to determine if BMI and micafungin dosing are independent risk factors for treatment failure, prolonged LOS, and/or increased rates of all-cause inpatient mortality among patients with IC.

SYSTEMATIC REVIEWS/META-ANALYSIS

Adult Medicine

Sun-23. Practicality of Plenity within the realm of weight loss drugs: A systematic review.

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Background: Obesity is recognized as a major pandemic today, contributing to the urgent need for therapies that increase patients' odds in achieving clinically meaningful weight loss. With several medications currently approved by the FDA, obesity pharmacotherapy has evolved considerably over the past few decades. The objective of this systematic review was to investigate the effectiveness and practicality of an innovative weight loss durable medical device: Plenity.

Methods: PubMed, Cochrane, and ClinicalTrials.gov were used to search for studies that evaluated the pragmatism of Plenity. Eligible study designs were randomized controlled trials (RCTs), retrospective cohort studies, and case control studies discussing the feasibility of Plenity. The outcomes evaluated included co-morbidities, adverse effects, and changes in body weight from baseline. Studies with patients of childbearing potential and type one diabetes were excluded. Only English language texts within the last five years of publication that presented patients' BMI range ≥ 27 - ≤ 40 and fasting plasma glucose ≥ 90 - ≤ 145 mg/dL at screening were included. The last search was performed on June 13th, 2022. All articles were screened and assessed by two investigators independently to reduce bias.

Results: The database search resulted in two RCTs including the GLOW trial, along with two editorials. The two RCTs highlighted Plenity as an innovative therapy for overweight individuals while providing a desirable safety profile. Both studies mentioned diarrhea, flatulence, abdominal distension and nausea as common adverse events. The GLOW trial expressed Plenity's tolerability as an attractive obesity treatment option, while the other RCT praised Plenity for having a positive impact on gut health.

Discussion: The FDA approval of Plenity presents moderate-quality evidence to support effectiveness in obese adults. Short-term use of Plenity appears to be safe. The findings from this review may contribute to future decision-making.

Other: One study was funded by Gelesis, Inc.

Endocrinology

Sun-42. Comparative effects of antidiabetic drugs on arterial stiffness in type 2 diabetic patients: a systematic review and network meta-analysis.

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Background: There is growing evidence that antidiabetic drugs have preventive effects on cardiovascular disease (CVD). However, comparative results of cardioprotective effects between them have not been established. Therefore, this network meta-analysis aims to compare surrogate markers of CVD, such as flow-mediated dilation (FMD), pulse wave velocity (PWV), and carotid intima-media thickness (CIMT), which reflect arterial stiffness, across antidiabetic drugs in type 2 diabetic patients.

Methods: Randomized controlled trials (RCTs) evaluating the effects of antidiabetic drugs on PWV, FMD, or CIMT compared to placebo or other antidiabetic drugs in type 2 diabetic patients were retrieved. PubMed and Embase were searched up to January 15, 2021. Two researchers screened studies for eligibility, extracted data, and assessed the quality of studies using the revised version 2 Cochrane risk-of-bias tool for RCTs. A frequentist network meta-analysis with random and fixed effects models was performed. The overall effect size was calculated as standardized mean differences (SMDs) with 95% confidence intervals (CIs).

Results: Fifty-eight RCTs were selected for analysis (n=5,613). The median treatment duration was twenty-four weeks. Twenty-seven studies were analyzed for FMD, fifteen for PWV, and thirty for CIMT, respectively. TZD showed a significantly better effect on PWV than sulfonylurea (SMD -1.35, [95% CI -2.24 to -0.47]), and better than DPP4 inhibitors on FMD (SMD 1.82, [95% CI 0.21 to 3.42]). For both maximum and mean CIMT, TZD was associated with a more positive effect than metformin (SMD -0.09, [95% CI -0.15 to -0.02], SMD -0.07, [95% CI, -0.11 to -0.03], respectively).

Discussion: We demonstrated that TZD could have more favorable effects on arterial stiffness than other antidiabetic drugs in T2DM patients. However, since antidiabetic drugs other than TZD showed inconsistent results, further studies would be needed.

Other: This study received the National Research Foundation of Korea Grant (NRF-2020R1F1A1069257). No conflicts of interest. Registered at PROSPERO (CRD42022324713).

Infectious Diseases

Sun-76. Efficacy and safety of colistin versus tigecycline for multidrug-resistant and extensively drug-resistant gram-negative infections: A meta-analysis.

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Background: Colistin and tigecycline are therapeutic options for multidrug-resistant (MDR) and extensively drug-resistant (XDR)

pathogens, and the efficacy and safety of both agents remain controversial. The aim is to perform a comparative meta-analysis of main efficacy and safety outcomes of colistin versus tigecycline as monotherapy or combination against MDR and XDR infections.

Methods: PubMed, Cochrane CENTRAL, and EMBASE were searched for relevant studies through December 2021. Comparative studies that compared tigecycline monotherapy or combination versus colistin monotherapy or combination were included. Publication bias was assessed graphically using funnel plots. Heterogeneity of the results was evaluated using the I^2 statistic. Pooled odds ratio (OR) with 95% confidence interval (CI) was calculated using random or fixed models at statistical significance of $p<0.05$. Outcomes of interest included clinical response, mortality, infection recurrence, and renal and hepatic toxicity. Sensitivity and subgroup analyses confirmed results against bias and suspected confounders. Quality of studies was assessed using Newcastle Ottawa scale for observational studies.

Results: Fourteen observational studies involving 1,163 MDR/XDR patients, receiving tigecycline versus colistin monotherapy or combination, were included. Base-case analyses revealed insignificant differences in the clinical response, reinfection, and hepatic impairment. The 30-day mortality was significantly relatively reduced with tigecycline monotherapy (OR=0.35, CI 0.16 to 0.75, p=0.007, I^2=0%). In-hospital mortality was significantly relatively reduced with the colistin monotherapy (OR=2.27, CI 1.24 to 4.16, p=0.008, I^2=0%). Renal impairment rates were lower with tigecycline monotherapy or in combination and was lower with monotherapy compared to the colistin-tigecycline combination. Low risk of bias and moderate/high evidence quality were associated with all studies.

Discussion: There were no statistically significant differences in main efficacy outcomes between colistin and tigecycline monotherapies or combinations, against MDR/ XDR infections, except for lower rate of 30-day mortality with tigecycline and in-hospital mortality with colistin. Tigecycline was generally associated with favourable renal toxicity outcomes.

Other: N/A

Oncology

Mon AM-94. Comparison of Cutaneous Adverse Events Between Second-Generation Tyrosine Kinase Inhibitors and Imatinib for Chronic Myeloid Leukemia: A Systematic Review and Meta-analysis.

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Background: Patients with chronic myeloid leukemia (CML) have been treated with tyrosine kinase inhibitors (TKIs) and often experienced skin adverse reactions such as rashes and pruritus. The aim of this study was to compare the risk of cutaneous adverse events in patients treated with imatinib or second-generation TKIs for CML.

Methods: Paired reviewers independently obtained studies from PubMed, Embase published up to March 15, 2022. The following terms were searched: (leukemia, myelogenous, chronic, BCR-ABL positive), chronic myeloid leukemia, tyrosine kinase inhibitor, TKI, imatinib, dasatinib, nilotinib and bosutinib. Two independent reviewers screened these results and selected articles related to cutaneous adverse events. A systematic review and meta-analysis were conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines.

Results: Overall, 18 trials involving 8,529 patients were analyzed. Patients receiving second-generation TKIs were significantly more likely to experience cutaneous adverse events compared with imatinib with relative risk (RR) of 1.48 (95% confidence interval (CI), 1.18-1.86). Except for dasatinib (0.94 (0.69-1.28)), there were increased risk of the adverse events in second-generation TKIs compared with imatinib as follows: nilotinib (2.29 (1.96-2.68)), bosutinib (1.60 (1.28-2.00)).

Discussion: Second-generation TKIs which are potent inhibitors of BCR-ABL, act on more kinases than imatinib. Although little is known about the exact mechanism, the risk can be higher because the majority of these kinases are active in the skin. In conclusion, cutaneous adverse reactions occurred more frequently in second-generation TKIs than imatinib.

Other: This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF- 2022R1C1C1011730).

Other

Sat-26. Global pharmacist interventions for medication adherence in rural settings: a systematic review.

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Background: Rural-urban disparities exist in medication utilization and adherence. Pharmacists play pivotal roles in medication management, but evaluations of pharmacist interventions, specifically those that target medication adherence in rural areas have not been consolidated.

Research Question or Hypothesis: What types of interventions have pharmacists implemented to improve medication adherence in the rural setting?

Study Design: Systematic literature review

Methods: PubMed, Embase, Scopus, and CINAHL were searched from inception to October 2021. Studies were included that evaluated the

impact of pharmacist interventions on medication adherence in rural populations. Pilot studies and studies with small sample size (<100 participants) were excluded. Study characteristics, types of interventions, and adherence measurements were extracted. Study quality was assessed using CONSORT for randomized controlled trials and STROBE for observational studies.

Results: Ten studies with 3650 patients in rural communities were included, of which four were conducted in the United States, four in India, and two in Uganda. Half of the studies were single-arm observational studies and four were randomized controlled trials. Various clinical areas were targeted including cardiometabolic diseases (n=6 studies), infectious diseases (n=2), oncologic conditions (n =1) and non-specific (n =1). Seven studies provided educational interventions. Other interventions included mobile pharmacy, medication synchronization, and home follow-up visits. Medication adherence was measured using the proportion of days covered, Morisky adherence scale, brief medication questionnaire, rate of primary adherence, or rate of missing doses. Four studies showed statistically significant adherence improvement in the intervention group, one study was not statistically significant, and five studies did not statistically assess whether adherence was improved after the intervention.

Discussion: Various pharmacist interventions have been implemented in rural settings with the aim to improve medication adherence. The results, however, were limited by appropriate evaluation of the impact from the interventions.

Other: n/a

Pain Management/Analgesia

Sat-45. Impact of pharmacist led opioid stewardship: A systematic review.

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Background: Recent data shows that the economic burden of the opioid crisis was $78.5 billion in the United States. As a result, many healthcare institutions have revamped their pain management practices. The objective of this systematic review was to examine the impact of pharmacist led opioid stewardship programs at various healthcare sites.

Methods: A literature search utilizing PubMed, ClinicalTrials.gov, and Cochrane databases was conducted using the search terms: "pharmacist-led" and "opioid stewardship." Outcomes evaluated were pharmacist interventions, feasibility of pharmacist led opioid stewardship programs and influence on the opioid crisis. Studies with no mention of pharmacist involvement were excluded. Articles published in English between January 01, 2012 to June 10, 2022 in human subjects were included for review. Abstract only texts were excluded from review. All articles were screened and assessed by the two investigators independently to reduce bias.

Results: The search yielded 31 articles; after thorough screening, 10 articles were included for review. Five articles were quality improvement/evaluative analyses, three articles were retrospective cohort studies, one randomized controlled trial and one meta-analysis. The meta-analysis included 51 studies and highlighted pharmacists' involvement in harm-minimization strategies and education across various settings. A total of seven articles described pharmacist interventions that included optimization of non-opioid alternatives, dosage and frequency modifications and mitigation of adverse effects. One evaluative analysis stated its stewardship program saw reductions in opioid/benzodiazepine use and prescriptions, healthcare costs and premature deaths.

Discussion: The articles in this systematic review display the positive impact pharmacist led opioid stewardship programs have on patient care, healthcare systems and the economy. It is evident that more of these programs are essential to diminish the ongoing nationwide opioid crisis.

Other: There are no funding, conflicts of interest, or registrations to report for this study.

Pulmonary

Sat-44. Comparative efficacy of biologic agents in patients with difficult-to-treat asthma: a systematic review and network meta-analysis.

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Background: Several biologic agents targeting mediators of type 2 inflammatory asthma, commonly observed in patients with difficult-to-treat asthma, have been developed and their use is increasing. However, few studies have evaluated the comparative efficacy of biologics. Therefore, the purpose of this study was to compare the efficacy of biologics in patients with difficult-to-treat asthma.

Methods: Inclusion criteria for this study were randomized controlled trials (RCTs) that evaluated the effectiveness of biologics compared to placebo or other biologics in patients with difficult-to-treat asthma published through January 6, 2022. Two independent researchers searched PubMed, Embase, Web of Science, and Scopus databases, and assessed the risk of bias using the revised version 2 Cochrane bias risk tool for RCT. Outcomes of interest were annual asthma exacerbation rate (AER), forced expiratory volume per second before bronchodilator (preBD FEV1), asthma control questionnaire (ACQ), and asthma quality of life questionnaire (AQLQ). A frequentist network meta-analysis using a random-effects model was performed. Pooled incidence rate ratio (IRR) or standardized mean differences (SMDs) were calculated.

Results: Forty-two RCTs were retrieved (n=21,134). The median treatment duration was 28 weeks. Tezepelumab had the greatest

effects in lowering the AER compared to placebo (IRR 0.399, [95% CI 0.295 to 0.540]). In terms of the preBD FEV1, dupilumab was associated with the most positive effect than placebo (SMD 0.15 [95% CI 0.08 to 0.21]). For the ACQ, omalizumab was evaluated as the most promising effect (SMD -0.410 [95% CI -0.594 to -0.226]), and itepekimab ranked first in AQLQ improvement (SMD 0.394 [95% CI 0.167 to 0.620]).

Discussion: This is the first network meta-analysis with biologics in patients with difficult-to-treat asthma. Although there are some differences according to the outcomes, dupilumab, omalizumab, tezepelumab, and itepekimab were generally positioned in high efficacy ranking.

Other: Funded by the National Research Foundation of Korea Grant (NRF-2019R1A6A1A03031807). No conflicts of interest/registration.

Transplant/Immunology

Sun-12. Systematic review of the impact of pre- and post-solid organ transplant chronic opioid use on recipient outcomes.

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Background: Chronic opioid use (COU) has been associated with negative outcomes in the general population but has not been systematically evaluated in solid organ transplant (SOT) recipients. This is a systematic review of the impact of pre- and post-transplant COU on recipient outcomes.

Methods: Electronic searches were performed in Medline, Embase, and Web of Science through date of inception to December 2021 for SOT and COU. A search alert was also conducted through Google Scholar. Literature was uploaded and managed through Covidence software. To reduce bias, title and abstracts were independently screened and relevant articles underwent independent full text review. Conflicts at either stage were resolved by the senior author.

Results: Literature search yielded 25,190 records and 8,258 were identified by Covidence as duplicate and removed. After title and abstract screening of the remainder, 482 studies were read for eligibility, with 22 included in final assessment (kidney = 10; lung = 4; liver = 7; heart = 1). Ten studies (45.5%) were retrospective, 10 (45.5%) database analyses, and 2 (9.0%) were alternative methodology. Demographic differences and safety outcomes were the focus of most studies. Patient survival was assessed in 13 studies (59.1%). COU increased patient death in 9 (69.2%) of these studies with the remaining showing no impact on survival. Increased patient morality was noted in the following organ studies: heart = 1, kidney = 5, liver = 2, lung = 1. Depending on the allograft included in the study, COU had varying impacts on length of stay, hospital readmissions, and COU post-transplant.

Discussion: The impact of COU on transplant outcomes is largely confined to retrospective and database analyses. With findings demonstrating a negative impact of COU on post-transplant survival, a more robust assessment of opioid minimization and sparing strategies on post-transplant outcomes is needed.

Other: No funding, conflicts of interest, or registration/registry name exist.