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ABSTRACT

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VPS ORIGINAL RESEARCH

ADR/Drug Interactions

1. Trends of kratom use and misuse in a U.S. general population sample.

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Introduction: Kratom is an herbal extract that interacts with opioid and adrenergic receptors. Over time, an increase in kratom-related exposures has been observed, yet trends in kratom-related misuse are not well-established.
Research Question or Hypothesis: What are the longitudinal trends of kratom use and misuse?
Study Design: This was a retrospective review of data from the U.S. Food and Drug Administration adverse events reporting system (FAERS).
Methods: FAERS data were analyzed from 2004 through 2021. Queries were designed to extract reports of all kratom-related and misuse-related events. Misuse events were identified based on 29 misuse-related terms established in previous FAERS research. Data analysis was conducted using SAS 9.4 (SAS Institute, Cary, NC) and Microsoft Excel (Microsoft Corporation, Redmond, WA). PRR was calculated to assess disproportionate reporting of misuse-related adverse events between kratom and all other drugs in FAERS. Demographic and outcomes data were presented using descriptive statistics.
Results: From 2004-2021, there were 785 total reports of kratom use, with 208 indicating misuse. Kratom reports were relatively limited early in this study period but there was a considerable increase from 2017 to 2018 (from 30 to 244) that remained elevated with annual reports ranging from 131 to 244 from 2018 to 2021. Reports indicating misuse increased from 2015 to 2016 (from 4 to 11) and has continued to increase, with 50 or more reports in 2020 and 2021. Across the study period, a PRR of 8.37 (CI 7.45-9.41) was calculated for kratom regarding misuse-associated reports, indicating kratom had a stronger association with misuse-related adverse events compared to all drugs reported to FAERS.
Conclusion: Trends in kratom use and misuse reports to FAERS have trended upwards over the past decade. These data indicate a need for increased awareness of kratom-related adverse effects and to continue to monitor trends amidst the opioid overdose epidemic.

2. Assessing clinical management of the interaction between direct oral anticoagulants and rifampicin at a large London teaching Trust.

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Introduction: Rifampicin is known to induce enzymes and transporters associated with metabolism of medications, including all direct oral anticoagulants (DOACs). This can lead to subtherapeutic DOAC concentrations and increased thromboembolism risk. Metabolic induction can last for several weeks after ceasing rifampicin therapy and, to date, there is limited guidance on DOAC initiation following rifampicin discontinuation.
Research Question or Hypothesis: This study's aim is to characterize current practice in managing anticoagulation with rifampicin use.
Study Design: This is a retrospective, observational, descriptive chart review.
Methods: Electronic patient records were reviewed to identify patients with documented DOAC use prior to, during, or starting after at least a 3-day rifampicin course from December 2021 through December 2022 at a large London based teaching Trust. Data collected include demographics, anticoagulation management at initiation, during, and following rifampicin therapy, and CHA_2DS_2-VASc, HAS-BLED, and ORBIT scores. Ethics were not required.
Results: Seventeen patients met inclusion criteria. Anticoagulation indications included atrial fibrillation (82.4%, n=14) and thromboembolism

treatment or prophylaxis (17.6%, n=3). Average CHA_2DS_2-VASc, HAS-BLED, and ORBIT scores were 3.12, 1.35, and 3.11, respectively. Two patients continued DOACs throughout rifampicin therapy. Where DOACs were stopped, 75% (n=9) stopped before or within 24 hours of rifampicin initiation, 86.7% (n=13) initiated low molecular weight heparins (LMWHs), and 13.3% (n=2) received no anticoagulation. Following rifampicin discontinuation, DOACs were started within 24 hours in 41.7% (n=5), between 24 hours to two weeks in 16.6% (n=2), and after two weeks in 41.7% (n=5) of patients.

Conclusion: Coinciding with current recommendations to avoid DOAC use with rifampicin, DOACs are frequently replaced with LMWHs upon rifampicin initiation. Upon rifampicin discontinuation, variation in timing of DOAC initiation reflects lack of, and demonstrates need for, guidelines to support a safe and efficacious introduction of DOAC therapy given the longevity of enzyme induction.

Adult Medicine

3. Clinical Efficacy of Tigecycline in the Treatment of Clostridioides Difficile Associated Diarrhea.

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Introduction: Clostridioides difficile associated diarrhea (CDAD) is the most common cause of nosocomial diarrhea and represents a major burden to the healthcare system. Treatment guidelines list tigecycline as a potential agent for the treatment of CDAD though no formal recommendation regarding its use has been given. Clinical evidence assessing the utility of tigecycline in the treatment of CDI is scarce and limited to case studies and retrospective case series. Further observations could help define tigecycline's utility in the treatment of CDAD.

Research Question or Hypothesis: The primary objective of this study was to determine if the use of tigecycline improved clinical cure rate in CDAD relative to guideline-directed standard antibiotic care. Secondary objectives included determining whether the provision of tigecycline affected in-hospital mortality, hospital readmission, or hospital length of stay.

Study Design: Retrospective chart review.

Methods: Adult patients were included if they were found to have Clostridioides difficile infection by two-step laboratory testing during hospitalization. Patients were divided into a tigecycline cohort or a standard of care (SOC) cohort on the basis of whether they did or did not receive tigecycline during their hospitalization. Outcomes were compared using the chi-squared and Mann-Whitney U test as appropriate. Data were analyzed using the statistical package Analyse-it 5.68.

Results: Seventy-two patients were included in the primary analysis. No difference in clinical cure at hospital discharge was observed between the tigecycline and SOC cohorts (36.4% vs. 32%, $p = 0.7175$). In-hospital mortality occurred more frequently in the tigecycline cohort (14.3% vs. 0%, $p = 0.0068$).

Conclusion: Tigecycline did not measurably improve patient-centric outcomes in our analysis and increased in-hospital mortality. This increase in mortality may be due to a deleterious effect of tigecycline on CDAD's disease process or due to differences in patient acuity that our analyses were underpowered to detect.

4. Teaching Pharmacy Students How to Interpret an Electrocardiogram.

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Introduction: Cardiovascular disease is the leading cause of death in the United States accounting for 690,882 deaths in 2020. Complications of cardiovascular disease can lead to cardiac arrest, which is often fatal if appropriate steps are not taken immediately. Education for healthcare providers and laypersons are important to recognize signs and symptoms of cardiovascular emergencies including cardiac arrest. The significance of this study is to prepare pharmacy students to identify abnormal cardiac rhythms to develop a sense of urgency leading to an expedited notification to other healthcare disciplines.

Research Question or Hypothesis: Utilizing a manikin simulation will improve accuracy and identification of cardiac rhythms.

Study Design: This was a single center, prospective, observational study conducted in 2022 of third year pharmacy students.

Methods: Students were given a didactic lecture, quiz, and patient case of how to interpret electrocardiograms and advanced cardiovascular life support. Students participated in a manikin simulation to identify and treat the cardiac rhythm during a mock scenario of advanced cardiovascular life support. Individual student roles and overall group performances were evaluated.

Results: Of the 58 total students, 45 students and 40 students completed the pre-simulation and post-simulation surveys, respectively. Students self-perceived identification of various cardiac rhythms performed at least 80% agreeable, except for rhythms involving QT, QRS, or ST changes. Manikin survival occurred in 7/9 (77.8%) student groups with 8/9 (88.9%) student groups treating appropriately. Students understood the pharmacist's role in cardiac arrest situation in 60% in the pre-simulation and 90% in the post-simulation. Students were confident to prepare medications in a cardiac arrest in 15.6% in the pre-simulation and 55% in the post-simulation.

Conclusion: Pharmacy students developed confidence and accuracy of identifying abnormal cardiac rhythms during a cardiac arrest manikin simulation. Limitations include a small sample size, limited student simulation experience, non-validated survey questions, and interpretation of survey impact on student grades.

5. Evaluation of Thiamine Prescribing for Wernicke Encephalopathy Prevention in Hospitalized Patients with Alcohol Use Disorder after Shortage-Prompted Formulary Change.

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Introduction: Intravenous (IV) fluids containing vitamins and minerals, including thiamine (known as a "banana bag"), are often empirically prescribed for patients with alcohol use disorder presenting to the hospital. In December 2021, a shortage of thiamine injection vials led to the need to conserve the site's supply. Clinical evidence supported the avoidance of reflexive use of IV banana bags in patients with a history of alcohol use; therefore, its compounding was stopped.

Research Question or Hypothesis: To describe thiamine prescribing practices upon removal of IV banana bag from the hospital's formulary and to determine implications.

Study Design: This was an IRB-exempt retrospective medication use evaluation (MUE) of thiamine for the prevention of Wernicke encephalopathy (WE) within one year after a shortage-prompted formulary change.

Methods: Hospitalized medical or surgical patients aged 18 years or older with an Alcohol Use Disorders Identification Test score of 16 or more on admission were included. Evaluation criteria were the following: thiamine administration within 24 hours after admission; thiamine dose and duration; use of Alcohol Withdrawal Protocol Order Set; diagnosis of WE during hospitalization or escalation of care for suspected WE. Descriptive statistics were used.

Results: Ninety-nine patient charts were evaluated. Most patients (85 percent) received thiamine within 24 hours of admission. Of these patients, 77 percent were prescribed 100 mg/day. Eighty-three patients received thiamine ≤200 mg/day for at least three days or until discharge, if sooner. Only eight patients were not prescribed thiamine. Thiamine was initially ordered from the site's Alcohol Withdrawal Protocol Order Set in 50 cases. No patients developed WE during hospitalization.

Conclusion: Positive findings from this thiamine MUE support the site's formulary decision and emphasize the importance of protocol use. Institutions may consider these findings when evaluating the need for IV banana bag indicated for WE prevention on their drug formulary.

6. Implementation of a nurse-driven nicotine replacement therapy protocol for hospitalized patients who smoke.

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Introduction: Institutional data show that fewer than one in four patients who smoke receive nicotine replacement therapy (NRT) during hospitalization. Providers feel that this contributes to workflow disruption due to patients being off the floor to smoke and missed opportunities to discuss smoking cessation with patients upon discharge. Clinical pharmacy was recruited to assist in the development of a protocol to increase rates of NRT ordering in the hospital.

Research Question or Hypothesis: Implementation of a nurse-driven protocol for NRT ordering, designed collaboratively by an interprofessional team, will increase rates of NRT ordering upon admission to the hospital.

Study Design: Quasi-experimental

Methods: The nurse-driven NRT protocol was implemented on two intervention floors. Two other floors served as controls. Each group (intervention and control) had one medicine and one oncology floor, all with similar NRT ordering rates at baseline. Rates of NRT ordering were compared for four months pre- and four months post-implementation of the nurse-driven NRT protocol. The primary outcome was the change in pre- and post-implementation rates of NRT ordering.

Results: The study included 670 patients who smoke, with 340 admitted to intervention floors and 330 admitted to control floors. Following implementation of the protocol, intervention floors saw a 10% increase in patients who smoke with NRT orders compared to pre-implementation of the protocol. Control floors saw an 8% decrease in patients who smoke with NRT orders during this time. Furthermore, 75% of hospital providers on intervention floors reported that the nurse-driven protocol was highly acceptable, and 90% reported it as feasible to implement on a wider scale.

Conclusion: Implementation of a nurse-driven protocol for NRT ordering in hospitalized patients increases the rate of NRT ordering and is well-accepted by hospital providers.

7. Dose Related Efficacy of Patiromer for Acute Hyperkalemia in Hospitalized Patients.

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Introduction: Few studies have evaluated the relationship between patiromer dose and serum potassium reductions for acute hyperkalemia in hospitalized patients. In these studies, only trends from secondary analyses were reported.

Research Question or Hypothesis: Is there a difference in the mean serum potassium reduction after administration of patiromer at a low dose (8.4 g) compared to higher doses (16.8 or 25.2 g)?

Study Design: Single-center, retrospective cohort study

Methods: An IRB approved analysis was conducted in hospitalized patients that received a single dose of patiromer following

hyperkalemia. Patients were excluded if they received intravenous insulin within six hours of the time the primary endpoint was assessed, hemodialysis, nebulized albuterol ≥10 mg, or intravenous loop diuretics. Patients in the two groups were matched by renal function. The primary endpoint was change in potassium 12-24 hours after patiromer administration. This was analyzed with a t-test ($p < 0.05$ for significance). Based on prior studies, 85 patients per group would be required to reach 80% power to detect a 50% difference. Secondary endpoints included incidence of normokalemia, hypomagnesemia, and hypokalemia. Analysis was performed in SPSS.

Results: After matching,152 patients were in each group. The median pre-patiromer potassium was 5.7 mEq/L in both groups. Both groups displayed a statistically significant reduction in potassium from baseline with a mean reduction (+/- SD) of 0.78 (+/- 0.72) mEq/L and 0.83 (+/- 0.80) mEq/L in the low and high dose groups, respectively. However, there was no significant difference in reduction between the two dose groups (p=0.58). There were no differences in secondary outcomes.

Conclusion: Although there was a significant decrease in potassium 12-24 hours after administration of single-dose patiromer, there was no statistically significant difference in serum potassium reduction between the low and high dose groups. This study cannot exclude the presence of a dose-related difference earlier after patiromer administration.

8. Evaluation of Lactulose and Rifaximin Prescribing in Hepatic Encephalopathy Patients and Impact on Hospital Readmissions.

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Introduction: Hepatic encephalopathy (HE) is a reversible complication related to decompensated liver disease associated with impaired hepatic metabolism of ammonia. Lactulose reduces intestinal ammonia production and absorption. Rifaximin targets urease producing gut bacteria to reduce ammonia. The combination of lactulose and rifaximin results in a higher likelihood of complete resolution of HE and lower mortality. Our institution does not have rifaximin on formulary due to cost. Providers are required to complete a lengthy process to prescribe rifaximin. This potentially limits the number of patients who receive combination therapy and can contribute to readmissions.

Research Question or Hypothesis: Patients who are prescribed combination therapy compared to those who are managed on lactulose alone will have a longer time to readmission and fewer readmissions.

Study Design: Retrospective review of rifaximin and lactulose orders, quantitative research

Methods: De-identified lactulose and rifaximin order reports were generated through the electronic medical record from January 2022 through December 2022. Patients with a confirmed initial diagnosis of HE or hepatic cirrhosis on admission after January 1, 2021 were included. Data collection included medications prior to admission, during admission, and upon discharge. Liver function tests and time to readmission were tracked.

Results: A total of 141 orders were included, majority were for males with cirrhosis on admission. 26/63 (41.3%) patients who received lactulose on discharge, 8/20 (40%) patients who received combination therapy and 2/4 (50%) patients who received rifaximin alone were readmitted. Average time to first readmission was 28.7 days, 46.5 days and 37.5 days for lactulose alone, combination therapy and rifaximin alone respectively.

Conclusion: Most patients were discharged on lactulose alone for HE. Rates of readmission were similar between patients receiving combination therapy and those receiving lactulose alone, however patients who received combination therapy had longer times to readmission, indicating a potential benefit of combination therapy.

Ambulatory Care

9. Diabetes Outcomes During the COVID-19 Pandemic at a Charitable Health Clinic.

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Introduction: Managing cardiovascular risk factors improves outcomes in patients with diabetes. During the COVID-19 pandemic, already suboptimal control rates worsened in the United States. More research is needed to better understand the effect of interprofessional care models on comprehensive diabetes outcomes during the COVID-19 pandemic, especially in underserved patients.

Research Question or Hypothesis: How did the COVID-19 pandemic affect quality measures in predominately non-English speaking patients with diabetes?

Study Design: A retrospective evaluation of electronic medical record data for a single patient cohort at 3 cross-sectional data points.

Methods: This analysis included patients with diabetes seen at a charitable health clinic in Richmond, VA. Data was collected at 3 time points, the last documented values before 3/2020 (baseline), 3/2021 (year 1), and 3/2022 (year 2). The primary outcome was a composite of hemoglobin A1c (HbA1c), blood pressure (BP), and statin use for each year. The outcome metrics were defined as a HbA1c ≤9%, BP ≤140/90 mmHg, and statin use in people aged 40 and older. Cochran Q tests were performed (SPSS Statistics V28) to evaluate changes in proportions over time.

Results: In the primary outcome analysis, 385 patients were included. From baseline, year 1 and year 2 the proportion of patients meeting the primary composite outcome during each time period were 34.3%, 34.0% and 38.4% respectively, p=0.193. There were no significant

differences in the individual components with the exception of increased statin use–which increased over the same time period (62.4%, 70.0%, 73.2% respectively, p<0.001). While encounters were converted to telehealth visits during the pandemic, the number of clinic visits/year did not change over time (4.8, 4.8, and 4.5, respectively, p=0.13).

Conclusion: A charitable health clinic was able to prevent the worsening of diabetes-specific quality metrics during the COVID-19 pandemic.

10. Assessing the Impact of Two Glucagon-Like Peptide-1 Agonists on the Lipid Profile.

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Introduction: Patients with uncontrolled diabetes have increased cardiovascular risk. They commonly have elevated levels of triglycerides and low-density lipoprotein (LDL) cholesterol, and low levels of high-density lipoprotein cholesterol (HDL). Glucagon-like peptide-1 (GLP1) agonists are commonly used to treat type 2 diabetes mellitus and are known to reduce adverse cardiovascular events. GLP1 positively impacts cholesterol by reducing hepatic production of very low-density lipoprotein (VLDL)-triglycerides and modulating reverse transport. However, literature is limited assessing the impact of GLP1 agonists on the lipid profile.

Research Question or Hypothesis: What impact do two, once-weekly dosed GLP1 agonist agents have on the lipid profile?

Study Design: Retrospective chart review

Methods: Data was analyzed retrospectively from September 2016 to August 2022 in patients (mean age 61.3 years) taking dulaglutide (n=67) or semaglutide (n=51) in a private cardiologist's clinic. A lipid profile was collected before and after initiation of each GLP1 agonist. There was a mean of 244 days between initiation of each agent and the second lipid profile. A Wilcoxon paired t-test was used to compare the change in values between the first and second lipid profile for each agent, and a Mann-Whitney independent t-test was used to assess any difference present comparing the two agents.

Results: Both GLP1 agonist agents significantly reduced total cholesterol (P<0.001, P<0.004) and triglycerides (P<0.001, P<0.050). LDL cholesterol significantly decreased (P<0.004) with semaglutide and had a trend toward a decrease (P=0.051) with dulaglutide. HDL cholesterol did not have a significant difference (P=0.699, P=0.320). No significant difference (P>0.05) was found in any lipid values comparing the two agents, or among patients taking a statin (n=81) concomitantly (P>0.05).

Conclusion: Both GLP1 agonist agents positively impacted LDL, total cholesterol, and triglycerides, regardless of statin use. HDL cholesterol did not have a significant difference. These findings are consistent with limited current literature.

11. HPV Vaccination Rates Following a Pharmacist-led Intervention in 9-and-10-year-olds.

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Introduction: The American Cancer Society and American Academy of Pediatrics recommend administering the Human Papillomavirus (HPV) vaccine to children ages 9 and 10 to improve on-time vaccination rates, as they continue to be below national goal. Pharmacist-led interventions using the electronic health record (EHR) may be an effective way to increase these rates.

Research Question or Hypothesis: Are pharmacist-led interventions incorporating the EHR in primary care practices an effective way to increase HPV vaccination rates among 9-and-10-year-olds?

Study Design: A retrospective, pre-post, quasi-experimental study involving a pharmacist-led intervention was completed at two primary care offices in a large healthcare network. Patients aged 9-10 years during the entire intervention period were included.

Methods: Between 11/1/2022 and 3/31/2023, an education session was provided by ambulatory care pharmacists to each primary care team regarding the HPV vaccine and eligibility of 9-and-10-year-olds. On 6/1/2023, a direct message was sent by the pharmacist via the EHR to the parent or guardian of eligible patients describing eligibility, risks and benefits, and best practice recommendations. The primary endpoint evaluated change in initial HPV vaccination rates in 9-and-10-year-olds measured 6 months after direct messaging. Secondary outcomes evaluated EHR message receipt, adverse events, and program revenue. Outcomes measured on a nominal scale were assessed with McNemar's Test or Cochran's Q Test using SPSS software; p<0.05 was considered significant.

Results: 367 patients ages 9 and 10 were eligible for HPV vaccination. Following pharmacist-led intervention, 45 patients were vaccinated with vaccination rate increasing from 0.5 to 12.8% (p<0.001). A total of 288 (78.5%) had access to EHR messaging with 203 (55.3%) having confirmed receipt of the message. No adverse reactions were reported within 7 days of vaccination. Most patients (76%) had private insurance, followed by Medicaid (22.6%), and uninsured (1.4%). Approximate revenue of the program was $4,129.89.

Conclusion: A pharmacist-led intervention using the EHR significantly increased HPV vaccination rates in 9-and-10-year-olds.

12. Utilization of behavioral screening tools and risk of suicide in veterans undergoing opioid de-prescribing at a rural VA Health Care System.

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Introduction: Opioid prescribing guidelines released by Center for Disease Control has resulted in a decline in opioid prescribing; however, concerns remain regarding the need to reduce harm associated with aggressive tapering practices.

Research Question or Hypothesis: Evaluating behavioral screening tool utilization and risk of suicide in veterans in whom opioids were de-prescribed with or without tapering

Study Design: Retrospective chart review

Methods: Veterans aged 18 or older with chronic use of high-dose opioids defined as greater than 90 morphine equivalent daily dose (MEDD) for ≥ 90 days between 2017 and 2020 were included, while those with palliative care were excluded. Data extracted from the electronic medical record included patient demographics, past medication and medical history, average MEDD at baseline and completion of de-prescribing, and documentation of Patient Health Questionnaire (PHQ)-9 or Comprehensive Suicide Risk Evaluation (CSRE). We also report proportion of patients with suicidal ideation or attempt. Descriptive statistics were used to summarize study findings.

Results: Baseline demographics for 58 veterans included in the study were mean age of 63 years, 51 (87.93%) male, 44 (75.86%) white, 21 (36.21%) with education level of high school or less, and 47 (81%) with at least one mental health comorbidity. Twenty-eight (48.28%) were prescribed antidepressants or antipsychotics, 19 (32.76%) non-steroidal anti-inflammatory drugs, 20 (34.48%) gabapentin, 13 (22.41%) benzodiazepines, and 30 (51.72%) muscle relaxants. Average MEDD at baseline was 79.25 mg and 16.51 mg after completion of de-prescribing. Only ten (21.28%) had documented PHQ-9 or CSRE prior to or during de-prescribing. Twelve (20.69%) cases of suicidal ideation or attempt were reported: three (5.17%) after being informed of taper, two (3.45%) during taper, and seven (12.07%) after stop date.

Conclusion: This study highlights the need for proactive utilization of behavioral screening tools during opioid taper or discontinuation given the risk of suicide in this population.

13. Evaluation of Diabetes Outcomes in a Pharmacist Managed Telephonic Clinic.

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Introduction: Telemedicine services leveraging interdisciplinary teams can improve diabetes outcomes. The aim of this study was to evaluate the clinical significance of telephonic interventions providing education, medication optimization, and lab monitoring in a collaborative pharmacist – nurse clinic.

Research Question or Hypothesis: Determine the change in A1c from baseline to 6 and 12 months after enrollment in the telephonic clinic.

Study Design: Retrospective, single cohort pre/post intervention study

Methods: This study was conducted on patients with uncontrolled Type 2 Diabetes Mellitus (T2DM) within a large, disproportionate share health system. Pharmacists and nurses outreached patients with an outdated A1c or A1c greater than 9%. Patients met inclusion if they had two or more encounters with clinic staff. The primary outcome was to determine the change in A1c from baseline to 6 and 12 months after enrollment. Secondary outcomes included the percentage of patients meeting A1c performance metrics, number of patient interactions, patient demographics, social determinants of health variables, emergency department visits and hospitalizations, primary care provider (PCP) visits, and change in weight.

Results: Of the 1,149 patients screened, 345 were included. Mean participant age was 59 years, 53% were female, and 49% identified as Black/African American. A significant reduction in A1c was found at both 6- and 12-months post-intervention, -2.0 and -2.4, respectively. At, baseline 21.7% of patients had an A1c less than 9%, improving at 6 and 12 months to 78.7% and 76%, respectively. Mean weight loss of 3.75 kg (SD 7.40) was observed from baseline to 12 months. No significant difference in hospitalizations or emergency department visits was found; however, there was a significant reduction in PCP visits.

Conclusion: Implementation of a collaborative pharmacist – nurse telephonic clinic significantly improved A1c in a socioeconomically and demographically diverse patient population. Our findings suggest that proactive telephonic outreach can positively impact diabetes outcomes for patients regardless of race or gender.

14. Pharmacist Perceptions of Delivering Patient Care through Telehealth.

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Introduction: During the COVID-19 pandemic, telehealth allowed providers to provide care to patients remotely and resulted in increased patient satisfaction. Many studies have surveyed an array of healthcare team members regarding their stance on telehealth communications. However, there is a lack of data assessing pharmacists' perceptions. Our study aimed to evaluate pharmacists' perceptions of telehealth services.

Research Question or Hypothesis: What are the facilitators and barriers to pharmacists providing care through Telehealth?

Study Design: Qualitative analytical study.

Methods: Participants were included if they were a licensed pharmacist utilizing telehealth in the outpatient setting. Study participants

completed an electronic survey that was used to collect characteristics and telehealth usage information, as well as the validated Health Optimum Telemedicine Acceptance (HOTA) questionnaire. Participants subsequently participated in a virtual focus group conducted by two investigators who guided discussion via pre-specified questions. Focus group responses were transcribed and analyzed via Dedoose™ software by an alternate investigator using Miles & Huberman's qualitative data analysis model.

Results: Six pharmacists were included. Responses were categorized as clinical effectiveness and patient experience. All participants performed at least 20 virtual visits and agreed that telehealth improved patient health status. Respondents agreed that telehealth is clinically effective due to having more frequent interactions and ability to provide multiple types of care for patients virtually. However, technological difficulties, the inability to provide physical examinations, and obtain lab work were identified limitations. The main benefit that patients gained from telehealth was the elimination of transportation barriers, allowing increased access to care. Pharmacists identified patient privacy and inability to educate on medical devices as a limitation.

Conclusion: Pharmacists perceive that telehealth is useful in several clinical scenarios. They identified opportunities to improve its development. Further investigation must be done to better grasp impediments in telehealth care in order to provide the most effective patient care.

15. Evaluation of Ambulatory Care Pharmacist-Led Management on Hemoglobin A1c Values Among Patients with Uncontrolled Diabetes in a Primary Care Clinic vs Usual Care Over Two Years.

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Introduction: Subpar management of diabetes mellitus (DM) can lead to poor outcomes and excessive costs. Literature has shown the positive impact of ambulatory care pharmacists on DM management, yet additional research compared to traditional care models is warranted beyond 6 months of time to support clinical pharmacy advancement.

Research Question or Hypothesis: What is the impact of an ambulatory care pharmacist on glycemic control over two years compared to patients who receive usual care?

Study Design: Retrospective cohort

Methods: Pharmacist-managed (PM) patients with a baseline HgbA1c ≥ 8% were matched 1:2 to patients who received usual care (UC). The primary outcome was the mean change in hemoglobin A1c (HgbA1c) over two years. The secondary outcomes were to evaluate the difference in (1) the proportion of patients achieving HgbA1c <8%, (2) the proportion of patients achieving blood pressure <130/80 mmHg, (3) mean LDL, (4) the proportion of patients prescribed SGLT2i, GLP-1a, and sulfonylureas, and (4) hypoglycemia after two years. Chi-squared test, paired t-test, and analysis of variance were used for analysis with calculated power of 86% to detect a 1% HgbA1c change assuming alpha of 0.05 (SAS 9.4).

Results: The adjusted mean HgbA1c change was -1.92 among PM patients (n=60) vs -0.98 among UC patients (n=120) ($p = 0.004$). 53.5% of PM patients vs 34.2% of UC patients achieved HgbA1c < 8% ($p = 0.014$). There were no statistically significant differences in proportion of patients achieving goal blood pressure, mean LDL, or hypoglycemia. After two years, 18.3% of PM vs 5.8% of UC patients were on an SGLT-2i ($p = 0.008$), and 46.7% of PM vs 9.2% of UC patients were on a GLP-1a ($p < 0.001$). No difference was found in sulfonylurea utilization.

Conclusion: Patients with uncontrolled DM who received care from an ambulatory care pharmacist had an HgbA1c reduction nearly twice that of matched controls provided usual care.

16. Are Two Better than One? Evaluation of the Effects of a Paired Pharmacist-Diabetes Educator Visit in Outpatient Clinics.

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Introduction: In March of 2020, a paired-visit pilot program began at an outpatient clinic to improve diabetes care. New patients referred to a clinical pharmacist under collaborative practice agreement for diabetes management were simultaneously referred to medical nutritional therapy (MNT) with a certified diabetes educator (CDE).

Research Question or Hypothesis: The paired-visit group will be observed to have the most improved outcomes.

Study Design: Retrospective cohort

Methods: Patients who were referred between May 2018 and April 2022 were considered for inclusion and, if eligible, placed into one of three groups: paired-visit, pharmacist-only, or no visit. Primary outcome was change in hemoglobin A1c (HgbA1c) from baseline to six and twelve months. Secondary outcomes included change in body mass index (BMI), change in show rate to diabetes self-management education (DSMES) and MNT visits, and change in emergency department (ED) visit frequency in which the chief complaint was hyper- or hypoglycemia.

Results: A total of 275 patients were included. Groups differed in age, race/ethnicity, insurance status and baseline medications, but otherwise were similar. Mean HgbA1c at baseline visit was above 10% for each group. There was a significant difference in the primary endpoint of HgbA1c for patients with both six- and twelve-month values.

Patients in the paired visit group averaged 7.59%, 8.22% in the pharmacist-only group and 9.37% in the no visit group ($p < 0.001$). No differences were found between groups in BMI or ED visits. Patients in the paired visit group had the greatest number of DSMES and MNT visits in the year after baseline visit compared to no visit and pharmacist-only groups (Mean number of classes: 0.96 vs 0.13 vs 0.43; $p<0.001$).

Conclusion: Implementation of the paired visit program yielded the lowest A1c values and significantly improved DSMES and MNT visit show rates when compared to patients who only saw the pharmacist or did not see the pharmacist or CDE.

17. Evaluation of SGLT-2 Inhibitor impact on renal function in patients with diabetes mellitus and chronic kidney disease.

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Introduction: Recent evidence supports the use of Sodium Glucose Transporter 2 (SGLT-2) inhibitors for treatment in Type 2 diabetes (DMII), Chronic Kidney Disease (CKD) and estimated glomerular filtration rate (eGFR) greater than 30mL/min/1.73m^2. With tolerability concerns and significant co-morbidities in the veteran population, the question arises if the safety and efficacy profile is similar in the VA clinical setting as compared to the DAPA-CKD trial.

Research Question or Hypothesis: Does the addition of a SGLT-2 inhibitor regimen improve eGFR function for patients with CKD and DMII compared to those patients not initiated on the regimen?

Study Design: This cohort study conducted in Hines VA Hospital utilized retrospective chart review from November 2020 through November 2021.

Methods: Patients with a diagnosis of DMII and CKD, with an eGFR range of 15 to 60 mL/min/1.73m^2 were included. Primary outcome is change in eGFR for patients on empagliflozin, compared to those not on empagliflozin.

Results: Primary outcome, mean change in eGFR from baseline to second measurement after 90 days or greater for the empagliflozin treatment group compared to the standard treatment arm was 2.08 and 3.15, respectively (95% CI, -1.65 to 3.80; P=0.437).

Conclusion: For the primary endpoint of mean change in eGFR from baseline to second measurement after 90 days or greater, results were not statistically significant, with a greater mean eGFR change in the standard treatment group. The addition of an SGLT-2 inhibitor regimen did not improve eGFR function for patients with CKD and DMII compared to those not initiated on the regimen. However, risk of decline in eGFR of at least 5mL/min/1.73m^2 was lower with empagliflozin. In addition, none of the participants in the empagliflozin treatment arm post-initiation progressed to CKD stage 4 or 5. Future studies should explore further changes in renal function.

18. Impact of pharmacist-led intervention in veteran patients with positive alcohol use disorder identification test on access to care.

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Introduction: Alcohol Use Disorder (AUD) is a significant burden in veterans. Factors such as limited literacy and perceived stigma may limit access to care and pharmacists are well positioned to bridge this care gap.

Research Question or Hypothesis: We evaluated the impact of pharmacist-led intervention (PLI) on access to care in veterans with a positive alcohol use disorder identification test (AUDIT-C) using the Veterans Health Administration academic detailing (AD) dashboard for AUD.

Study Design: Quality improvement.

Methods: Veterans ≥18years of age with a positive AUDIT-C screen (≥5) without a completed brief intervention (BI) in the past year were included while anyone prescribed AUD pharmacotherapy or followed by a mental health (MH) provider were excluded. All patients were mailed educational packet prior to pharmacist call, and note was entered in patients' chart to alert provider irrespective of whether the patient answered the telephone call. Primary outcome was proportion of patients who completed BI within 90 days of PLI. Secondary outcomes were proportion of patients who completed referral with a provider and change in mean AUDIT-C score within 90 days in patients with successful pharmacist telephone encounter. Descriptive statistics were used for reporting; paired t-test was used to assess AUDIT-C score change.

Results: Of the 675 patients screened, 143 were included and 91 answered pharmacist's call. The median age was 60 years with majority male population. PLI resulted in BI completion in 41.26% (59/143) patients. Of 91 patients who answered the call, 19 (20.88%) accepted a referral to MH provider and 17 completed psychotherapy, of whom 6 also completed follow up with pharmacist resulting in initiation of pharmacotherapy in 3 patients. Significant decrease in mean AUDIT-C was noted [mean difference 2.79; 95%CI (1.52-4.06); p-value<0.001].

Conclusion: This initiative resulted in increased brief intervention completion and improved access to care with significant reduction in mean AUDIT-C score.

19. Impact of a Pharmacist-Led Weight Management Service in a Cardiology Clinic.

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Introduction: Two glucagon-like peptide-1 receptor agonists (GLP-1 RA) are FDA-approved for weight management, liraglutide (Saxenda®) and semaglutide (Wegovy®). These medications require frequent dose titration, patient education, and insurance coverage navigation, which a pharmacist is well-equipped to manage. Data is lacking on the benefit of a pharmacist-managed service using GLP-1 RAs for weight loss in a high-risk cardiac population.

Research Question or Hypothesis: A pharmacist-led weight loss service within a cardiology clinic using GLP-1 RAs and lifestyle counseling is associated with clinically significant weight loss and improvement in cardiometabolic comorbidities such as diabetes, dyslipidemia, and hypertension, in patients with obesity or overweight.

Study Design: Single-center, IRB-approved, prospective, pre-post analysis

Methods: Patients 18 years and older with a body-mass index (BMI) of at least 30 kg/m^2 or 27 kg/m^2 with at least one weight-related comorbidity with a preceding failed dietary effort and insurance coverage for Wegovy® or Saxenda® were included. Exclusion criteria were any labeled contraindication to GLP-1 RA or pregnancy. The pharmacist initiated and titrated GLP-1 RA and provided lifestyle modification counseling. The primary outcome was the proportion of patients achieving ≥5% weight loss at 6 months, assessed via descriptive statistics.

Results: Between March 2022 and March 2023, 204 patients were referred by their cardiologist. Of these, 145 patients were not interested or had no insurance coverage for Wegovy® or Saxenda®, leaving 59 patients who initiated treatment. The mean baseline BMI was 40 kg/m^2. Thirteen patients completed 6 months of treatment at time of study completion. All patients achieved ≥5% weight loss at 6 months, with a mean weight loss of 15.2%. At 6 months, A1c improved by 0.5%, LDL by 29 mg/dL, triglycerides by 32 mg/dL, systolic blood pressure by 5 mmHg and diastolic by 3 mmHg.

Conclusion: Pharmacist-led management of GLP-1 RA in patients with obesity or overweight led to clinically significant weight loss and improved weight-related comorbidities.

20. Effect of extended pharmacist involvement in discharge transitions of care on hospital readmission rates: prospective, randomized, parallel arm design trial.

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Introduction: Pharmacist involvement in transitions of care has been shown to improve patient outcomes and reduce readmission rates. Pharmacists reduce medication errors at discharge by ensuring all home medications continued are appropriate, provide discharge counseling on new and existing medication therapies, and evaluate the safety and efficacy of the patient's medication therapy in order to decrease readmission rates. Results from this study may provide a financial benefit for hospital reimbursement by reducing 30 day readmission rates.

Research Question or Hypothesis: Extended pharmacist involvement at discharge transitions of care may help reduce 30 day hospital readmission rates and emergency department (ED) visits.

Study Design: Prospective, randomized, parallel arm design trial

Methods: Patients 18 years of age and older with a readmission risk score of 25 or greater, and admitted on general medicine floors from November 1, 2022 through February 28, 2023 were included. Patients were randomized into a standard of care (SOC) or extended SOC group. The primary outcome was the comparison of composite ED and hospital 30 day readmission rates for patients that have extended pharmacist intervention at discharge versus SOC. A key secondary outcome included number of drug-related problems identified and resolved. The primary outcome was analyzed using chi-squared analysis (alpha of 0.05) and secondary outcomes as descriptive statistics. Data was analyzed using Stata® 16.1 statistical software.

Results: 296 patients were included for analysis with 148 patients in both extended SOC and SOC groups. Extended SOC decreased the composite 30 day ED visit and hospital readmission rate by 6.7% (p= 0.63). Extended SOC group decreased 30 day ED visits by 4.7% and inpatient 30 day readmissions by 7.9%.

Conclusion: Patients in extended SOC group resulted in a non-statistical decrease in ED visits and inpatient readmissions 30 days after discharge compared to SOC group.

21. Assessing Appropriate Antibiotic Prescribing at a Family Medicine Outpatient Clinic.

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Introduction: Approximately half of outpatient antibiotic prescribing might be inappropriate, including antibiotic selection, dosing, or duration, in addition to unnecessary antibiotic prescribing. Failure to follow the appropriate guidance for antibiotic prescribing can lead to antibiotic resistance. Antibiotic resistance is one of the greatest public health threats today and can lead to increased health care costs and increased morbidity and mortality. The most important modifiable risk factor for antibiotic resistance is inappropriate prescribing of antibiotics.

Research Question or Hypothesis: What proportion of antibiotic prescriptions are guideline concordant in primary care?

Study Design: This is a single-center retrospective cross-sectional study.

Methods: A list of every antibiotic prescribed from September 1, 2021-September 1, 2022 was generated. This list was sorted into 3 categories; upper respiratory tract infection (URI), urinary tract infection (UTI), and skin and soft tissue infection (SSTI) based on

diagnosis code. Thirty prescriptions from each category were randomly selected to chart review. The definition of appropriate prescribing was based on current practice guidelines. The prescription regimen was considered guideline concordant if all of the following criteria were met: antibiotic treatment is indicated and the drug choice, dose, and duration of therapy is appropriate.

Results: Across all infections roughly one-third of prescriptions were appropriate based on current guidelines. Only 47% of URI prescriptions were indicated. Medication choice was suitable for 80% of SSTI prescriptions, 73% of UTI prescriptions, and 79% of URI prescriptions. Medication dose was appropriate in all UTI and URI prescriptions. However, the dose was appropriate in only 67% of SSTI prescriptions. Duration of antibiotic treatment was an issue across all infections, 75% of SSTI prescriptions, 64% of UTI prescriptions, and 64% of URI prescriptions were appropriate.

Conclusion: Antibiotic prescribing for common infections in primary care is suboptimal. Interventions are needed to improve antibiotic stewardship. Further study is needed to determine best practices in the outpatient setting.

22. GLP-1 Receptor Agonists: Safety and Efficacy Differences in a Real-World Population.

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Introduction: The safety and efficacy between GLP-1 RAs are accepted, but not thoroughly studied. While there are some head-to-head studies for GLP-1 RAs, there are no studies that review more than two GLP-1 RAs at once. These studies did not consider safety and efficacy differences that could arise from social determinants of health. The purpose of this study was to assess the safety and efficacy of long-acting injectable GLP-1 RAs in a real-world underserved population.

Research Question or Hypothesis: Determine if there are efficacy differences between injectable semaglutide, liraglutide, dulaglutide, or exenatide extended release (ER) in the outpatient setting of a disproportionate share hospital.

Study Design: A retrospective chart review was done of patients 18 years and older with diabetes who were prescribed injectable semaglutide, liraglutide, dulaglutide, or exenatide ER by MetroHealth providers between January 1st, 2018 to September 1st, 2022.

Methods: The primary end point was percent change in A1c from baseline to 6 months and secondary endpoints evaluated changes in A1c at 12 months, discontinuation rates, emergency department visits, weight, renal function, blood pressure, and mortality.

Results: A total of 9,402 participants were included. Average age was 55.4 years with 60.9% female and 45% African American. Amongst the participants, 2,547 were prescribed dulaglutide, 166 prescribed exenatide ER, 2,486 prescribed liraglutide, and 769 prescribed semaglutide. From baseline to 6 months there was an A1c change of -1.07, -0.36, -0.84, and -0.90 (P = <0.001) and from baseline to 12 months -0.90, -0.23, -0.64, and -0.86 (P = <0.001) respectively. There were weight reductions in all cohorts. There was no significant difference regarding creatinine, microalbumin, or eGFR.

Conclusion: Dulaglutide had the largest reduction in both A1c and weight. This study provides practitioners with additional information regarding differences between GLP-1 RAs and supports additional head-to-head GLP-1 RA studies being conducted as additional medications in this class are brought to the market.

23. Improvement of hypertension and diabetes control with virtual medication management.

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Introduction: In-person pharmacist involvement in chronic disease management has demonstrated effectiveness. We implemented a virtual medication management service in primary care.

Research Question or Hypothesis: Virtual engagement with pharmacists will improve hypertension and diabetes control

Study Design: pre-post quality improvement study

Methods: Patients were included if they had at least 2 encounters (telephonic or virtual) with a clinical pharmacist between January 1, 2020, and February 1, 2022, along with elevated hemoglobin A1c (>7%) and/or blood pressure (>140 systolic or >90 diastolic). We used a linear mixed effects regression model to test for associations between patient characteristics (age, race, insurance) and follow-up lab measurements, controlling for the baseline lab value. Baseline (within 6 months prior to initial encounter) and follow-up (within 4 months after last encounter) values were compared using the Wilcoxon signed rank test for continuous variables, and McNemar's for categorical variables.

Results: A total of 243 patients were included with elevated blood pressure and 526 with elevated A1c. Median systolic blood pressure decreased from 149 to 135mmHg from baseline to follow up, and median diastolic blood pressure decreased from 79 to 73mmHg. By the last encounter, 41% of patients had blood pressure measuring less than 140/90. Median A1c decreased from 9.3 to 7.7% and 26% of patients reached A1c of less than 7%. The proportion of patients with follow-up A1c of less than 8% increased from 16.7% to 56.7%. All improvements were statistically significant with p<0.05. In the linear mixed effects model, we found a strong nonlinear association between time from first contact and an initial decrease in A1c (p<0.001) and a mild nonlinear association between time from first contact and a decrease in diastolic blood pressure (p=0.049).

Conclusion: A virtual pharmacist-driven medication management service improved control of diabetes and hypertension among a sample of primary care patients.

24. Professional Continuous Glucose Monitoring (ProCGM) in a Medically Underserved Population (MUP) with Persistently Uncontrolled Type 2 Diabetes: A Pilot Study.

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Introduction: Previous studies demonstrated ProCGM is helpful in identifying and correcting patterns of hyper- and hypoglycemia. American Diabetes Association Recommends ProCGM when personal CGM is unavailable. Few studies have observed the effect of ProCGM for patients in a MUP.
Research Question or Hypothesis: Does ProCGM improve glycemic control in a MUP setting?
Study Design: Prospective, pre-post intervention pilot study of a single cohort of patients in a public health center.
Methods: Patients with type 2 diabetes, A1c ≥ 9% for two consecutive readings or >1% increase in A1c, and taking at least one dose of insulin were included. Participants with a ProCGM sensor placed had to have at least 1 follow-up visit with the clinical pharmacist. The primary analysis evaluated A1c 1-6 months after intervention. Secondary analysis evaluated characteristics associated with a benefit from a ProCGM. Participants completed a pre- and post-survey about the ProCGMs.
Results: Twenty-nine patients received a Pro-CGM, twenty-two had a follow-up A1c, and thirteen wore the sensor for two weeks. The mean A1c pre- and post-CGM was 11.0% and 9.8% respectively, and the decrease was significant for patients who wore the sensor for at least 10 days (p=0.012). Using the Pro-CGM data 91% had a change to their medication regimen and 45% achieved an A1c <9%. Six participants experienced hypoglycemia per the CGM report, but only two were aware of it. After reviewing their glucose report with the pharmacist, 95% of participants agreed or strongly agreed to feeling more knowledgeable about glucose patterns. No survey characteristics were predictive of a benefit of the Pro-CGM.
Conclusion: Data from Pro-CGM enabled patients and providers to better understand glucose patterns in those with persistently uncontrolled type 2 diabetes. This study demonstrated glycemic benefit in patients in a MUP who wore a Pro-CGM for at least 10 days and met with a clinical pharmacist.

25. SGLT2 Inhibitors and the Risk of Genitourinary Infections at A1c ≥ 10%: A Population Health-based Retrospective Review.

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Introduction: Sodium-glucose co-transporter 2 (SGLT2) inhibitors are first-line treatment for type-2 diabetes. Evidence has shown a three-to-five-fold increase in the risk of genitourinary infections with their use due to inhibition of renal glucose reabsorption, thus resulting in glucosuria. Increased glucosuria is thought to increase the risk of genitourinary infections at a greater degree in patients with a significantly elevated A1c (≥10%). As such, it is common practice to delay initiation of SGLT2 inhibitors in these patients. The real-world infection risk in such patients compared to those with lower A1c has not been well characterized, therefore the necessity of this practice is unknown.
Research Question or Hypothesis: What is the real-world risk of genitourinary infections in patients receiving SGLT2 inhibitors with A1c ≥ 10% compared to patients with A1c <10%?
Study Design: Retrospective cohort study
Methods: This study evaluates data from adult patients treated within the Legacy Health system between January 2013 and January 2023, who were newly prescribed an SGLT2 inhibitor. Diagnosis codes related to genitourinary infections were used to quantify infections. The primary outcome was the rate of genitourinary infection before and after initiation of SGLT2 inhibitors, reported within groups of baseline A1c ≥ 10% and <10%.
Results: A total of 5,546 patients were included in the study. The mean age was 64 years. 961 patients had a baseline A1c of ≥10%. The before and after differences of mean genitourinary infection rates differed between A1c groups (0.207 vs. -0.249, P<0.0001), with a higher infection rate after SGLT2 initiation in the A1c <10% group compared to the A1c ≥10% group.
Conclusion: Our findings suggest patients with a baseline A1c of ≥10% are not at an increased risk of developing genitourinary infections following the initiation of SGLT2 inhibitors compared to those with a baseline A1c of <10%.

Cardiovascular

26. Real-World Use of Guideline-Directed Medical Therapy in Heart Failure with Reduced Ejection Fraction among US Patients (2021-2022).

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Introduction: Guideline-directed medical therapy (GDMT) "quadruple therapy" and loop diuretics are the cornerstone of evidence-based treatment for heart failure with reduced ejection fraction (HFrEF). However, the initiation of these medications has historically lagged behind guideline recommendations.
Research Question or Hypothesis: What proportion of US patients with HFrEF are receiving GDMT? How much do K and eGFR abnormalities predict GDMT use?

Study Design: Retrospective observational cohort study

Methods: The TriNetX platform was used to access data from 55 US healthcare organizations (>91M patients). Patients that met the following criteria during 2021-2022 were included: Diagnosis of HF and outpatient encounter; EF≤40%; presence of K+ and eGFR values by laboratory testing. Patients were further categorized according to normal/abnormal values of K (normal: 3.5-5.0 mEq/L) and eGFR (normal: ≥30 mL/min/1.73m2). Prescription records were queried during the 7-120 days immediately after laboratory testing. Odds ratios (and Chi-square test) for use of GDMT medications were calculated among patients with abnormal K or eGFR values in comparison to patients with normal values (SPSS v28).

Results: 6,112 patients met criteria for the analysis. Among patients without K or eGFR abnormalities, GDMT use was as follows: ACEI/ARB/ARNI=43%; ß-blocker=44%; MRA=23%; SGLT2I=12%, loop diuretic=30%. The odds ratios for GDMT use in patients with low eGFR were as follows: ACEI/ARB/ARNI (0.21, P<0.001); ß-blocker (0.53, P<0.001); MRA (0.21, P<0.001); SGLT2I (0.21, P<0.001); loop diuretic (0.80, P=0.06). The odds ratio for GDMT in patients with hyperkalemia were as follows: ACEI/ARB/ARNI (0.57, P<0.001); ß-blocker (0.57, P<0.001); MRA (0.56, P<0.001); SGLT2I (0.92, P=0.44); loop diuretic (0.60, P<0.001). The odds ratio for GDMT in patients with hypokalemia were as follows: ACEI/ARB/ARNI (0.47, P<0.001); ß-blocker (0.45, P<0.001); MRA (0.37, P<0.001); SGLT2I (0.60, P=0.0049); loop diuretic (0.74, P=0.06)

Conclusion: Real-world GDMT use remains low for HFrEF patients regardless of K and eGFR abnormalities. GDMT underuse appears to be exacerbated in patients with K and eGFR abnormalities.

27. Evaluation of Intravenous Heparin Protocols in Cardiothoracic Surgery Patients.

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Introduction: Multiple heparin protocols within one institution can lead to inconsistent dosing practices and affect the clinical outcomes and safety profiles of Cardiothoracic Surgery Intensive Care Unit (CTICU) patients.

Research Question or Hypothesis: What are the outcomes and adverse events associated with the three different heparin protocols at Carolinas Medical Center (CMC) in the postoperative setting for patients admitted to the CTICU?

Study Design: Single-center, retrospective chart review in 100 adult patients who received heparin postoperatively in the CTICU between May 1, 2022 and July 31, 2022.

Methods: Patients were identified through SlicerDicer within Epic. Data collection included demographics, anticoagulation indication, heparin protocol utilized (regular, neurology, or cardiac acute coronary syndrome [ACS] dosing), duration of therapy, time to target aPTT, time within therapeutic range, bleeding events and clotting events. Data points were analyzed with descriptive statistics. Exclusion criteria included pregnant women and prisoners.

Results: Among the three heparin protocols, the average duration of therapy was 10.8 days in regular, 7.0 days in ACS, and 5.9 days in neurology dosing. The average time to target aPTT was 14.8 hours in regular, 22.3 hours in ACS, and 21.4 hours in neurology dosing. The average time within therapeutic range was 60.0% in regular, 51.0% in ACS, and 50.4% in neurology dosing. Bleeding events occurred in 10.3% of patients within regular and neurology dosing, and 15.9% within ACS dosing. Clotting events occurred in 17.2% of patients within regular, 10.3% within neurology, and 6.4% within ACS dosing.

Conclusion: There was a greater average time within therapeutic range for patients receiving the regular dosing protocol while having lower rates of bleeding events and higher rates of clotting events. A study with a larger sample size is warranted to evaluate the statistical and clinical significance of these findings to determine the optimal dosing strategy in this patient population.

28. Increasing Implementation of Guideline Directed Medical Therapy for Sodium-Glucose Cotransporter 2 Inhibitors in Heart Failure Patients with Reduced Ejection Fraction.

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Introduction: Heart Failure is a progressive disease that can reduce quality of life and lead to death. The use of SGLT2i for HFrEF has been demonstrated to significantly reduce mortality and HF hospitalizations.

Research Question or Hypothesis: Will a pharmacist-led intervention utilizing consultation notes distributed to Physicians and CPPs lead to an increase in HFrEF patients prescribed an SGLT2i?

Study Design: Pre/post intervention quality improvement project focused on increasing SGLT2i prescribing for HFrEF patients.

Methods: Eligible patients were identified through the VA National Academic Detailing Service HF platform. Patients were screened through the VA Computerized Patient Records System (CPRS). A consultation note was distributed to Primary Care Physicians and Clinical Pharmacy Practitioners through CPRS to consider prescribing an SGLT2i for qualifying patients. The pre-intervention and post-intervention cohort consisted of the same patient population before and after implementation of the consultation note. The study endpoint is the percentage of patients prescribed an SGLT2i after the consultation note is implemented. The study population included veterans aged 18 years and older living with HFrEF (LVEF ≤40%) who are receiving HF management through the VA.

Results: Of the 372 veterans identified through the VHA Heart Failure Patient Report, 74 veterans were eligible for intervention. Each consultation note included a review of SGLT2i contraindications and

recommendations from the 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure regarding SGLT2i use in HFrEF patients. In total, 33 out of 74 interventions were accepted (44.6%) and 41 out of 74 were not accepted (55.4%). Reasons for non-acceptance included veteran death (2.4%), veteran following with community cardiologist (9.8%), being unable to contact veteran (12.2%), veteran declining (22%), provider declining (24.4%), and no reason specified (29.3%).

Conclusion: This pharmacist-led intervention resulted in an increase of HFrEF patients prescribed an SGLT2i, demonstrating that pharmacists can effectively improve care by reviewing patients for appropriate drug therapy and providing guideline-directed recommendations.

29. The Impact of Iron Deficiency on Hospital Readmissions in Patients with Acute Decompensated Heart Failure: A Retrospective Cohort Study.

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Introduction: Iron deficiency (ID) is recognized as a common co-morbidity in patients with Heart Failure (HF). Acute Decompensated Heart Failure (ADHF) is a serious health concern, characterized as a sudden onset or change in the signs and symptoms of HF that requires immediate treatment and associated with a poor prognosis as well as high rehospitalization rate. The impact of IV iron therapy in ADHF patients with iron deficiency remains unclear.

Research Question or Hypothesis: The aim of this study is to evaluate the effect of intravenous iron therapy for ADHF in patients with iron deficiency on hospital readmission rates.

Study Design: Single-Center, Retrospective Cohort Study.

Methods: All patients confirmed with ADHF were included if they were above 18 years old and diagnosed with iron deficiency (ferritin < 100 ng/ml) from Jan 2017 to Dec 2019. The patients were divided into two groups. The first group served as the control group, and the second group received IV iron complex therapy. The primary outcome was an all-causes 30 days readmission rate. The secondary outcome was HF 30 days readmission rate.

Results: A total of 263 patients were included; 230 were in the control group, while 33 patients were in the IV iron complex group. Our preliminary results showed that patients in the control group had more cases of readmission than the intervention group for all-causes 30-day readmission:17.8% compared with 15.2% of patients in IV iron complex; P=0.705. Additionally, there was no significant difference in HF 30 days readmission rate between the two groups; P=0.666.

Conclusion: IV iron therapy at discharge was not associated with a decrease in hospital readmission rate. However, the study in the future will extend to a multicenter to minimize the variation numbers between the two groups.

30. Outcomes of Levosimendan-Based Therapy in Heart Failure: A Retrospective Data Review.

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Introduction: Levosimendan has positive inotropic and vasodilatory actions resulting in increased contractile force, preload and afterload reduction, without adversely affecting the diastolic function, which makes it one of preferred inotropes in acute decompensated heart failure (ADHF). However, its use found to have conflicting results.

Research Question or Hypothesis: Does levosimendan use in ADHF result in favorable effectiveness and safety in comparison to other inotrope(s)?

Study Design: Retrospective cohort study

Methods: We included all patients admitted with ADHF to the main tertiary cardiology center in Qatar during 6/2019 - 12/2022 and received inotrope(s) during the index admission. We divided the study population in two groups; (1) ADHF patients received levosimendan as a single agent or in combination with other inotrope(s); (2) ADHF patients who received other inotropic therapy, including dobutamine, noradrenaline, dopamine, or milrinone, either alone or in combination. Outcomes assessed were escalation to intra-aortic balloon pump (IABP), in-hospital mortality, 30-day mortality, inotrope induced-hypotension, and inotrope induced-arrhythmias. Chi-square test was used to compare outcomes between the two groups, and P-value <0.05 indicated statistical significance.

Results: We found 161 patients eligible for inclusion; 45 received levosimendan and 116 received other inotrope(s). The majority of patients were male (85%), and the study population age was 59±15 years. More than 55% were Asian. Baseline demographics and disease-related characteristics were balanced between the arms except for ejection fraction which was significantly lower in the levosimendan group (29% ± 11 vs. 38% ± 13, P<0.001). All effectiveness outcomes were comparable between the two groups. However, hypotension and arrhythmias were significantly higher with levosimendan (hypotension: 20% vs. 8.6%, P=0.045; arrhythmias: 22.2% vs. 6.9%, P=0.006).

Conclusion: Using real-world data, levosimendan demonstrated similar effectiveness compared to other inotropic therapy in ADHF with increased risk of hypotension and arrhythmias. Such findings might

alert cardiologists to monitor for hypotension and arrhythmias upon using levosimendan.

31. Evaluating the impact of injectable lipid-lowering therapy in patients at risk for new or recurrent cardiovascular disease at a large tertiary cardiovascular center in the United Kingdom.

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Introduction: Primary hypercholesterolemia and mixed dyslipidemia are major causes of cardiovascular disease (CVD). In selected individuals, guidelines for injectable proprotein convertase subtilisin/kexin type 9 inhibitors (PCSK9i) initiation aim to decrease low density lipoprotein (LDL-C) levels below Joint British Societies' (JBS3) recommended target of < 1.8mmol/L in those with or without CVD to reduce the risk of future cardiovascular events.

Research Question or Hypothesis: To compare lipid-lowering effects of two available PCSK9i therapies and determine if one agent is more effective in reducing LDL-C levels below JBS3 guideline threshold.

Study Design: A retrospective chart review and data analysis conducted in a pharmacist-led lipid clinic at a large tertiary cardiovascular center in the United Kingdom.

Methods: Outpatient lipid clinic records were reviewed for therapy initiation dates between September 2021 – October 2022. Patients were referred for PCSK9i initiation based on genetic predisposition, CVD risk, and baseline LDL-C levels. Patients received either alirocumab 150mg or evolocumab 140mg, dosed every two weeks. Patients' LDL-C levels were evaluated at baseline, 1 and 3-6 month intervals.

Results: Of 109 included patients, 61 received alirocumab and 48 received evolocumab. Baseline alirocumab group lipid treatments: statins 26 (43%), ezetimibe 34 (56%), other lipid-lowering therapies (fibrates) 10 (16%), and oral combination therapy 19 (31%). Baseline evolocumab group lipid treatments: statins 27 (56%), ezetimibe 27 (56%), other lipid-lowering therapy 5 (10%) and oral combination therapy 23 (48%). Baseline LDL-C averaged 5.03 mmol/L in alirocumab versus 4.94 in evolocumab, 2.39 versus 2.09 by month 1, and 2.32 versus 1.84 by months 3-6. Target LDL-C was achieved within 3-6 months in 25 (41%) alirocumab patients, versus 30 (62.5%) evolocumab patients.

Conclusion: These results demonstrate that while evolocumab group achieved LDL target in more people, baseline lipid therapies and lab values were significantly different. Further studies and analysis are necessary to establish a definitive treatment difference between groups.

32. Impact of co-prescribing Sodium-Glucose co-transporter 2 inhibitors and Pioglitazone on New Onset Heart Failure in Type 2 Diabetes Mellitus.

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Introduction: Several SGLT2is have demonstrated efficacy in reducing heart failure (HF) events and mortality in patients with Type 2 Diabetes Mellitus (T2DM). Pioglitazone (PIO), an older therapy for patients with T2DM, is associated with increased risk for new onset HF (NOHF). This study aims to evaluate the effect SGLT2is have on risk for NOHF in patients with T2DM treated with pioglitazone.

Research Question or Hypothesis: Does SGLT2i therapy affect risk for NOHF in patients with T2DM receiving pioglitazone?

Study Design: Retrospective cohort study and time-to-event analysis

Methods: A retrospective cohort study was conducted using the TriNetX electronic health records network. The primary cohort included patients with a T2DM diagnosis between Jan. 1, 2014-Feb. 28, 2023. Patients with Type 1 DM were excluded. Patients prescribed PIO +SGLT2i were compared to a matched control prescribed pioglitazone. The index event was the first instance in which both diagnosis and medication criteria were met. The primary outcome of HF (I50) could occur between 14-1,825 days post-index. Cohorts were balanced using a matched 1:1 propensity score algorithm. Covariates included: age, sex, race, cardiovascular disease (ICD-10 codes: I00-I99), mean natriuretic peptide levels, and select medications (CN104, AN000, IM600). The incidence of NOHF was estimated and compared via Kaplan-Meier analysis and log-rank test, respectively. Hazard ratios and 95% confidence intervals were calculated via proportional hazard model.

Results: After matching, there were 4,116 patients in each cohort. At baseline, the average age was 60 years old. NOHF occurred in 260/4,116 of the post-match Cohort PIO+SGLT2i and 312/4,116 of the post-match Cohort PIO, HR = 0.928 (95%CI 0.787 to 1.095; p=0.377). The pre-match HR = 0.679 (95%CI 0.599 to 0.771; p=0.000).

Conclusion: The combination of SGLT2i therapy with pioglitazone reduced NOHF, but was not statistically significant post-match. These findings warrant additional studies to investigate the effect of SGLT2i and pioglitazone co-prescribing.

33. Long-term cardiovascular adverse events induced by fluoroquinolones: A retrospective case-control study.

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Introduction: A correlation is already established between fluoroquinolones (FQs) use and cardiovascular events (CVEs), such as QT prolongation; however, recent warnings linked FQs to serious events like aortic aneurysm and valve regurgitation. Long-term safety data beyond one year of therapy are lacking. Therefore, we aimed to assess the incidence of serious CVEs within and beyond one year post completion of FQ therapy and potential associating factors.

Research Question or Hypothesis: What is the incidence of cardiovascular events (CVEs) beyond one year of therapy with fluoroquinolones and what are the potential factors that may trigger them?

Study Design: A retrospective case-control study

Methods: This was a study of inpatients who received ciprofloxacin, levofloxacin, or moxifloxacin for ≥3 days. Patients' echocardiograms were evaluated for the development of aortic or valvular disease or worsening of an existing condition beyond one year post completion of therapy.

Results: Of 373 included patients, 83 developed new valvular disease or worsening of an existing one, where tricuspid valve regurgitation was the most common CVE (50/83; 60.2%). Aortic valve regurgitation occurred more commonly with moxifloxacin compared with ciprofloxacin and levofloxacin (17.8% vs. 6.7% and 10.7%, respectively; P=0.01). Median time to CVE detection ranged 93-166 days for all FQs. The receipt of moxifloxacin and elevated baseline QT interval were associated with an increased CVEs risk (adjOR 3.26; 95% CI, 1.31-8.11 and adjOR 1.02; 95% CI, 1.00-1.04, respectively). Other factors didn't show such association.

Conclusion: Tricuspid valve regurgitation was the most common serious CVE post FQ therapy. The lack of association of different factors with the occurrence of CVEs indicate that all patients receiving FQ therapy, especially moxifloxacin, should be monitored during the first-year post therapy. Alternatively, other antibiotics with better safety profile might be considered.

Clinical Administration

34. Comprehensive E-Consult Service at a Large Academic Health System.

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Introduction: E-consults have been utilized in healthcare systems by medical professionals. Pharmacy e-consults remain novel. Previous studies have shown benefit in the pharmacist's inclusion in niche e-consult programs. Additional research is required to fill literature gaps to assist in optimizing the pharmacist's role in these programs.

Research Question or Hypothesis: Is there a difference in the acceptance rate between e-consults answered by pharmacists who are experts in the e-consult disease state versus those who are not experts?

Study Design: This study was a retrospective review of all pharmacy e-consults completed by pharmacists at a large academic health system between March 1st, 2020 and August 31st, 2022.

Methods: E-consults were identified using a report. Key data collection points included e-consult disease state, ordering provider, pharmacists' specialty, and recommendation result. The primary outcome for this study was the difference in acceptance rates of expert versus non-expert pharmacist recommendations. Secondary outcomes included the overall implementation rate, acceptance rate between provider types, time to implementation, and pharmacist response time. Acceptance rates were compared between expert/non-expert dichotomy via Pearson chi-square test.

Results: A total of 375 e-consults met inclusion criteria and spanned 19 unique disease states. The three most common included diabetes mellitus (27%), pain management (13.1%), and mental health (11%). Nearly 60% of e-consults were in a disease with an expert. The provider acceptance rate was higher when e-consult was completed by an expert versus non-expert (62.6% versus 39.6% respectively, $p = 0.002$). The overall implementation rate was 51.6%. Physicians (MD/DOs) accepted the pharmacist's recommendations 55.6% of the time, certified nurse practitioners (CNPs) 64.7%, physician assistants (PAs) 100.0%, and other professionals 25.0% ($p = 0.033$). Mean time to pharmacist recommendation implementation was 16.5 days (SD = 29.4 days). Mean time to pharmacist response was 1.1 days (SD = 1.4 days).

Conclusion: Comprehensive e-consult programs are more successful when integrating pharmacists with niche expertise.

Community Pharmacy Practice

35. Predictors of Perceived Value of a Community Pharmacy-Specific Board Certification Among Pharmacists.

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Introduction: Obtaining a pharmacy board certification provides pharmacists formal recognition of their careers and their involvement in a direct and comprehensive patient care. Credentialing demonstrates the competence in a specialty practice. However, there is currently no community pharmacy board certification available to community pharmacists in the United States.

Research Question or Hypothesis: Which demographics or perceptions are predictors of perceived value of a community pharmacy board certification?

Study Design: The research design was a descriptive cross-sectional survey. Data collection occurred from July 1, 2022, to August 1, 2022.

Methods: A cross-sectional survey was distributed electronically via Qualtrics. Respondents were from three state boards of pharmacy. The survey asked 10 demographic questions and 18 perception questions. The perception questions based on a 5-point Likert scale questions measured the respondent's attitudes for the board certification. Predictors were compared to the target variable "board certification value" using linear regression modeling.

Results: 53 survey responses were collected. Statistically significant positive predictors of a pharmacist seeing value in a community pharmacy board certification were association of board certification with financial rewards/pay increase (p=0.02), association of board certification with personal satisfaction (p=0.004) and feeling that all practicing pharmacists have an adequate opportunity to become board-certified (p=0.006). Statistically significant negative predictors were viewing community pharmacists as general practitioners (p=0.044), feeling familiar with the current availability of board certifications (p=0.004), and feeling board certifications are generally accessible to most pharmacists (p<0.001). There were no statistically significant demographic predictors.

Conclusion: Positive perceptions of the current landscape of board certifications and rejecting community pharmacy as a specialty seemed to be connected to a lower perceived value of a community pharmacy board certification. Positive aspirational feelings surrounding board certification and feeling that there is adequate opportunity to be board certified was more common among those who see value in a community pharmacy board certification.

36. Risk Assessment as a Component of Preventive Pharmacy Services at Community Setting.

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Introduction: Community pharmacists can contribute to preventive health care by identifying high-risk individuals for particular diseases and referring them to doctor for further care.

Research Question or Hypothesis: This study aimed to investigate the outcome of a preventive pharmacy service consisting of risk assessment of certain disease conditions and consultation provided by the pharmacist at the community pharmacy setting.

Study Design: The study was conducted between November-December 2019 on adult patients (n=107) at two community pharmacies located in Istanbul, Turkey.

Methods: Risk assessment tests which can be employed without the necessity of on-site testing were chosen for four conditions namely, osteoporosis, cardiovascular disease, diabetes, and depression. Two interviews were planned; the first interview to be face-to-face at the community pharmacy and the second one to be on phone two weeks after the first interview just for the high-risk patients.

At the first interview risk assessment tests were administered to the eligible patients. Patients who were identified to be at high risk for developing any of these diseases were educated about the relevant condition(s) and preventive health measures and then referred to the physician. The focus of the second interview was the assessment of the outcome of referral.

Results: Of the 217 risk tests administered, 91 revealed high-risk patients. About half (47.3%) of all referrals resulted in a doctor's visit; most of those patients (50% for osteoporosis, 80% for cardiovascular diseases, 66.6% for diabetes, 88.9% for depression) received a diagnosis or follow-up visits were planned.

Conclusion: Preventive pharmacy services may contribute to the prevention, early diagnosis, and treatment of several diseases.

Critical Care

37. Efficacy of tolvaptan compared to hypertonic 3% saline for the treatment of severe hyponatremia in hospitalized patients.

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Introduction: Euvolemic and hypervolemic hyponatremia are often refractory to first line agent normal saline. Alternative agents to treat severe hyponatremia are 3% saline and tolvaptan.

Overcorrecting sodium can cause brain damage and death. Experts recommend increasing sodium by 10-12 mEq maximum over 24 hours. Our health system recommends 8-10 mEq over 24 hours.

Research Question or Hypothesis: Is there a difference in the ability to attain an 8-10 mEq increase in [Na] levels within 24 hours using tolvaptan versus 3% hypertonic saline?

Study Design: This chart review included euvolemic or hypervolemic hyponatremia patients treated with 3% saline (n=122) and/or tolvaptan (n=95) between July 1st, 2021 and June 30th, 2022. Primary endpoint was percentage of patients with an 8-10 mEq increase in serum sodium [Na] levels in the first 24 hours.

Methods: Nominal data was analyzed using the 2-Proportions test and non-parametric data with Mood's Median test. A sample size of 210 was used to achieve an 80% power to detect a 15% difference between groups. Statistical tests used a significance level of 0.05.

Results: Primary outcome occurred in 58.9% of the tolvaptan group and 37.7% of the 3% saline group (p=0.001). Hypernatremia

presented in 3.2% of the former and 1.6% of the latter. Change in [Na] over 24 hours was 8 mEq/L in the former and 7 mEq/L in the latter group (p= 0.044).

Conclusion: More tolvaptan patients achieved the primary outcome relative to the 3% saline group. However, a higher percentage of the tolvaptan group exceeded the maximum recommended increase in [Na] relative to the 3 % saline group.

Limitations of this study include its intention-to-treat design and uneven baseline characteristics. Future prospective studies are needed to track symptomatic improvement.

38. Efficacy and Safety of Anticoagulant Use in Critically Ill Patients with New-Onset Atrial Fibrillation.

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Introduction: New onset atrial fibrillation (NOAF) occurs in 5-15% patients admitted to an intensive care unit (ICU). Current guidelines lack evidence to support the role of anticoagulants (AC) in managing NOAF in critical illness. We aimed to evaluate the efficacy and safety of AC use in critically ill patients with NOAF.

Research Question or Hypothesis: We hypothesize that AC use in critical illness associated NOAF increases risk of bleeding and decreases risk of ischemic stroke.

Study Design: This was a retrospective cohort study with a new-user design.

Methods: We collected data from electronic charts of a medical center in Taiwan. Patients were included if they were aged 20 years or older and had a NOAF during the ICU stay between January 1, 2021 and June 30, 2022. Patients were followed through December 31, 2022. The primary efficacy outcome was ischemic stroke and the primary safety outcome was bleeding. The secondary outcome was in-hospital mortality. Propensity score matching was conducted to balance measurable confounders in both groups. Cox proportional hazard models were used to estimate the hazard ratio (HR).

Results: A total of 167 patients were included, with 56 AC users and 111 AC non-users. Compared with non-users, AC users did not have significant differences in the risk of bleeding (HR, 1.42; 95% CI, 0.94 to 2.14) and the risk of ischemic stroke (HR, 0.51; 95% CI, 0.09 to 2.48). Among the bleeding events in AC users, 90.9% (40/44) of those were minor. AC use was significantly associated with decreased in-hospital mortality (HR, 0.56; 95% CI, 0.33 to 0.94).

Conclusion: In critically ill patients with NOAF, AC use was not significantly associated with the risk of bleeding, and demonstrated a reduction of in-hospital mortality. Future studies with larger sample sizes and longer follow-up period should be conducted to provide more information.

39. Weaning Effect of Clonidine in Critically Ill Patients Received Dexmedetomidine at a Tertiary Hospital in Riyadh City: A Retrospective Study.

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Introduction: Critically ill patients often need sedation for various reasons. Dexmedetomidine (DEX) is a non-benzodiazepine sedative used for mechanically ventilated patients. Clonidine is similar to DEX but can be given orally and may facilitate DEX weaning.

Research Question or Hypothesis: Does adding clonidine to DEX reduce intensive care unit (ICU) length of stay (LOS), mechanical ventilation duration, reintubation rates, mortality or DEX dose?

Study Design: Retrospective Observational Chart Review Study

Methods: We compared two groups of ICU patients who received DEX alone or DEX plus clonidine at a tertiary hospital in Saudi Arabia between Jan 2020 and Jan 2022. We used the Hodges–Lehmann estimator and a proportional odds model adjusted for age and Acute Physiology and Chronic Health Evaluation II to compare the outcomes of interest.

Results: Of the 255 patients screened, 66 were eligible. Thirty-two were in the DEX group and 34 in the DEX plus clonidine group. The median age of the sample was 42.0 years and 62.1% were male. There was no difference in median ICU LOS (0 days; 95% CI: -0.4 to 5.0; adjusted odds ratio (OR)=1.0; 95% CI: 0.46–2.61), median mechanical ventilation duration (-2 days; 95% CI: -5.0 to 2.0; aOR=1.5; 95% CI: 0.6–3.7), reintubation rates (25.0% vs 11.8%, aOR=0.91; 95% CI: 0.8–1.1) or mortality (18.8% vs 5.9%, aOR=0.94; 95% CI: 0.81–1.09) between the groups. However, DEX dose was lower in the combination group (aOR=0.32; 95% CI: 0.13–0.79), with a median of 0.2 mcg/kg/hr versus 0.4 mcg/kg/hr at 48 hours adjusted for age and initial dose.

Conclusion: Clonidine was associated with a reduction in the dose of DEX and could be used to facilitate DEX weaning. However, there was no significant difference in ICU LOS between the groups. Further studies, such as cost-effectiveness analysis, are needed before introducing clonidine into the sedation clinical pathway.

40. Dexamethasone VS Methylprednisolone for Multiple Organ Dysfunction in COVID 19 Critically Ill Patients A multicenter Propensity Score Matching Study.

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Introduction: To date, Dexamethasone has a mortality benefit in COVID-19 patients, particularly those requiring invasive mechanical ventilation (However, it is uncertain if another corticosteroid, such as Methylprednisolone, may be utilized to obtain a superior clinical outcome. We conducted a study to compare Dexamethasone's clinical and safety outcomes versus Methylprednisolone in COVID-19 critically ill patients admitted to the intensive care units

Research Question or Hypothesis: This study aims to compare dexamethasone to methylprednisolone efficacy and safety in critically ill patients with COVID-19.

Study Design: A multicenter, retrospective cohort study includes COVID-19 critically ill adult patients admitted to ICUs from March 2020 to July 2021.

Methods: Patients were categorized into two groups based on the type of corticosteroid received within 24 hours of ICU admission, the active group for patients who received Methylprednisolone and Dexamethasone as the control group Propensity score (matching was used 1:3 ratio) based on the patient's age and multiple organ dysfunction score within 24 hours of ICU admission

Results: A total of 264 patients were included according to the selected criteria. Of these patients, 198 were given Dexamethasone therapy, while 66 patients were given Methylprednisolone within 24 hours of ICU admission. In regression analysis, patients who received Methylprednisolone compared to Dexamethasone had a higher MOD score on day #3 of ICU admission (beta coefficient: 0.17 (95% CI 0.02, 0.32), P= 0.03). Moreover, hospital-acquired infection was higher in the Methylprednisolone group (OR 2.17, 95% CI 1.01, 4.66; p = 0.04). However, other complications during the stay were similar between the two groups. The 30-day and the in-hospital mortality were similar in both groups on multivariable cox proportional hazards regression analysis.

Conclusion: In COVID-19 critically ill patients, the use of Dexamethasone compared to Methylprednisolone resulted in a lower multiple organ dysfunction score on day three of ICU admission with a similar mortality rate.

41. Decreasing Early Epinephrine Administration in Ventricular Arrest with a Visual Alert.

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Introduction: Early defibrillation is critical to survival when a cardiac arrest is caused by ventricular fibrillation (VF) or pulseless ventricular tachycardia (PVT). Epinephrine is associated with worse outcomes when given prior to two shocks in shockable rhythms. Two propensity matched analyses were recently published and found that early administration of epinephrine was associated with lower odds of survival and return of spontaneous circulation (ROSC). A visual alert in the emergency medication trays was implemented to decrease the use of epinephrine prior to two shocks for PVT/VF arrest.

Research Question or Hypothesis: A visual alert will decrease early epinephrine use and result in an increase in survival to discharge.

Study Design: Single-center retrospective review of all patients with a cardiac arrest due to an initial shockable rhythm treated with defibrillation, one year prior to implementation of the visual alert compared to patients one year after implementation of the alert.

Methods: The study population includes patients who were at least 18 years old and had an index in-hospital cardiac arrest due VF or PVT. Patients who did not receive any defibrillation or epinephrine and patients with missing data on timing of defibrillation or epinephrine are excluded. The primary outcomes were incidence of early epinephrine use before and after alert implementation and impact on survival to discharge. Secondary outcomes include ROSC and neurological disability using the cerebral performance category scores between the two groups.

Results: Early epinephrine was administered to 38% of PVT/VF patients before alert implementation. Twenty percent of early epinephrine patients survived to discharge. After alert implementation, no patients received early epinephrine and 46% survived to discharge. Time to defibrillation decreased from 2.4 minutes to 1.57 minutes after alert implementation.

Conclusion: A visual alert decreased use of early epinephrine in PVT/VF arrest and improved survival to discharge rates.

42. Continuation of ICU-Initiated Digoxin in Survivors of Critical Illness.

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Introduction: New onset atrial fibrillation (NOAF) is a common arrhythmia encountered in the intensive care unit (ICU). While a paucity of robust data exists on recommended treatment for NOAF, digoxin can be utilized without compromising hemodynamic stability. NOAF may resolve with resolution of precipitating risk factors, leading to uncertainty in the need for long-term antiarrhythmic continuation.
Research Question or Hypothesis: The objective of this study was to evaluate the prevalence of long-term digoxin continuation for patients newly initiated on digoxin in the ICU for NOAF.
Study Design: This IRB-approved, retrospective cross-sectional study was conducted in adult medical ICU patients at the University of Michigan from January 2018 through January 2022.
Methods: Patients were evaluated if they were newly initiated on digoxin in the medical ICU and survived ICU discharge. The primary outcome was the prevalence of digoxin continuation at hospital discharge. Baseline demographics and relevant medication use at admission, ICU and hospital discharge, and 30- and 90-days post-hospital discharge were and compared based upon continuation of digoxin at hospital discharge. Descriptive statistics and chi-squared or Mann-Whitney U tests, as appropriate, were performed with SPSS.
Results: A total of 61 patients were evaluated; 51 ICU survivors were discharged alive from the hospital. Upon ICU discharge, 28 (55%) patients continued digoxin and 15 (29%) continued digoxin at hospital discharge. Of those discharged on digoxin, 9 (60%) patients continued digoxin at 30-days post discharge, with 8 (53%) remaining on digoxin at 90-days post-discharge. Cardiology consultation (p=0.41) and CHA_2DS_2VASc score (p=0.84) were not associated with outpatient digoxin continuation.
Conclusion: Nearly a third of surviving patients initiated on digoxin in the ICU for NOAF continued the medication at hospital discharge and over half had persistent use at three months. A strategy for evaluating the appropriateness of continuing digoxin for this patient population warrants further investigation.

43. The effects of prophylactic laxative use on critically ill patients requiring mechanical ventilation: a retrospective cohort study.

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Introduction: Up to 15% of patients with mechanical ventilation (MV) experienced constipation in critical care settings. Constipation was associated with prolonged hospitalization and higher mortality rate.
Research Question or Hypothesis: What are the effects of prophylactic use of stimulants and/or docusate on clinical outcomes in critically ill patients requiring MV?
Study Design: Single-center, retrospective cohort study.
Methods: Data were extracted from MIMIC IV database. Patients who received MV within the first 24 hours following intensive care unit admission were enrolled and were divided into four groups: non-laxative, stimulants, docusate, and stimulant-docusate combination. The primary outcome was in-hospital mortality. The secondary outcomes included the incidence of diarrhea, electrolyte disturbances, enterobacterial infection, ventilator-associated pneumonia (VAP), and ICU length of stay (LOS). Multivariable logistic regression and multiple linear regression were used to investigate the associations between prophylactic use of different laxatives and predefined outcomes. Inverse probability treatment weighting was used to adjust for confounders. Statistical analyses were conducted via R. A $P < 0.05$ was considered statistically significant.
Results: 2314 patients were included, 268 of whom received stimulants, 260 received docusate, 374 received combination, and 1412 did not receive any laxative. Compared with non-laxative group, prophylactic use of docusate was associated with a decreased in-hospital mortality (OR: 0.6, 95% CI 0.43 to 0.85, $P = 0.003$), and longer LOS (OR: 5.69, 95% CI 1.77 to 18.24, $P = 0.003$). Preventative use of stimulants showed no effect on in-hospital mortality. The combination of laxatives was associated with increased mortality (OR: 1.38, 95% CI 1.06 to 1.79, $P = 0.015$). Laxative prophylaxis was not associated with increased risks of electrolyte disturbances, diarrhea, enterobacterial infections, and VAP.
Conclusion: These findings suggested that prophylactic use of docusate may decrease in-hospital mortality, while the combination can increase in-hospital mortality. Moreover, the prophylactic use of laxatives was not associated with adverse outcomes, including diarrhea, electrolyte disturbance, and VAP.

44. Continuation of ICU-Initiated Diltiazem in Survivors of Critical Illness.

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Introduction: New onset atrial fibrillation (NOAF) can be a common arrhythmia encountered in the intensive care unit (ICU). Several antiarrhythmics are available to treat NOAF, including diltiazem. NOAF has the potential to resolve, causing uncertainty regarding the need for continued antiarrhythmic therapy.

Research Question or Hypothesis: The objective of this study was to evaluate the prevalence of long-term continuation of diltiazem in patients with ICU-associated NOAF.

Study Design: This IRB-approved, retrospective cross-sectional study included patients admitted to the medical ICU at the University of Michigan and newly initiated on diltiazem from January 2018 through January 2022.

Methods: Adult patients in the medical ICU newly initiated on diltiazem and surviving to ICU discharge were evaluated in the study. The primary outcome was the continuation of diltiazem at hospital discharge among those who survived to discharge. Baseline demographics and relevant medication use at admission, ICU and hospital discharge, and 30- and 90-days post-hospital discharge were collected and compared based upon continuation of diltiazem at hospital discharge. Descriptive statistics and chi-squared or Mann-Whitney U tests, as appropriate, were performed with SPSS.

Results: A total of 134 patients were evaluated, with 101 patients surviving to hospital discharge. Among survivors, 30 (30%) patients continued diltiazem use outpatient. Of these, 16 (53%) patients continued diltiazem at 30-days post-discharge, and 10 (33%) remained on diltiazem at 90 days post-discharge. Cardiology consultation (p=0.68) and CHA_2DS_2VASc score (p=0.97) were not associated with diltiazem continuation. Additionally, no difference in continuation versus those discontinued prior to hospital discharge was seen in patients with a diagnosis of heart failure (43% vs. 34%, respectively; p=0.36)

Conclusion: Approximately a third of surviving patients initiated on diltiazem in the ICU for NOAF continue the medication at hospital discharge. A strategy for evaluating the appropriateness of continuing diltiazem for this patient population warrants further investigation.

45. Clevidipine vs. nitroglycerin for hypertensive emergency complicated by pulmonary edema.

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Introduction: Clevidipine and nitroglycerin are recommended treatments for hypertensive emergency, but their objective efficacy in treating concomitant pulmonary edema is unclear.

Research Question or Hypothesis: Will intravenous (IV) clevidipine or nitroglycerin lead to quicker respiratory status improvement in patients with hypertensive emergency complicated by pulmonary edema?

Study Design: A retrospective chart review from May 2019 to September 2022 identified all patients who received IV clevidipine or nitroglycerin and had hypertensive emergency complicated by pulmonary edema.

Methods: The study included patients with provider-documented pulmonary edema and receiving oxygen support when the medications began. Patients were excluded if they presented with acute coronary syndrome or aortic dissection. The primary outcome was the improvement of oxygen status using an ordinal scale at hour three of therapy. The ordinal scale categories are: 0, no oxygen support; 1, nasal cannula; 2, high-flow or noninvasive mechanical ventilation; 3, invasive mechanical ventilation; 4, death. Notable secondary outcomes were achievement of guideline-directed blood pressure goals, duration of respiratory support in the first 24 hours, and need for medication discontinuation around an acute decrease in blood pressure.

Results: Ordinal scale improvement after three hours occurred in 16.2% of nitroglycerin patients (n=37) compared to 16.1% receiving clevidipine (n=31); P>0.99. The first hour SBP reduction goal of 15-25% was achieved in 54.8% of clevidipine patients and 37.8% of nitroglycerin; P=0.22. During the first 24 hours, clevidipine patients received respiratory support for 17.7 hrs compared to 20.1 hrs for nitroglycerin; P=0.01. Around an acute decrease in blood pressure, clevidipine was stopped in 3.2% of patients and 43.3% for nitroglycerin; P=0.01.

Conclusion: At three hours, there was no difference in ordinal scale improvement of oxygen support between the clevidipine and nitroglycerin groups. There were more discontinuations of therapy around an acute decrease in blood pressure in the nitroglycerine group, suggesting a safety benefit of using clevidipine.

46. Doxycycline Potential Roles in Reducing Thrombosis and Mortality in Critically Ill Patients with COVID-19: A Multicenter Cohort Study.

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Introduction: Developing therapeutic agents against coronavirus disease 2019 (COVID-19) has been a top priority. Doxycycline has revealed potential effects in animal studies to prevent thrombosis and reduce mortality. However, less is known about its anti-thrombotic role in patients with COVID-19.

Research Question or Hypothesis: What are doxycycline's clinical outcomes in critically ill patients with COVID-19?

Study Design: A multi-center retrospective cohort study

Methods: The study was conducted between March 1, 2020, and July 31, 2021. Patients who received doxycycline in intensive care units (ICUs) were compared against patients who did not (controls). The primary outcome was composite thrombotic events. The secondary outcomes were 30-day and in-hospital mortality, length of stay, ventilator-free days (VFDs), and complications during ICU stay. Propensity score (PS) matching was used based on the selected criteria. Logistic, negative binomial, and Cox proportional hazards regression analyses were used as appropriate.

Results: A total of 1302 patients met the inclusion criteria (doxycycline, 203; control, 1099). After PS (1:3) matching, 664 patients (doxycycline, 166; control, 498) were included. Thromboembolic events were lower in the doxycycline group (OR: 0.54; 95% CI: 0.26-1.08; p=0.08); however, it failed to reach statistical significance. Moreover, D-dimer levels and 30-day mortality were lower during ICU stay in doxycycline group [beta coefficient (95% CI): -0.22 (-0.46, 0.03; p=0.08); HR: 0.73; 95% CI: 0.52-1.00; p=0.05, respectively]. In addition, patients who received doxycycline had significantly lower odds of bacterial/fungal pneumonia (OR; 0.65; 95% CI; 0.44-0.94; p=0.02).

Conclusion: Doxycycline use as adjunctive therapy in critically ill patients with COVID-19 might be an appealing therapeutic option for thrombosis reduction and survival benefits.

47. EVALUATING THE INCIDENCE OF HYPERCHLOREMIA INDUCED ACUTE KIDNEY INJURY IN SEPTIC CRITICALLY ILL PATIENTS

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Introduction: Hyperchloremia is common in the critically ill despite the use of balanced fluids for resuscitation and maintenance and can result in increased mortality, need for CRRT, and longer ICU and hospital lengths of stay. A major contributing source of chloride is through administration of IV medications. The use of alternative medication diluents can help reduce the load of chloride administered through IV medications.

Research Question or Hypothesis: To evaluate a saline conservative medication diluent strategy by using D5W with compatible medications and evaluate the effect on the change in serum chloride for septic patients in the MICU.

Study Design: This is a single-center, retrospective study, where data was collected through electronic medical record chart review between January 2020 and January 2023.

Methods: Eligible records for review included all septic patients admitted to the medical intensive care unit for ≥ 48 hours. Patients with medications prepared in normal saline were compared to those whose medications were diluted with D5W. The primary outcomes were delta chloride (change in serum chloride) and development of acute kidney injury (AKI). Secondary endpoints included renal replacement therapy (RRT), length of stay, frequency of hyperglycemia, and mortality.

Results: A total of 822 patients were screened, with 219 patients meeting inclusion criteria. There was a statistically significant reduction in delta chloride [4.0 (2.0-9.0) vs 3.0 (1.0-5.0)]; p=0.044 and mortality in the implementation group 51 (32.7%) vs 7 (11.1%); p=0.001. The incidence of AKI [91 (58.3%) vs 33 (52.4%)], need for RRT [36 (23.1%) vs 12 (19%)], incidence of hyperglycemia [76 (48.7%) vs 26 (41.3%)], and LOS [5.33 (3.16-9.11) vs 5.0 (3.13-8.0)] were not statistically significantly different between groups.

Conclusion: The study demonstrated a mortality reduction with the implementation of a saline conservative medication diluent strategy.

48. Ketamine-based sedation in critically ill COVID-19 patients on mechanical ventilation: A multicenter ambidirectional cohort study.

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Introduction: Ketamine has analgesic, anti-inflammatory, anticonvulsant, and neuroprotective effects. This study aims to evaluate the effectiveness and safety of ketamine among mechanically ventilated (MV) critically ill patients with COVID-19.

Research Question or Hypothesis: The effectiveness and safety of ketamine in critically ill mechanically ventilated patients with COVID-19

Study Design: A multicenter, ambidirectional cohort study included critically ill adult COVID-19 patients admitted to five ICUs in Saudi Arabia from March 01, 2020, until July 31, 2021.

Methods: Eligible patients on MV within 24 hours of ICU admission were categorized into two groups based on Ketamine use (Control vs. Ketamine). The primary endpoint was the hospital length of stay. Other outcomes were secondary. Propensity score matching (1:2) was used based on predefined criteria.

Results: A total of 1130 were included based on eligibility criteria. Among them, 94 patients (8.3%) received ketamine, and 1036 patients (91.7%) were in the control group. The hospital length of stay (LOS) was significantly shorter in the ketamine group (beta coefficient (95% CI): -0.26 (-0.45, -0.07), p-value=0.008). Moreover, the PaO2/FiO2 ratio significantly improved 24-hour post-ketamine initiation compared to 6-hour pre-initiation (124.9 (92.1, 184.5) vs. 106 (73.1, 129.3); p-value= 0.002). Additionally, the mean time for lactic acid normalization was significantly shorter in the ketamine group (beta coefficient (95% CI): -1.55 (-2.42, -0.69), p-value=<0.01). However, no differences in 30-day mortality, in-hospital mortality, MV duration, ICU-acquired complications, or ICU length of stay were observed.

Conclusion: In critically ill COVID-19 patients with ARDS requiring MV, Ketamine-based sedation was associated with shorter hospital LOS, improved PaO2/FiO2 ratio 24-h post ketamine, and shorter time for lactic acid normalization but with no mortality benefits.

Drug Information

49. Assessment of Readability and Quality of Consumer-Oriented Pediatric Drug Information Websites.

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Introduction: The Internet is often a first-line medical resource for parents seeking childhood lay medical advice. Concerns exist regarding readability and quality of consumer-oriented Internet drug information, particularly where readability should be aimed at a sixth grade reading level.

Research Question or Hypothesis: This study sought to assess popular pediatric drug information websites for consumer-oriented readability and information quality.

Study Design: Sample websites were identified by simulating searches on three top United States search engines using pre-identified terms. The primary outcome was website readability according to the English-language and healthcare-validated Simple Measure of Gobbledygook (SMOG) Index. The secondary outcome was website informational quality, measured using the validated DISCERN instrument.

Methods: Google, Bing, and DuckDuckGo were used to perform Internet searches by combining "child" with four sample search terms: "ear pain" OR "treatment" OR "medicine" OR "antibiotics." The ten most common domains across all search engines were compiled. Four raters independently applied the SMOG Index to one web page from each domain for a total of 40 web pages to determine the primary outcome and then independently applied the DISCERN instrument to the same pages to determine the secondary outcome. Advertisements, videos, paywalled, or unavailable content were excluded.

Results: Final analysis included 37 web pages. The SMOG Index ranged from 8.24 - 17.88 (median 12.07). Mean SMOG score for commercial web pages was 12.18±1.67, versus mean combined organizational, government, and educational score of 12.24±2.30 (p = 0.93). The median DISCERN score was 55 (interquartile range 46 – 62) with interrater reliability calculated at 0.86 (Microsoft Excel v.16.70).

Conclusion: Readability averaged at a high school reading level, which is higher than the recommended sixth grade reading level, with no difference between commercial and combined organizational, government, and educational domains. Quality ranged from "fair" to "good." Improved readability and quality control is needed for consumer-oriented drug information.

50. Time Trial Project: Comparison of Time to Answer Using Different Drug Information Resources.

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Introduction: Healthcare providers search for medical information frequently to support their clinical decision-making. Certain resources or websites are used more frequently than others depending on the clinician's preference. phactMI is a collaboration of pharmaceutical company medical information (MI) leaders that provides a tool that searches product labeling and medical information responses to give answers to drug information questions. This descriptive study sought to identify the fastest times to answering drug information questions when using different medical information resources.

Research Question or Hypothesis: Are specific medical information resources better at answering certain types of drug information questions?

Study Design: Cross-sectional

Methods: Five participants took part in the study including: pharmacy students, pharmacy residents, and a drug information pharmacy specialist. The participants answered 10 questions using 5 different medical information resources. Each subject went through the 10 drug information questions in a different order of resources. The subjects recorded when they started the drug information question until the point when they had a verbal answer for the drug information question. When answering the drug information question, they only had the assigned medical information resource on their web browser.

Results: Fifty time samples were included and the mean times to answer in minutes were: Medline primary literature search (6.24), FDA website/labeling information (3.45), Lexicomp/UpToDate/Micromedex (3.39), Google online search (3.21), and phactMI (2.71). Baseline medical information background varied based on the subject's experience. Overall, they had the strongest understanding of how to use Lexicomp/UpToDate/Micromedex and the least strongest understanding of how to use phactMI.

Conclusion: phactMI resulted in quicker times to answer. There were differences in the answers based on the type of information that each source could provide, i.e., package labeling could not provide off-label information. The choice of one resource over another should be based on situation specific factors. Using two resources to confirm an answer is optimal for ensuring accuracy.

Education/Training

51. Health Equity Language within Residency Training Promotional Content.

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Introduction: At this time, it is challenging for students passionate in advancing health equity and serving underserved and vulnerable populations to identify specific programs that support this mission. The study objective is to analyze the use of health equity (HE) and social determinants of health (SDOH) related language within pharmacy residency websites and recruitment materials.

Research Question or Hypothesis: Residency training programs are not implementing language related to health equity in their promotional content.

Study Design: The study is an IRB approved evaluation of 1535 randomly selected residency programs, accounting for 20% of programs being selected from each state. The sample was split in half and each half was reviewed by two student pharmacists.

Methods: Each program's residency and health system's website and promotional materials were thoroughly reviewed for language referencing HE and SDOH. The search terms used were diversity, inclusion, equity, patient populations, determinants, disparities, underserved, vulnerable, justice, under-insured, trans-gender, Spanish, and marginalized.

Results: A total of 318 programs met inclusion criteria. Of the reviewed programs 29% included language related to health equity within the overview, rotation descriptions, preceptor biographies, or other website sections. Sixty-eight percent of the overarching health systems incorporated equity language in their mission, vision, values and/or diversity, equity, and inclusion (DEI) statements. When specifically assessing PGY-1 descriptions, excluding mission and DEI statements, 25% of programs included HE or SDOH language.

Conclusion: A majority of PGY-1 programs lacked language identifying their focus and work around HE or SDOH within their residency promotional materials. Programs specifically located in medically underserved areas did not clearly highlight their work in HE through their website information about the health systems or within their residency programs. For students seeking a residency with a focus on HE and SDOH, it is challenging for them to locate and connect with similarly aligned residency programs due to a lack of language within promotional materials.

52. Implementation of a Layered Learning Model in a First Year Pharmacy Course.

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Introduction: Research shows that completing an academia experience increases confidence and is a positive learning experience for pharmacy students. Additional studies have shown the benefits of layered learning models, where a lecture delivered by Advanced Pharmacy Practice Experience (APPE) students was linked to improved test scores for second-year pharmacy students. Learning the top 300 most commonly used drugs is routine in pharmacy schools and is an opportunity for APPE students to teach first-year students. Prior to widespread implementation, it is important to evaluate how beneficial a teaching experience on the Top 300 Drugs is for APPE students.
Research Question or Hypothesis: To evaluate the impact of a layered-learning academia opportunity about the Top 300 Drugs on APPE students
Study Design: This descriptive study reports results from a qualitative survey completed by APPE students about teaching an interactive activity on the Top 300 drugs. The goal is to assess students' perception of the process and its impact.
Methods: Between March 2022 to February 2023, APPE students created and delivered an interactive teaching activity about the Top 300 Drugs to first-year students during a layered-learning academia experience. APPE students were then invited to complete an anonymous survey on their experience. Data was collected about previous teaching experience, perception of preparation and delivery, and impact on personal growth and future career.
Results: A total of 29 students completed the survey, with 29 (100%) agreeing/strongly agreeing that this activity improved their teaching skills, confidence, ability to work in a team, and reinforcement of knowledge. While only 6 (20.6%) students reported having previous academia experience in pharmacy school, 20 (69%) and 29 (100%) believed the activity will positively impact their post graduate training and their career as a pharmacist respectively.
Conclusion: An academia experience on the Top 300 Drugs can be valuable as it positively impacts APPE students' teaching skills and confidence.

53. THE EFFECT of PHARMACEUTICAL CARE PRACTICES ON CLINICAL COMPETENCIES and PROFESSIONAL PREPAREDNESS of STUDENTS.

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Introduction: The pharmacy education program requires the students to equip with the basic subject knowledge, skills and competencies that will enable them to practice pharmacy independently after graduation. Pharmaceutical Care (PC) course is offered as three consecutive courses in the 7th, 8th and 9th semesters of the pharmacy curriculum in the Pharmacy curriculum of our faculty
Research Question or Hypothesis: We hypothesized that PC practices has a positive effect on students' clinical problem-solving, reasoning, and decision-making skills as well as on their perceptions of their professional readiness.
Study Design: The research was designed as a cross-sectional descriptive survey study. Data were collected using the "Evaluation of Pharmacy Students' Perceptions of Readiness for Patient-Centered Pharmacy Practices (EUHA)" and "Clinical Problem-Solving, Reasoning and Decision Making Competencies (PCPREP)" questionnaires
Methods: A total of 278 students (7^{th} Term 103; 8^{th} Term 106; 9^{th} Term 69 students) were included in the study. The scales, whose validity and reliability were made and permission for use were obtained, were directed to the students online via google forms. The data were analyzed with the SPSS program.
Results: The reliability coefficients of PCPREP and EUHA questionnaires were calculated as 0.95 and 0.98 respectively. There was a statistically significant difference between the 7^{th}-8^{th} and 9^{th} semesters in the students' readiness perceptions for patient-oriented pharmacy practices, and the students' perceptions were at the highest level at the end of the Pharmaceutical Care practices ($p<0.00$). There was a statistically significant linear relationship between the students' perception of readiness at the end of the 9^{th} semestre and their problem-solving and decision-making competencies ($r = 0.534$ $p<0.000$).
Conclusion: These findings showed that Pharmaceutical Care practices increased pharmacy students' perceptions of clinical pharmacy readiness and that students' readiness perceptions were moderately related to their clinical problem-solving and decision-making competencies.

54. An Interprofessional Healthcare Training Program Focused on Families Dealing with Opioid Addiction.

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Introduction: Healthcare professionals are a powerful influencer for patients with opioid addiction to accept treatment. Reducing stigma

through cross-sector training and dissemination of prevention interventions is needed to break down the "siloing" of services for children and families affected by opioids.

Research Question or Hypothesis: To cross-train an interprofessional workforce to increase awareness resources needed to positively affect the lives of young children and families dealing with opioid abuse.

Study Design: Educational/prospective study.

Methods: A program focusing on opioid addiction and its impact on families with children was led by psychiatrists, rehabilitation counselors, social workers, pharmacists, and community health workers. The program was directed to health professional students including pharmacy, physical therapy, nursing, rehabilitation counseling, and medicine. The 3-hr program focused on recognizing addiction symptoms, treatment of intoxication and withdrawal, understanding the impact of addiction on families, attachment and relationship-based approaches to working with families, and appropriate referral services for those with substance abuse. Surveys were collected post-program to evaluate student's knowledge and perceptions with the training using descriptive statistics.

Results: Eighty-nine students participated from pharmacy (53.9%), physical therapy (25.8%), nursing (7.4%), rehabilitation (6.7%), and medicine (3.4%). The majority were females (71.9%) and African-American (48.3%). After the program, 79 students (88.7%) reported confidence in their ability to support families impacted by the opioid crisis. Approximately 73 students (82.0%) were more knowledgeable about evidence-based therapies and 75 (84.3%) students were more familiar with family-focused interventions. Seventy-two students (80.1%) were more confident to refer families to the appropriate substance abuse services, and the majority (84.3%) believed that interprofessional practice is improved by educating healthcare professionals together. Overall, 78 (87.6%) of participants reported their satisfaction with the training.

Conclusion: This program allowed healthcare professional students to learn evidence-based treatments for children impacted by families with opioid addiction in an interprofessional setting, allowing them exposure to real-world situations and interact with other disciplines.

55. A mixed-methods approach to repetitive formative assessment with timely feedback on instructional benefit in Doctor of Pharmacy students.

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Introduction: Students benefit from formative assessment in multiple ways. Repeating formative assessment with feedback improves student learning and participation and informs instruction.

Research Question or Hypothesis: This study sought to determine if repeated formative assessment with timely feedback changed student perceptions on knowledge, engagement, feedback, and confidence in two third-year integrated pharmacy care (IPC) courses.

Study Design: Using a mixed-methods design, students participated in two sets of pre- and post-course Likert surveys containing 12 items each on formative assessment perceptions, followed by one qualitative interview.

Methods: Five formative assessments (i.e., minute paper, muddiest point, etc.) were assigned to third-year Pharm.D. students in a fall IPC module and repeated in a spring IPC module. Pre- and post-course surveys contained items regarding perceptions in knowledge, engagement, feedback, and confidence domains. Responses were rated on a scale where 1 = strongly disagree to 5 = strongly agree and were compared using unpaired t-tests. For the qualitative phase, student group interview sessions were conducted and analyzed using NVivo® software (QSR International 2022).

Results: A total of 32 and 60 surveys were completed in each cohort, respectively. A statistically significant increase was observed overall in two confidence measures (mean pre- and post-survey scores 3.96 ±0.96 vs. 4.53±0.51, $p = 0.006$, respectively, and 4.23±0.75 vs. 4.63 ±0.61, $p = 0.011$), and two knowledge items (4.16±0.69 vs. 4.54 ±0.56, $p = 0.002$, respectively; 4.12±0.78 vs. 4.63±0.69, $p = 0.024$ (Microsoft Excel v.16.70). An analysis of eight student interviews revealed emerging themes of helpfulness, understanding, learning, and studying following repeated formative assessment.

Conclusion: Students perceived repetitive formative assessment with timely feedback as enhancing knowledge and confidence measures in third-year IPC courses. Emergent qualitative themes aligned with perception of formative assessment enhancing knowledge and engagement.

56. How to Phase II: Timelines, Perceptions, and Suggestions from PGY1 Residency Program Directors.

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Introduction: Phase II was introduced in 2016 as a structured opportunity for applicants and residency programs to interact after the Phase I Match. Previous studies demonstrate difference in residency program director (RPD) and residency applicant perceptions of the Phase II process, indicating the need for clarification on how to navigate the process for applicants and their mentors. Six years after initial implementation, there is need for evaluation and potential modifications.

Research Question or Hypothesis: This study aims to gather data from programs on the Phase II structure and timelines to benefit applicants and to identify RPD perceptions for further improvement of Phase II.

Study Design: Survey-based cohort study

Methods: A 30-item survey was developed including nine demographic items, 12 timeline-based quantitative items, five skip-logic items on screening interviews and four qualitative questions on the benefits, drawbacks, and suggested changes to Phase II. The survey was disseminated to all RPDs participating in Phase II with available contact information in June 2021 and May 2022.

Results: The survey was initiated by 180 of the 484 RPDs participating in Phase II (36.8% response rate). Participating programs had an average of 1.4 (± 0.7) positions open in Phase II and 31 applicants per open position. The timelines for screening applications, contacting applicants, and conducting interviews were variable. For qualitative data, respondents appreciated the structured process and noted the quality and geographic diversity of applicants in Phase II. Some challenges reported by respondents were the quantity of applications, lack of time to fully review applications, and technical issues. Suggested changes included an extended Phase II timeline, universal Phase II application deadline, and technical improvements.

Conclusion: Despite the structured approach of Phase II, there is still variability in timelines for programs. Information regarding timeline trends can better prepare residency applicants for Phase II. Respondents identified further opportunities to refine Phase II to benefit residency stakeholders.

57. Progress on Representation of Diversity, Equity, and Inclusion Content on Doctor of Pharmacy Program Websites.

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Introduction: Diversity of students is essential for creating a diverse health care workforce. Websites are a public-facing representation of a pharmacy program's values and focus areas, which reach not only current students but prospective students who may be looking to enroll in a program who shares their values relating to diversity, equity, and inclusion (DEI). Thus, research regarding representation of DEI content on pharmacy school program websites is needed.

Research Question or Hypothesis: How has representation of DEI content on pharmacy program websites changed from 2022 to 2023?

Study Design: Cross-sectional study design utilizing a structured website review of fully-accredited Pharm.D. programs in the United States (U.S.) (n=138) from 2021-22 to 2022-23.

Methods: Information was collected about the presence of DEI content (present vs. not present), number of clicks to reach DEI content, and program demographics. Data was analyzed descriptively with frequency counts and percentages and compared across demographics using chi-square tests. Chi-square tests were also used to compare presence of DEI content across years. All tests used a significance level of p≤0.05.

Results: In 2022-23, a total of 94 pharmacy programs (68.1%) had DEI content present on their website, a significant increase from 2021-22 (n=69, 50.0%) (p<.001). Of these 94 programs, 54 (57.4%) were in public institutions compared to 40 (42.6%) in private institutions (p=.021). There were also significant differences in geographic distribution (p=.012) with the Midwest having the highest percentage of programs with DEI content (n=27, 87.1%), followed by the West (n=21, 80.8%), Northeast (n=16, 61.5%), and South (n=30, 56.6%). The mean number of clicks remained similar across years (2.06 to 1.95, p=.090).

Conclusion: Pharmacy programs have made significant strides in providing DEI content on their program websites. Future research should focus on the optimal ways to organize and present DEI content. Reasons for differences by program demographics and ways to mitigate these differences should be explored.

58. An evaluation of virtual reality in dispensing techniques training of pharmacy skills lab: a randomize controlled trial.

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Introduction: There has not yet been a publication of virtual reality (VR) applications in pharmacy education with a randomized controlled design. It is hoped that scientific data can be established in different models of drug dispensing training and teaching.

Research Question or Hypothesis: The learning effectiveness of dispensing training will be similar for pharmacy students using virtual reality versus real-world dispensary.

Study Design: A prospective randomized control trial

Methods: The VR dispensary (with the HTC VIVE Pro Headsets) is designed with TAM (technology acceptance model) after a series of market surveys. The dispensing training is part of the pharmacy skills lab. The participants were randomized with 1:1:1 ratio into three groups: the control, the VR or the real-world dispensary (RD). The design of the activity is composed of 4 components for each student, including VR tutorial practice, VR dispensary training, real-world dispensaries (RD) training, and the final dispensing test (12 medications). A Poisson regression model was adopted to analyze students' performance in dispensing accuracy and time spent. Descriptive statistics were used in students' demographic characteristics and the satisfaction questionnaire.

Results: All 57 students completed and were evaluated with 12 medication dispensing final tests. The mean items of correct dispensing are 10.74 in control, 10.95 in VR and 11.26 in RD group respectively. Students in RD demonstrated a slightly shorter time (317.68secs) to complete dispensing than VR (334secs) and the control group

(331.89secs) with no statistical significance among 3 groups (p=0.188). The average satisfaction of VR applications in perceived usefulness is 4.11 and perceived ease of use is 4.13 out of a total score 5.

Conclusion: Based on the evaluation, VR dispensary training can provide comparative learning results in a pharmacy skills lab. It also adds diversity to learning experiences. For some facilities, VR dispensaries may be good alternatives to reducing the tasks of managing actual dispensaries.

Emergency Medicine

59. Glucommander™ Use in the Emergency Department.

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Introduction: Management of diabetic ketoacidosis and hyperosmolar hyperglycemic state involves careful fluid resuscitation, insulin administration, and potassium supplementation. As of February 2022, East Carolina University Health Medical Center (ECUHMC) utilizes Glucommander™ in practice to improve intravenous insulin management for these hyperglycemic emergencies. The use of Glucommander™ in the emergency department (ED) has not been evaluated since its implementation at ECUHMC.

Research Question or Hypothesis: Is the use of Glucommander™ safe and effective for intravenous insulin management of hyperglycemic emergencies?

Study Design: This was an IRB-exempt retrospective chart review of patient medical records. Patients were included if they were 18 years of age or older and received treatment of hyperglycemia, diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar state (HHS) with the use of Glucommander™ software in the ED. Patients were excluded if they were pregnant.

Methods: The primary outcome was incidence of hypoglycemia with a blood glucose level less than 70 mg/dL. Secondary outcomes were incidence of hypokalemia with a potassium less than 3.3 mEq/L, time to closure of anion gap (less than or equal to 12 mEq/L) in DKA, and time to blood glucose less than 180mg/dL in hyperglycemia and HHS. Data analysis was completed with descriptive statistics.

Results: One hundred patients were reviewed. Overall, three (3%) incidences of hypoglycemia and five (5%) incidences of hypokalemia occurred. The average anion gap duration for DKA was 19.2 hours, and time to goal blood glucose level in hyperglycemia and HHS were 8 hours and 12.4 hours, respectively. The average time of intravenous to subcutaneous insulin transition was approximately 38 hours.

Conclusion: This data represents appropriate management of IV insulin therapy in the emergency department. Future evaluation with an IRB-approved study of Glucommander™ use in areas of the hospital beyond the emergency department will be beneficial to truly see the impact and areas of improvement for IV insulin usage.

60. Incidence and characteristics of unplanned emergency department visits among cancer patients receiving chemotherapy in the ambulatory setting.

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Introduction: Most cancer patients receive chemotherapy in the ambulatory setting. During their treatment journey, patients may experience various types of complications that may necessitate unplanned visits to the emergency department (ED). There is limited real-world data describing the burden of such visits and their characteristics.

Research Question or Hypothesis: Among cancer patients receiving chemotherapy in the ambulatory setting, what is the proportion that presents to the ED and what are the characteristics of those patients and their visits?

Study Design: Retrospective study conducted at a comprehensive cancer center in Jordan.

Methods: Utilizing the medical records database, we identified all patients who were treated in the chemotherapy infusion clinic and those who had visits to the ED, between January and December 2021. Patients who received only supportive therapy were excluded. The proportion of patients who required ED visits and their characteristics, types of chemotherapy, and reasons for ED visits were recorded. Descriptive statistics were used to report the data.

Results: Over the study period, 4,985 patients received 38,803 chemotherapy cycles in the infusion clinic. Among those patients, 2,773 (56%) had a total of 10,061 unplanned ED visits. Patients who presented to the ED had a mean age of 54±14(SD) years and 1763 (64%) were females. The most common types of malignancies were breast (40%) and gastrointestinal (20%). The most common chemotherapy regimens received by the patients were platinum-based (27%), targeted therapy (18%), and anthracycline-based (16%). Most of the ED visits were due to neuromuscular/skeletal (35%), and gastrointestinal (20.4%) symptoms.

Conclusion: In a large cohort of cancer patients receiving chemotherapy in the ambulatory settings, over half of them required at least one unplanned ED visit. Most visits were for neuromuscular/skeletal and gastrointestinal symptoms. Future studies should identify measures to reduce such visits and improve the outcomes and quality of life of patients.

61. Comparison of door-to-needle times of tenecteplase versus alteplase in the treatment of acute ischemic stroke.

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Introduction: Alteplase is the only fibrinolytic therapy that has been FDA-approved for acute ischemic stroke (AIS); however, previous studies have concluded that tenecteplase is non-inferior to alteplase. The purpose of this study will be to evaluate the difference in door-to-needle (DTN) times between tenecteplase and alteplase for the treatment of AIS.

Research Question or Hypothesis: Is there a difference in DTN times between tenecteplase and alteplase for treatment of AIS?

Study Design: Single center, retrospective cohort analysis

Methods: Adult patients admitted to Morton Plant Hospital between November 2020 and December 2022 who received either tenecteplase or alteplase for AIS were included. The primary outcome was DTN time. Secondary outcomes included DTN time within 45 minutes, length of stay in hospital and ICU, disposition upon discharge, change in Modified Rankin Scale (mRS), incidence of new ischemic stroke within 21 days, neurological improvement at 24 hours and at discharge. Safety outcomes included major and minor bleeding (criteria by the International Society on Thrombosis and Hemostasis), hemorrhagic conversion, and angioedema.

Results: A total of 108 patients were included in this study with 54 patients in each group. For the primary outcome, there were no statistically significant differences between tenecteplase versus alteplase (medians, 45 [IQR, 31.8-63.3] vs. 46 [IQR, 36.8-55.8] minutes, P=0.66). For secondary outcomes, the tenecteplase group had significantly greater change in mRS (+1.11 vs. +0.17, P=0.03), as well as lower incidence of major bleeding (5 vs. 14, P=0.02) and hemorrhagic conversion (4 vs. 12, P=0.03). There were no statistically significant differences in the other secondary outcomes.

Conclusion: For the treatment of AIS, there was no difference in DTN times between tenecteplase and alteplase. There was, however, a significantly greater reduction in mRS from baseline to discharge and significantly lower incidence of major bleeding events and hemorrhagic conversion with tenecteplase.

62. Ceftriaxone vs cefazolin+gentamicin for presumptive antimicrobial coverage in type III open fractures.

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Introduction: Open fractures are classified by the Gustilo-Anderson fracture grading schema. Antimicrobial therapy is based on recommendations from the Eastern Association for the Surgery of Trauma. They recommend presumptive cefazolin + gentamicin in type III fractures. Concerns have risen that gentamicin is not an ideal presumptive antimicrobial. It requires dosing/compounding by pharmacy and comes with a risk of acute kidney injury (AKI). Ceftriaxone monotherapy has been suggested as an alternative. It has standard dosing, sufficient coverage and a lower risk of AKI.

Research Question or Hypothesis: We hypothesized that ceftriaxone is comparable to cefazolin + gentamicin in preventing infections for post – traumatic open fractures.

Study Design: Retrospective, single center, randomized, controlled, cohort study

Methods: We assessed patients who presented to GMC with type III open fractures between 08/2020 and 08/2022. Patients were divided based on receiving ceftriaxone or cefazolin + gentamicin (control). The primary outcome was post-traumatic infection rates at 90 days. Secondary outcomes included time to antibiotic administration and AKI. All data was assessed for normality utilizing a Shapiro-Wilk test. Continuous variables were assessed via ANOVAs, independent samples T-Tests, or Mann-Whitney U test. Chi-squared or Fisher's exact tests were utilized for categorical data. Statistical significance was defined *a priori* as $p < 0.05$.

Results: There was no statistically significant difference in the primary outcome, with 4 infections in the ceftriaxone group and 4 in the control group (16% vs 22%, $p = .605$). Mean time to antimicrobial administration for ceftriaxone was 89.53 vs 147.58 (minutes) in the control group ($p = 0.225$), with a median time of 25 vs 98 (minutes) respectively. There was no statistically significant difference in rate of AKI between the two groups (1 vs 1, $p = .811$).

Conclusion: We observed no significant difference in post-traumatic infections but a decrease in time to administration with ceftriaxone monotherapy versus cefazolin + gentamicin.

63. Intravenous or Oral Diltiazem Use in the Emergency Department Setting Among Patients with Heart Failure Reduced Ejection Fraction or Left Ventricular Dysfunction.

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Introduction: Diltiazem is a non-dihydropyridine calcium channel blocker (nonDHP-CCB) that is commonly used as a rate control agent in management of atrial fibrillation. NonDHP- CCBs are recommended to be avoided in patients with reduced ejection fraction heart failure (HFrEF) due to possessing negative ionotropic properties.

Research Question or Hypothesis: The goal of this medication use evaluation is to evaluate the use of diltiazem in the emergency department in patients with known reduced ejection heart failure, or those who had a reduced ejection fraction after administration of diltiazem.

Study Design: Retrospective, multicenter, chart review

Methods: Patients were included who received at least one intravenous or oral diltiazem administration between April 11 and July 9, 2022 at either of the four emergency departments across the Atrium Health Wake Forest Baptist System. The primary outcome is the number of patients with a past medical history of HFrEF who were administered diltiazem in the emergency department.

Results: Two hundred and eighty-five patients were enrolled after reviewing 471 diltiazem administrations. Of the 285 included patients, 40 (14%) patients had a history of preserved ejection fraction heart failure and 21 (7.36%) had a history of HFrEF. Ten (3.5%) patients received diltiazem with a confirmed ejection fraction of 40% or less prior to administration. One hundred and eight patients had a documented ejection fraction greater than 40% within the past year. Of the 108 patients, 6 (5.5%) had an ejection fraction of 40% or less confirmed by an echocardiogram within a month of diltiazem administration.
Conclusion: The frequency of diltiazem administration in patients with HFrEF in the emergency department setting is not clinically significant. Many patients who received diltiazem with known heart failure did not have a decrease in ejection fraction from baseline.

64. A Comparison of Tenecteplase and Alteplase for Acute Ischemic Stroke.

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Introduction: In December 2021, BayCare Health System transitioned from alteplase to tenecteplase as the primary thrombolytic for the treatment of acute ischemic stroke (AIS). Several landmark trials demonstrated similar outcomes between the two agents. This study sought to replicate these findings in our hospital system.
Research Question or Hypothesis: Is there a difference in neurological outcomes between tenecteplase and alteplase at 24 hours?
Study Design: This study was a multi-center, retrospective chart review that compared adult patients who received alteplase or tenecteplase for AIS during separate 11-month periods.
Methods: Adult patients that received thrombolytic therapy for AIS between January 1, 2021 to October 31, 2022 were included. The primary efficacy outcome was the incidence of major neurological improvement at 24 hours, defined as NIHSS of 0 or 1, or improvement of 4 points from baseline. The secondary efficacy outcome was the incidence of functional improvement, defined as a positive change of ≥1 in modified Rankin score (mRs) post-discharge and at 90 days. Safety outcomes included the incidence of intracranial hemorrhage (ICH) at 24-48 hours, orolingual angioedema and all-cause mortality at 90 days. Power was calculated to detect a 10% difference between the two groups for the primary outcome with an alpha of 0.05 and beta of 0.2. Discrete data was analyzed using the 2-sample proportions test and continuous data using Mann-Whitney U test. All analyses were completed in Minitab 18.
Results: There was no statistical difference in neurological improvement between alteplase (n=312) and tenecteplase (n=309), (63.1% vs 56.3%. p=0.086). There was no statistical difference in functional improvement between agents (p=0.41). The incidence of hemorrhagic conversion was significantly lower in the tenecteplase group (p=0.02), but incidence of mortality and angioedema were similar (p=0.73, 0.25).
Conclusion: There was difference in efficacy outcomes between tenecteplase and alteplase, and minimal difference in safety outcomes.

65. Effectiveness and Safety of 1 gram versus 2 grams of Prehospital Tranexamic Acid in Trauma Patients .

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Introduction: Tranexamic acid (TXA) is an antifibrinolytic utilized to control hemorrhage. Adverse effects include seizures, hypotension, and venous thromboembolism (VTE). TXA has been studied in traumatic hemorrhage in combat and civilian populations as seen in the CRASH-2, CAL-PAT, and STAAMP trials, with standard dosing of 1 gram (g) intravenous (IV) over 10 minutes followed by 1 g IV over 8 hours. In 2021, San Antonio Fire Department protocol was updated from 1 g to 2 g IV as a slow IV push for adult trauma patients in hemorrhagic shock.
Research Question or Hypothesis: 2 gram TXA is associated with more hypotension and blood product use than 1 gram
Study Design: Retrospective, observational, cohort study conducted at a Level 1 Trauma Center
Methods: Patients were identified from San Antonio Fire/EMS charts and the institution's electronic medical record to compare 1 g versus 2 g dose before and after the protocol change. The primary and secondary efficacy outcome was 28-day mortality and blood product usage, respectively.
Results: 125 patients were included with 82 receiving 1 g and 43 receiving 2 g bolus. Patients were predominantly Latino males, median age of 36 years, and similar baseline characteristics. The main injury type was penetrating (80.8%) due to gunshot wound. There was no difference in hypotension after TXA administration between groups (1 g: 35.4% vs. 2 g: 34.9%, p=1.00) or 28-day mortality (1 g: 8.5% vs. 2 g: 4.7%, p=0.72). Whole blood administration was higher in the 2 g group (37.8% vs. 60.8%, p=0.02). In subgroup analyses, TXA dose was not associated with hypotension, VTE, or 28-day mortality.
Conclusion: This study suggests that 2 g as a slow IV push prehospital TXA is safe and similiarily effective in civilian trauma patients. There was no significant difference in hypotension or 28-day mortality when compared to 1 g.

Endocrinology

66. Complications of Diabetes and the Cost Effectiveness of Continuous Glucose Monitoring in Patients with Type 1 Diabetes.

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Introduction: Type 1 diabetes mellitus (T1DM) is a chronic disease with the potential for significant complications including retinopathy, neuropathy, and nephropathy. Despite the availability of exogenous insulin to treat T1DM, a large percentage of patients do not maintain adequate glycemic control, which can lead to various, costly complications. Our objective was to determine the cost-effectiveness of real-time continuous glucose monitoring (RT-CGM) compared to non-continuous or self-monitoring (NCGM) in patients with T1DM in the United States.

Research Question or Hypothesis: RT-CGM will result in better glycemic control, reducing the risk of complications and making it cost-effective for the control of T1DM.

Study Design: We conducted a decision analysis study to assess the cost effectiveness of RT-CGM versus NCGM.

Methods: Using data from recently published randomized controlled trials and meta-analyses, we populated a decision analysis tree considering RT-CGM and NCGM with five main outcomes: no complications, retinopathy, neuropathy, nephropathy and death. The data used to populate the tree included probabilities of the complications, the annual costs associated with the complications, and the utility values associated with each condition. All analyses were conducted using Microsoft Excel.

Results: The data included in our analysis revealed that complications occurred in 6% of patients using RT-CGM, compared to 9.7% using NCGM. Specifically, the percentage of patients with retinopathy, neuropathy, and/or nephropathy was lower in those using RT-CGM rather than NCGM. Considering these outcomes and costs, RT-CGM resulted in an expected improvement in effectiveness of 0.05 QALYs and an increase in cost of $2,265 resulting in an ICER of $45,291/QALY. The robustness of our findings was confirmed through sensitivity analysis.

Conclusion: Considering a willingness-to-pay threshold of $50,000/QALY, RT-CGM is cost-effective for the control of T1DM. RT-CGM can be considered a high value technology compared to NCGM because it reduces the risk of diabetic complications.

67. Prevalence and factors associated with insulin overbasalization in a family medicine residency clinic.

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Introduction: In patients with type 2 diabetes, basal insulin has a ceiling effect, with doses of 0.5 units/kilogram/day or higher being unlikely to reduce glucose values substantially. In addition to a lack of glycemic control, overbasalization of insulin has been associated with weight gain and hypoglycemia. Prevalence and factors associated with insulin overbasalization are largely unknown.

Research Question or Hypothesis: How prevalent is insulin overbasalization in patients with type 2 diabetes and what factors are correlated with overbasalization?

Study Design: Retrospective chart review

Methods: A chart review was conducted that included patients 18 years of age or older with a diagnosis of type 2 diabetes who were prescribed insulin glargine, insulin detemir, or insulin degludec in the previous 12 months in two family medicine residency clinics. The primary outcome was to determine the prevalence of overbasalization. Secondary outcomes were to evaluate factors associated with overbasalization, such as weight, concurrent use of GLP-1s, and A1c. Overbasalization was defined as a total basal insulin dose of 0.5 units/kg/day or higher. Descriptive statistics and logistic regression with 95% confidence intervals were used to analyze results (Stata, version 13).

Results: One hundred twelve patients were included in the study. Forty-two percent of patients were considered overbasalized with a mean insulin dose of 0.88 units/kg/day compared to 0.3 units/kg/day in those who were not classified as overbasalized. Patients in the overbasalized group were more likely to be obese compared to those who were not overbasalized (OR 3.37 $\pm$ 1.51, 95% CI 1.4 to 8.1). No association was found between use of a GLP-1 and overbasalization (OR 2.03 $\pm$ 0.8, 95% CI 0.93 to 4.41). Achievement of an A1c less than 7% was comparable between the groups (OR 0.75 $\pm$ 0.31, 95% CI 0.33 to 1.69).

Conclusion: Insulin overbasalization is common and is associated with a greater risk of obesity in patients with type 2 diabetes.

68. Impact of Increasing Triglyceride Levels Prior to Initiation of a GLP-1 Receptor Agonist on Rate of Medication Discontinuation

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Introduction: Diabetes mellitus (DM) is a metabolic condition characterized by an increase in blood glucose (BG) levels which is linked to microvascular and macrovascular complications. GLP-1RAs are recommended for type 2 DM patients because they lower A1C and body weight with a low risk of hypoglycemia. However, the risk of pancreatitis and gallbladder problems limit their use in people with high triglycerides (TG). Hence, evaluating pancreatitis and triglyceride levels can avert therapy failure.

Research Question or Hypothesis: To evaluate the discontinuation rate of GLP-1RAs in patients with varying levels of baseline triglycerides.

Study Design: Retrospective, chart review

Methods: Individuals treated for T2DM or obesity with GLP-1RAs at a large physician group in 2010-2019 were included. The primary outcome was the rate of GLP-1RA discontinuation. Secondary outcomes include rate of biliary colic, pancreatitis, and the impact of increasing TG on A1C goals.

Results: The study included 364 patients. There were 264 patients in Group 1 with high TG (median TG = 153 mg/dL (113 – 222) and 100 patients in Group 2 with very high TG (median TG = 653 mg/dL (560 – 827). Discontinuation of GLP-1RA was statistically associated with increasing TG and occurred at a rate of 3.8% in Group 1 (χ^2= 0.103, p = 0.048). Pancreatitis occurred in 0.4% of Group 1 patients and was not statistically associated with increasing TG (χ^2= 0.032, p = 0.538). There was no biliary colic in any of the groups. It was discovered that A1C is significantly correlated with high TG (r = 0.266, p < .001).

Conclusion: This study found that increasing TG had a statistically significant increase on GLP-1RA discontinuation. However, because of the small sample, it is difficult to determine whether the results are representative of the true population. Thus, more research with a larger sample is required.

Family Medicine

69. Impact of an Interprofessional Polypharmacy Intervention in Ambulatory Elderly Patients .

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Introduction: Polypharmacy significantly impacts the elderly, contributing to poor adherence, drug interactions, medication errors, and avoidable adverse drug events which can increase morbidity and mortality. With the expected growth of the elderly population in the next few decades, the need to reduce and prevent the negative health and financial outcomes of polypharmacy is vital.

Research Question or Hypothesis: Does an interprofessional intervention reduce the number of potentially inappropriate medications prescribed in elderly patients seen at an outpatient primary care clinic?

Study Design: Single-center, prospective cohort, pre-post analysis

Methods: Following an educational program on the impact of polypharmacy on elderly patients, a random sample of 5-7 patients per Primary Care Provider (PCP) within the clinic was reviewed by an interprofessional team for potentially inappropriate medications as defined by validated tools. Patients with a diagnosis of Type 2 Diabetes, aged 65-89 years, insured by managed Medicare, and with at least four medications were identified via the electronic medical record. The interprofessional team submitted recommendations for resolution of polypharmacy issues to the PCP for review and implementation. The primary outcome was percentage of polypharmacy recommendations implemented at 6-month follow-up. Quantitative outcomes were summarized using frequencies and percentages.

Results: A total of 155 patients were included in the study and 2,463 medications reviewed. Nearly 35% of the medications were identified as potentially inappropriate, with no clear indication being the most common category. A total of 463 recommendations were provided to the PCP for implementation. At 6-month follow-up, 44.6% of the recommendations were implemented.

Conclusion: Potentially inappropriate medication use is prevalent within an outpatient, elderly population. This intervention resulted in an overall reduction in potentially inappropriate medications; however, the real-world implementation rates did remain low.

Gastroenterology

70. Evaluation of anticoagulation strategies for portal vein thrombosis in cirrhosis patients.

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Introduction: Portal vein thrombosis (PVT) is a complication of cirrhosis that may occur as a result of several hemostatic abnormalities including decreased production of liver-produced coagulation factors. Anticoagulation strategies for PVT vary from unfractionated heparin (UFH), low molecular weight heparin (LMWH), and warfarin, to direct-oral anticoagulants (DOACs). Robust data on the preferred, safest anticoagulant for PVT is lacking, and guidelines do not provide a definitive evidence-based strategy.

Research Question or Hypothesis: There are no differences in bleeding rates between anticoagulants for the treatment of PVT in patients with cirrhosis.

Study Design: This is an institutional review board exempt multicenter retrospective chart review.

Methods: Hospitalized patients with cirrhosis and PVT from January 1, 2017 – January 1, 2022 who received ≥ two doses of anticoagulation with LMWH, warfarin, or a DOAC were included. Anticoagulation episodes were defined as any period of anticoagulation during admission. Patients were eligible to have multiple anticoagulation episodes with the same and/or different anticoagulants. Patients on anticoagulation for indications other than PVT were excluded. The primary outcome was the rate of overall bleeding events. Secondary outcomes included major and minor bleeding events, mortality, continuation of anticoagulation at discharge, and hospital readmission. Nominal variables were summarized as numerical counts (%), while quantitative variables were summarized as median [IQR]. A logistic, linear, mixed model accounted for repeat measures on individuals to decipher differences between anticoagulants. Data analysis was completed using R statistical software with R version 4.2.2.

Results: Of the 57 anticoagulation episodes occurring in 21 patients, there were 16 with apixaban, 18 with LMWH, and 23 with warfarin included for analysis. Three bleeding events occurred with apixaban

(18.8%), seven occurred with LMWH (38.9%), and ten occurred with warfarin (43.5%).

Conclusion: After controlling for repeated measures, there were no statistical differences in bleeding events between apixaban, LMWH, and warfarin when used for the treatment of PVT in cirrhosis patients.

Geriatrics

71. Vancomycin Associated Nephrotoxicity and Clinical Outcomes Assessment in Geriatric Empiric Dosing Strategies (VANCO-AGED).

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Introduction: IDSA has shifted towards AUC/MIC monitoring to reduce vancomycin nephrotoxicity. However, trough-based monitoring remains more feasible in our health authority. Local and national guidelines on empiric vancomycin dosing strategies are largely uncharacterized in geriatrics, despite known age-related pharmacokinetic changes that increase the risk of vancomycin accumulation and subsequent toxicity.

Research Question or Hypothesis: What empiric vancomycin dosing strategy provides optimal therapeutic care while mitigating toxicity in geriatrics?

Study Design: Single center, retrospective chart review.

Methods: Patients included were aged 80 years and older, admitted between September 2020 to March 2022, non-dialysis, and received vancomycin for at least 72 hours. Primary objectives were to characterize empiric regimens and determine the proportion of subtherapeutic (<10 mg/L), therapeutic (10-20 mg/L) or supratherapeutic (>20 mg/L) troughs. Secondary objectives were time to therapeutic range, incidence of acute kidney injury (AKI), incidence of retreatment, and readmission within 30 days.

Results: Seventy patients with mean age 86 ± 4 years, weight 73 ± 21 kg, and SrCr 108 ± 60 umol/L were included. Sixty (86%) patients received a mean loading dose of 24 ± 4 mg/kg. Mean maintenance dose was 19 ± 7 mg/kg/day. Twenty-two (31%) patients received Q12H dosing and 46 (66%) patients received Q24H dosing. On Q12H dosing, 8 (36%) patients reached therapeutic range and 13 (59%) patients were supratherapeutic. On Q24H dosing, 28 (61%) patients reached therapeutic range and 10 (22%) patients were supratherapeutic. Mean time to therapeutic range was 79 ± 61 hours. Nineteen (27%) patients experienced AKI. Stage 3 KDIGO AKI had a higher occurrence on Q12H dosing (5% vs. 2%). Retreatment was required for 5 (7%) patients and 1 (1%) patient required readmission.

Conclusion: In this geriatric population, once daily dosing was more commonly observed. This interval achieved therapeutic range sooner with less nephrotoxicity compared to twice daily dosing. Larger prospective studies in geriatric vancomycin dosing are warranted.

72. Psychotropic medication prescribing in assisted living and skilled nursing facilities.

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Introduction: Psychotropic drugs act on the central nervous system and are associated with side effects of sedation, dizziness, and confusion. These effects are more pronounced in older adults, which may increase fall risk and hospitalizations. The Centers for Medicare and Medicaid Services (CMS) requires routine pharmacist review of psychotropics in skilled nursing facilities (SNF) to determine appropriateness and continuation of therapy. Assisted living facilities (ALF) are not required by CMS to routinely monitor psychotropic orders, which could allow for overutilization or inappropriate psychotropic prescribing.

Research Question or Hypothesis: How does quantity and appropriateness of psychotropic prescribing differ between SNF and ALF?

Study Design: Cross-sectional study of St. Barnabas Health System residents from January 1, 2022 to December 31, 2022.

Methods: Chart review was conducted for SNF and ALF residents prescribed psychotropics in 2022. Information pertaining to psychotropic orders was de-identified and compiled in Excel. Orders were evaluated using pre-determined criteria to determine appropriateness. Prescribing patterns and appropriateness of orders for SNF and ALF were compared using chi-squared tests.

Results:

544 psychotropics were ordered for SNF and 477 psychotropics were ordered for ALF during the study period. 57.4% of SNF orders and 57.9% of ALF orders were appropriate per pre-determined clinical criteria (RR 1.01; 95% CI [0.91-1.12]; $p = 0.87$). 94.4% of SNF orders and 96.3% of ALF orders were appropriate per renal function (RR 1.02; 95% CI [0.98-1.06]; $p = 0.35$). 54.7% of SNF orders and 68.1% of ALF orders were appropriate per both pre-determined clinical criteria and renal function (RR 1.25; 95% CI [1.09-1.42]; $p = 0.03$).

Conclusion: Psychotropic prescribing patterns and appropriateness of orders between SNF and ALF did not differ significantly and therefore do not imply necessity for expansion of pharmacy services to ALF.

73. Medication adherence in Medicare-enrolled older adults with both asthma and chronic obstructive pulmonary disease before and during COVID-19 pandemic.

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Introduction: Access to medication could be limited during the beginning of the COVID-19 pandemic.

Research Question or Hypothesis: Did medication adherence change in Medicare-enrolled older adults with both asthma and COPD during the pandemic compared to pre-pandemic period? What were the determinants of high adherence?

Study Design: Retrospective cohort study.

Methods: Medicare-enrolled older adults with both asthma and COPD were included. Medication adherence of controller medications was assessed in this study. The proportion of days covered (PDC) reflected medication adherence from January to July 2019 vs. January to July 2020. Microsoft Excel and IBM SPSS software were used to analyze the data. Paired t-tests assessed changes in adherence. Logistic regression explored the associations between patient characteristics and high adherence (PDC ≥ 80%) to at least one controller medication. A Bonferroni adjustment was utilized in each analysis to determine the P value that established statistical significance.

Results: This analysis included 989 patients. The mean age was 76.4 ± 6.7 years, with 77.7% being female. Patients had 6.6 ± 3.6 prescribers and were prescribed 14.6 ± 4.9 medications. Adherence to controller medications ranged from 83% to 90% in 2019. Medication adherence significantly decreased for all controller medications in 2020 (P < 0.001). In 2019 and 2020, the number of controller medication classes and 90-day supply were associated with high adherence (P < 0.001). In 2019, variables associated with high adherence also included the number of medication-related problems (P < 0.001) and having ≥ 3 albuterol rescue inhalers (P < 0.001).

Conclusion: Decreased medication adherence was observed in the first 7 months of the pandemic. Patients with multiple controller medication classes and a 90-day supply were more likely to adhere to the inhalers. A 90-day supply of medications should be prioritized to increase adherence. Healthcare professionals need to assess medication adherence and resolve barriers to adherence to achieve desired outcomes in this population.

Health Services Research

74. CLINICAL CHARACTERISTICS ASSOCIATED WITH ACUTE KIDNEY INJURY AND CEFTAZIDIME/AVIBACTAM USE.

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Introduction: Acute kidney injury (AKI) is a frequent diagnosis in the acute care setting. However, data evaluating the incidence and correlates associated with ceftazidime/avibactam-induced kidney injury have not been well described.

Research Question or Hypothesis: The goal of this study was to identify the characteristics and correlates associated with the risk of developing AKI with use of ceftazidime/avibactam as monotherapy or in combination with vancomycin.

Study Design: A retrospective analysis was performed using electronic health records of 287 patients (> 18 years of age), obtained from West Virginia University using the TriNetX database. AKI was defined using ICD-10-CM codes (N17). The primary outcome was the incidence of AKI after exposure to ceftazidime/avibactam within 365 days.

Methods: Multivariable logistic and LASSO regression analyses were performed to evaluate the outcomes.

Results: Among the AKI cohort (n = 144), 77%, 62.5%, 40.3%, and 50.7% had a history of Type II Diabetes, obesity, hypertension, and heart failure, respectively. Of which, 80.6% had sepsis, 22% had MRSA infection, and 35.4% and 57.6% had resistance to beta-lactams (Z16.1) and other antibiotics (Z16.2), respectively. In the AKI cohort, 70.3% received combination therapy with intravenous vancomycin. Multivariable analysis demonstrated that MRSA infection OR 3.7 [1.3,11.4] (p < 0.01), sepsis 9.1 [4.8, 17.5] (p < 0.0001), and resistance to beta lactam agents 7.6 [2.9, 22.3] (p < 0.0001) were significant risk factors for AKI. LASSO regression further confirmed these results. Interestingly, combination therapy was also found to be a significant risk factor for AKI during LASSO analysis OR = 1.24.

Conclusion: AKI incidence remains high among patients receiving ceftazidime/avibactam as monotherapy and in combination with vancomycin during hospitalization. However, the presence of resistant bacteria and use of combination antibiotic therapies may lead to significant kidney burden. Future multi-institutional prospective trials are recommended to explore the potential relationship between ceftazidime/avibactam and AKI.

75. Impact of pharmacist involvement in ensuring medication affordability to improve access at discharge.

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Introduction: Pharmacist involvement at discharge has been shown to improve outcomes regarding adverse events, readmission rates, and medication errors. However, literature regarding pharmacist impact on medication access and cost assistance is limited. In an effort to improve medication access, University of Louisville (UofL) Hospital Pharmacy Department created an initiative to evaluate medication affordability for select, high-cost medications prior to patients' discharge.

Research Question or Hypothesis: The purpose of this study is to evaluate the impact of a pharmacist-driven initiative aimed to address high-cost medication access prior to discharge from an acute inpatient setting.

Study Design: Retrospective, chart review

Methods: Patients newly initiated on designated high-cost medications, including direct oral anticoagulants (i.e. apixaban, rivaroxaban, dabigatran and edoxaban), treatment dose low molecular weight heparin, ticagrelor, and lacosamide between October 1, 2021 and April 30, 2022 were included. The primary outcome evaluated the post-implementation group alone and included number of patients reviewed and number of pharmacist interventions. Secondary outcomes included both pre- and post-implementation groups and evaluated number of patients educated, 30-day readmissions, prescriptions filled from UofL Outpatient pharmacy and revenue generated.

Results: In total, 186 patients were evaluated including 68 in the pre-implementation arm and 118 in the post-implementation arm. Following initiative implementation, almost two-thirds (66.1%) of patients evaluated required a cost-related intervention. Of the interventions performed, patients commonly required a cost-benefit discussion (76.9%), copay enrollment (10.3%), or an alternative therapy recommendation (10.3%). Pharmacy education rates significantly improved post-implementation (48.5% pre-implementation vs 83.1% post-implementation; p <0.001). Readmission rates at 30-days were numerically lower (7.4% pre-implementation vs 5.1% post-implementation) but did not reach statistical significance (p=0.757). No statistically significant difference in prescription acquisition rates or revenue generated at UofL Outpatient pharmacy were observed.

Conclusion: Pharmacist involvement at discharge provided a positive impact on medication access by increasing cost-assistance interventions and patient education services.

76. Predictors of influenza vaccination among adults 65 years and older: 2019 Behavioral Risk Factor Surveillance System

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Introduction: Influenza vaccination rates for older adults remain consistently below public health goals.

Research Question or Hypothesis: To what extent do income and race predict uptake of the influenza vaccine and the location of administration among adults 65-years and older?

Study Design: Retrospective, cross-sectional study using national data from the 2019 Behavioral Risk Factor Surveillance System

Methods: We assessed whether participants 65-years and older reported receiving an influenza vaccine during the past 12 months (yes or no) and if so, the administration location (healthcare or non-healthcare setting). Demographic characteristics included income (low: less than $25,000; medium: $25,000-$49,000; high: $50,000 or more), race and ethnicity (white, non-Hispanic; Black, non-Hispanic; Hispanic; different or more than one race), gender, education level, employment status, health insurance, self-reported health status, whether a participant currently smoked, had asthma, or diabetes. Sample weights were applied. We used SPSS to conduct descriptive statistics, chi squared tests, and multivariable logistic regression analyses with a p-value of <0.05 as significant.

Results: A weighted total of 5,711,284 survey participants were included in this study, of which 78.8% identified as white and non-Hispanic. One-third of participants (31.3%) reported a low income. Two-third of participants (65.3%) received the influenza vaccine within the past 12 months, most commonly in a healthcare setting (55.1%). In adjusted analyses, participants with high income were 1.5 times more likely to receive a vaccine than those with low income (95% C.I. 1.07,2.07). Participants with medium and high income were 1.6 times more likely to receive the influenza vaccine at a healthcare setting than those with low income (95% C.I. 1.11,2.31 for medium income; 95% C.I. 1.11,2.43 for high income). There was no difference in receipt of the influenza vaccine or administration location by race and ethnicity.

Conclusion: Additional research is needed to identify strategies to increase vaccination uptake among low income older adults in the United States.

Hematology/Anticoagulation

77. Hospital Acquired Venous Thromboembolism: A Preventability Assessment.

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Introduction: The American Heart Association has a call to action to reduce hospital acquired venous thromboembolism (HA-VTE) by 20% by 2030. However, not all HA-VTE are preventable suggesting the focus should be on reducing preventable HA-VTE.

Research Question or Hypothesis: Determine the proportion of HA-VTE events which were potentially preventable.

Study Design: Retrospective, single center pilot study.

Methods: Patients were identified through Patient Safety Indicator report using ICD-10-CM diagnosis codes for deep vein thrombosis (DVT) and pulmonary embolus (PE) from January-August of 2019. Enrollment targets included 50 patients, even distribution of medical and surgical patients and capping of mechanical prophylaxis only to 10%. Seven preventability factors for HA-VTE were determined: appropriate prophylaxis, missed doses, initiation delay, prophylaxis never ordered, interruption of therapeutic anticoagulation without VTE prevention, underdosing, and non-adherence with mechanical prophylaxis alone. Those with at least one factor were considered to have potentially preventable HA-VTE. Manual data

extraction using a systematic data collection form included demographics, VTE risk assessment, objective confirmation of thrombosis, and prophylaxis ordered and administered. All data extraction was verified by a second investigator. Descriptive statistics were completed with PRISM GraphPad. Data are presented as median (interquartile range) where appropriate.

Results: The median age and body weight were 66 years (55.5-79) and 85.5 kg (69.5-100.5) respectively. The initial regimen was heparin in 87.2%. The VTE risk level was moderate to high in 47/50,94%. Preventability factor(s) were found in 20/50,40% of patients. The most common factor was missed doses in 29.8% with a median of 2 doses (1-3) and a range of 1 to 20. Patient refusal was primary reason for missed doses occurring in 71%. Initiation delay occurred in 12.7%. Sixty percent of patients receiving mechanical prophylaxis only (3/5) had nonadherence.

Conclusion: Forty percent of HA-VTE were potentially preventable with missed doses as the most common factor.

78. INR Recall Extension in Pharmacist-run Anticoagulation Clinic.

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Introduction: Warfarin is a narrow therapeutic index medication requiring repeat monitoring via international normalized ratio (INR). Guidelines have differing recommendations for INR recall intervals; with an institutional recommendation of no more than six weeks. Few studies have evaluated INR recall extension to reduce healthcare costs; limitations of these studies include short duration of follow up. During the COVID-19 pandemic, in an effort to reduce contact with the health care system, INR recall was extended in the institutional pharmacy anticoagulation clinic, which provides a real-world population for review.

Research Question or Hypothesis: What is the impact on patient outcomes when INR recall is extended?

Study Design: Retrospective cohort study

Methods: Patients enrolled in the anticoagulation clinic between January 1, 2019 and February 28, 2021 were screened. Group assignment was based on the INR recall interval; extended vs. traditional. Patients were included if they met criteria for extended INR recall interval; their data in the traditional time period was used for paired comparison. The primary outcome was median time-in-therapeutic range (TTR). The secondary outcome was frequency of extreme INRs.

Results: A total of 206 patients were included. Median number of INRs per patient was significantly higher in the traditional time period (13 [11-15] vs. 7 [7-8]; p<0.01). Median TTR was significantly higher in the extended group (85% [70%-96%] vs. 75% [64%-86%]; p<0.01). Extreme INRs ≥4.0 and ≤1.5 were significantly higher in the traditional group (n=48, 23% vs. n=27, 13%; p<0.01 and n=54, 26% vs. n=24, 12%; p<0.01, respectively).

Conclusion: Patients' TTR was within the guideline recommended range during both INR recall intervals. Extension of INR recall did not increase frequency of extreme INRs. As expected, less INRs per patient were measured during the extended time which may have impacted findings. Results support extension of INR recall intervals for patients with high baseline TTR.

79. An Evaluation of the Multiple Myeloma Blood Monitoring Protocol in an Oncology Center in London, England.

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Introduction: Current cancer guidelines in the United Kingdom (UK) recommend patients receiving chemotherapy for multiple myeloma (MM) should have a blood draw before each dose within a cycle. For some MM regimens, there could be up to 5 blood draws for each cycle, which is burdensome.

Research Question or Hypothesis: Are blood draws on day 1 only of each chemotherapy cycle for MM patients sufficient if platelets are ≥75x10^9/L and neutrophils ≥1.5x10^9/L?

Study Design: This retrospective chart review from October 2008 – February 2023 evaluated all MM patients receiving chemotherapy from a large oncology specialty center in London, England.

Methods: The ten most recent patients per Bortezomib or Carfilzomib-based regimens to have completed a cycle of each MM chemotherapy regimen were included for a total of 18 regimens evaluated. The name of the regimen, cycle number, days 1, 8, 15, 22, and 29 platelets and neutrophils were recorded if applicable. Patients' blood values and medical histories were obtained from the electronic health records.

Results: There were 113 patients included in this analysis, and 72% met the platelet and neutrophil thresholds throughout their whole cycle (platelets ≥75x10^9/L and neutrophils ≥1.5x10^9/L). Only 6% of patients met these criteria on day 1 but then dropped below the platelet or neutrophil threshold on later days of treatment. The remaining 22% never met the platelet and/or neutrophil threshold on day 1, or any other treatment day.

Conclusion: The high number of MM patients who met the platelet and neutrophil threshold on day 1 and throughout their cycle highlights an opportunity for less frequent blood monitoring in these patients. Additionally, the platelet and neutrophil values on day 1 in MM patients receiving chemotherapy can help identify patients who may require more frequent blood monitoring. This approach could streamline the blood draw process and help reduce the time and resources consumed.

HIV/AIDS

80. Safety and Effectiveness of Antiretroviral Therapy in a Diverse Population of Older People with HIV in South Florida.

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Introduction: Advances in antiretroviral therapy (ART) enable people with HIV to live longer, healthier lives and to prevent transmission of the virus. However, older people with HIV (OPWH) are more susceptible to long-term toxicity and drug interactions associated with ART. Black and Hispanic patients experience more health disparities and a higher HIV stigma, which interfere with their ability to receive medical care. In addition, these groups have specific social determinants of health, which increase their risks of negative outcomes.

Research Question or Hypothesis: Are there differences in safety and effectiveness of ART in White, Black, and Hispanic OPWH?

Study Design: Retrospective observational study

Methods: An electronic health record search of patients receiving care between January 1, 2017 and December 31, 2022 at two affiliated HIV clinics in South Florida was conducted. Adults ≥50 years old with HIV-1 infection who self-identified as White, Black, or Hispanic were included. The primary effectiveness endpoint was the percentage of OPWH with undetectable viral load throughout the study. Secondary safety endpoints were changes in body weight, fasting blood glucose, fasting lipids, and serum creatinine. A non-parametric one-way ANOVA or Chi square test was used to determine differences between groups.

Results: A total of 116 White, 42 Black, and 40 Hispanic OPWH were included. Upon enrollment, most patients (97%) were already receiving ART. Of these, the percentage with undetectable viral load was lower among Black (61.8%) compared to White (85.8%; $P<0.01$) or Hispanic (83.3%; $P<0.05$) patients. Similarly, throughout the study, the percentage with undetectable viral load was lower among Black (61.6%) compared to White (84.7%; $P<0.05$) or Hispanic (83.3%; $P=0.12$) patients. No significant changes in safety endpoints throughout the study were observed among the groups.

Conclusion: Fewer Black OPWH had undetectable viral load upon enrollment and throughout the study compared to White or Hispanic OPWH, suggesting the need to provide more targeted interventions for Black patients.

Infectious Diseases

81. Model-Informed Precision Dosing of Vancomycin in Vietnamese Children: Comparison of Two Bayesian Programs.

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Introduction: Model-informed precision dosing (MIPD) of vancomycin integrating Bayesian estimation is important to ensure adequate vancomycin exposure, especially in children. Coupled to the lack of pharmacy-regulated MIPD programs, the availability of Bayesian software is limited due to cost restraint in a low-resource country.

Research Question or Hypothesis: To compare the accuracy and precision of vancomycin Bayesian AUC_{24} estimations.

Study Design: Retrospective cohort study in two pediatric hospitals with a combined 2000 beds.

Methods: Pediatric subjects < 16 years old who received vancomycin ≥ 24 hours were enrolled. AUC_{24} was defined as 24-hr area-under-curve, which is the therapeutic target recommended by current guidelines. The accuracy and precision of AUC_{24} were calculated by $\sum(x_{estimated} - x_{actual})/ x_{actual}$ and $\sum(|x_{estimated} - x_{actual}|)/ x_{actual}$, and respectively, using two Bayesian programs, including PrecisePK® and Shinyapps.

Results: Analysis included 64 subjects with 83 vancomycin serum concentrations. Median age was 2 (interquartile range [IQR] 1-3) years old, weight 10.75 (8.25-11.75) kg, baseline serum creatinine 0.43 (0.38-0.5) mg/dL and empiric dose 60 (57.97-61.54) mg/kg/day. Most subjects received empiric vancomycin for pneumonia (80%), bacteremia (18.5%), and skin-skin structure infection (1.5%). A total of 14% (20/140) patient samples were positive, with 7.7% (5/65) MRSA infection. The median (IQR) vancomycin volume of distribution, clearance and AUC_{24} were 6.85 (5.19-8.15) L/kg, 1.77 (1.24-2.55) L/hr/kg, and 363.60 (272.40-481.45) mg-hr/L, respectively. Compared to PrecisePK®, the accuracy and precision for Shinyapps was -1.73% and 7.18%, respectively.

Conclusion: Since the accuracy and precision were <10%, both PrecisePK® and Shinyapps are reasonable Bayesian MIPD for use in children of Vietnam to dose and monitor vancomycin therapy.

82. Predictors of human papillomavirus (HPV) vaccine hesitancy among adults ages 27 to 45.

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Introduction: Current data suggests that adults respond positively to shared decision making (SDM) with healthcare providers on whether or not to receive vaccines; however, data supporting SDM with the human papillomavirus (HPV) vaccine in adults is limited. Providers may benefit from knowing which variables are likely to influence vaccine hesitancy in adults.

Research Question or Hypothesis: This study sought to determine factors that influence HPV vaccine hesitancy among non-monogamous adults ages 27 to 45 years.

Study Design: This cross-sectional study used a 27-item pilot-tested survey. The primary outcome was HPV vaccine hesitancy defined as an "I don't know" response on the item inquiring about the willingness to receive vaccination. HPV vaccine knowledge and belief variables were examined as potential predictors of hesitancy. The objective of this study was to determine factors associated with HPV vaccine hesitancy in adults ages 27 to 45 years. Predictors of hesitancy included various demographics (age, gender, education, religion), HPV risks, perceptions, and general vaccination perception variables.

Methods: Participants from the online Qualtrics® platform that were 27 to 45 years old, in a non-monogamous sexual relationship, and proficient in reading English were invited to participate in an anonymous survey.

Results: A total of 430 responses were received. Average (SD) respondent age was 34.5 (5), 50% female, 25% white, 25% Hispanic, 24% African American. Those who did not know HPV is transmitted sexually were over two times more likely to report hesitancy (OR =2.35; CI 1.22-4.53). Those who did not know what HPV vaccine protects against were 7 times more likely to report hesitancy (OR =7.11; CI 3.44- 14.70). Other demographics were not significantly associated with hesitancy.

Conclusion: Lack of HPV knowledge and vaccine purpose were independent predictors of HPV vaccine hesitancy. Providers may use these findings to educate their patients to reduce HPV vaccine hesitancy.

83. Evaluation of Escherichia coli (E.coli) resistance rates in community-acquired urinary isolates over a 10-year period.

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Introduction: Urinary tract infections (UTI) are often treated in the emergency department (ED) with *Escherichia coli* being the most likely cause. *E.coli* resistance has increased for many common antibiotics, but rates vary depending on risk of drug resistance in each population. We stratified ED patients into two groups based on risk factors for drug resistant pathogens (DRP), community (CA-UTI) or healthcare (HA-UTI)-associated UTI, and evaluated rates of *E. coli* resistance. We repeated this evaluation after a 10-year period to assess resistance trends.

Research Question or Hypothesis: *E.coli* resistance will increase in CA-UTI patients over a 10-year period.

Study Design: Two identical retrospective medical record evaluations of patients treated in the ED for UTI were performed over a 10-year period (2011,2021). We evaluated rates of *E.coli* resistance and changes over time. ED-patients with a positive urine culture (>100,000 cfu/mL) treated for UTI and discharged with an antibiotic prescription were included. Exclusion criteria were age <18 years, pregnancy, asymptomatic bacteriuria, and no treatment. Patients were classified as CA-UTI or HA-UTI based upon risk factors for DRP. HA-UTI risk factors included long term care facility or nursing home residence, indwelling catheter, immunosuppressive disease/therapy, hospitalization >2 days, previous antibiotics, urologic procedure in last 90 days, and chronic dialysis in last 30 days.

Methods: The CA-UTI data sets were compared for changes in *E. coli* resistance to levofloxacin, nitrofurantoin, cefazolin and sulfamethoxazole-trimethoprim. Data sets were compared utilizing appropriate parametric or non-parametric statistical tests.

Results: Data sets were similar except for higher percentage of males and mean age in 2021. In 2011 and 2021 respectively, *E. coli* resistance was 9.2% vs 9.9% to levofloxacin, 8.9% vs 6% for cefazolin, 25.2% vs. 26.6% for SMX/TMP, and 8.4% vs. 2.6% for nitrofurantoin.

Conclusion: Changes in CA-UTI *E. coli* resistance over a 10-year period were most notably improved for NTF, and not significantly different for levofloxacin, cefazolin, or SMX/TMP.

84. Cefdinir versus cephalexin for the treatment of urinary tract infections: a retrospective evaluation.

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Introduction: The Infectious Diseases Society of America recommends as alternative agents for the treatment of urinary tract infections (UTI). Cefdinir and cephalexin are commonly prescribed for UTI in our health system. Poor urine penetration exhibited by cefdinir compared to cephalexin may result in dissimilar efficacy, but there is a lack of comparative efficacy data between cefdinir and other cephalosporins.

Research Question or Hypothesis: Is there a difference in treatment failure between cefdinir and cephalexin for lower UTI?

Study Design: This was a multi-site, retrospective chart review conducted between July 31, 2021 and July 31, 2022.

Methods: Patients with lower UTIs discharged from emergency rooms within our health system with a prescription for cefdinir or cephalexin were included. Exclusion criteria included pyelonephritis, bacteremia, multiple antibiotic prescriptions on discharge, and documented UTI or receipt of antibiotics within 2 weeks. The primary outcome was treatment failure (antibiotic switch or readmission to the emergency department within 7 days) between patients prescribed cefdinir or cephalexin.

Demographic data was analyzed using descriptive statistics. Nominal data was analyzed using the Chi-square or Fisher's Exact test. Non-parametric continuous data was analyzed using the Mann-Whitney test. A sample size of 242 was used to achieve an 80% power to detect a 15% difference in the rate of treatment failure between groups. Statistical tests used a 95% confidence interval with a significance level of 0.05.

Results: Treatment failure within 7 days occurred in 11.6% (n=14) of the cefdinir group and 8.3% (n=10) of the cephalexin group ($p = 0.389$). Treatment failure at 14 days was higher for cefdinir at 20.7% (n=25) than for cephalexin at 11.8% (n=14) (p=0.053). There was no difference in treatment failure between uncomplicated and complicated UTI in either group at both 7 and 14 days.

Conclusion: Patients treated with cefdinir had similar rates of treatment failure compared to those treated with cephalexin.

85. Evaluation of an educational intervention on outpatient antibiotic prescribing patterns for skin and soft tissue infections in the emergency department.

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Introduction: Skin and soft tissue infections (SSTIs) are a common cause of emergency department (ED) visits. IDSA recommends outpatient treatment durations of 5-10 days. Reducing antimicrobial exposure can limit future antimicrobial resistance. Since 2014, 5-day courses have been evaluated as noninferior to longer durations for initial infection. For cellulitis, IDSA recommends antimicrobials active against Streptococcal and methicillin-susceptible Staphylococcal infections. IDSA recommends doxycycline or sulfamethoxazole-trimethoprim as empiric therapy for purulent infections. Treatment with multiple agents did not improve outcomes for non-purulent infections. Evidence for use of multiple agents for purulent infections is lacking. This study applies previous findings to an ED outpatient population.

Research Question or Hypothesis: What impact will an educational intervention by pharmacy covering duration of therapy and preferred antibiotics have on outpatient prescribing for SSTIs seen in the ED?

Study Design: This is a descriptive, single-center, pre-/post-intervention retrospective study evaluating outpatient antibiotic prescriptions for SSTIs evaluated by ED providers.

Methods: Patients receiving antibiotics during an ED encounter with a diagnosis of abscess, animal bite, cellulitis, or wound infection were screened for outpatient antibiotic prescriptions, including duration of therapy and number of antibiotics. Pre-intervention, 104 patients were seen between September 2021 and March 2022 who received antibiotics for SSTI. Post-intervention, 103 patients were seen between June 2022 and November 2022 who received antibiotics for SSTI. Post-intervention data was collected after providers were educated regarding recommendations to (1) shorten prescription durations for initial, uncomplicated infections, and (2) utilize single-agent therapy for uncomplicated, purulent infections.

Results: Pre-intervention, percentage of therapy durations were 3.8% (5-day), 38.5% (7-day), and 57.7% (10-day). Post-intervention, the percentage of durations changed to 10.7% (5-day), 47.6% (7-day), and 41.7% (10-day). Pre-intervention, 24% of patients received prescriptions for two antibiotics. Post-intervention, 16.5% of patients received prescriptions for two antibiotics.

Conclusion: Educational interventions can improve outpatient prescribing patterns for better adherence to IDSA guidelines for SSTIs seen in the ED.

86. Characteristics and Outcomes of Community-Acquired Pneumonia Requiring Hospital Admission in Patients with Cancer

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Introduction: Cancer patients with Community-Acquired Pneumonia (CAP) are at high risk of complications. Though several studies evaluated CAP that results in hospital admission, few included patients with cancer.

Research Question or Hypothesis: What are the characteristics and outcomes of CAP that requires hospital admission in cancer patients?

Study Design: Retrospective cohort study.

Methods: We included patients admitted to a comprehensive cancer center between January 2021 and August 2022 with a diagnosis of CAP. CAP was defined as pulmonary infiltrate on chest radiograph along with at least one of the following criteria: fever, cough, chest pain, shortness of breath, elevated white blood cells, or elevated C-reactive protein. Patients' characteristics, cultures, and length of hospital stay were recorded. We also assessed outcomes of CAP which included transfer to ICU, all-cause mortality, and early clinical stability, defined as temperature ≤37.8°C, heart rate ≤100/min, respiratory rate ≤24/min, systolic blood pressure ≥90mmHg and oxygen saturation ≥90% on room air on day 3 of admission. Results were reported using descriptive statistics.

Results: During study period, we evaluated 632 cancer patients admitted with CAP; mean age was 62 years (±13.9 SD), 55% were males, and 11% had chronic lung diseases. The most common cancer

were breast (23%) and lung (20%) cancer. Among the patients who had blood and sputum cultures upon admission, 30% and 12% had positive sputum and blood cultures, respectively. Early clinical stability was achieved in 49% of the patients and 89% were discharged home with a median length of hospital stay of 6 days (range 1-48). During hospitalization, 3% were transferred to the ICU and 11% died.

Conclusion: Among cancer patients hospitalized with CAP, about half of the patients achieved early clinical stability and the majority were discharged home. Future studies should identify predictors for patients who may be treated as outpatients.

87. Baricitinib versus tocilizumab in hospitalized COVID-19 patients with noninvasive mechanical ventilation.

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Introduction: Janus kinase inhibitors (baricitinib) and interleukin-6 inhibitors (tocilizumab) are approved for the treatment of severe COVID-19 pneumonia and have equal standing by the NIH in addition to corticosteroids and oxygen supplementation. Similar outcomes in efficacy and mortality between both agents in previous retrospective studies, warrants further evaluation.

Research Question or Hypothesis: Is there a difference between baricitinib and tocilizumab in the progression to mechanical ventilation and safety outcomes in hospitalized COVID-19 patients?

Study Design: This is an IRB approved, retrospective and prospective, observational study, comparing baricitinib and tocilizumab in hospitalized COVID-19 patients.

Methods: Patients were included if they were exhibiting rapidly progressing oxygen requirements >6 L/min in 24 hours, high flow oxygen or on non-invasive MV admitted between August 20, 2021-December 31, 2022. The primary outcome was progression to invasive MV. Secondary outcomes included in house mortality rates, time to progression to MV, duration of MV, intensive care unit and hospital length of stay, and safety outcomes.

Results: A total of 470 patients were screened with 316 meeting the inclusion/exclusion criteria evaluated; 122 patients in the baricitinib group and 194 patients in the tocilizumab group. Baseline characteristics between the groups were similar, with the exception of significantly more patients in the baricitinib group on HHF at baseline ($p<0.001$). For the primary outcome, progression to MV occurred in 11% of patients receiving tocilizumab compared with 25% of patients receiving baricitinib ($p<0.001$). Subgroup analysis of those on HF or greater showed no difference in progression to MV between both groups. Mortality was reduced in the tocilizumab group versus baricitinib (21% vs 35%; $p=0.003$). No statistically significant differences in the other secondary outcomes including adverse events.

Conclusion: Progression to MV is higher with the utilization of baricitinib versus tocilizumab. However, this may have been driven with more patients in the baricitinib group on aggressive oxygen supplementation at baseline.

88. Bacteremia upon Hospital Admission in Adult Patients with Cancer: Microbiological Profile and Mortality.

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Introduction: In cancer patients, bacteremia is recognized as a life-threatening complication associated with high morbidity and mortality. Though there have been significant changes reported in the spectrum and resistance patterns of pathogens causing bacteremia, there are limited data from the Middle Eastern region.

Research Question or Hypothesis: What is the microbiological profile and associated mortality of bacteremia upon admission in cancer patients?

Study Design: Retrospective study at King Hussein Cancer Center in Jordan.

Methods: The study included adult cancer patients admitted to the hospital with bacteremia (July 2021-September 2022). Patients were excluded if they were under the palliative and bone marrow transplant services or had blood cultures deemed as contaminants. Patients' characteristics, etiologic microorganisms, antibiotic susceptibilities, empiric antibiotics, and 30-day mortality were recorded, using the electronic medical records. Categorical data were presented as counts and percentages while continuous data were presented as means and standard deviation.

Results: A total of 651 cases were included; mean age was 58±16 (SD) years, 358 (55%) were males, and 442 (68%) had solid tumors. Gram-negative bacteria represented the majority of bacteremia cases (426/651, 65%). The most common gram-negative pathogen was *Escherichia coli* (245/426, 58%) followed by *Klebsiella species* (60/426, 14%), while *Coagulase-negative staphylococci* was the most common gram-positive pathogen (59/225, 26%) followed by *Staphylococcus aureus* (49/225, 22%). Extended-spectrum-beta-lactamase-producing *Enterobacterales*, carbapenem-resistant *Enterobacterales*, methicillin-resistant *Staphylococcus aureus*, and carbapenem-resistant *Pseudomonas aeruginosa* were found in 149 (48%), 16 (100%), 22 (47%) and 2 (8%) cultures, respectively. Piperacillin/Tazobactam was the most common empirical antibiotic (37%) with a susceptibility of 85% among the tested isolates. All-cause 30-day mortality was 191 (29%).

Conclusion: The majority of bacteremia cases diagnosed upon hospital admission in cancer patients were caused by gram-negative bacteria, among which more than one-third were multidrug-resistant. Further studies should identify predictors of resistance to help guide the empiric antibiotic prescribing decisions.

89. Daptomycin Dosing Based on Susceptible Dose-Dependent Guidance for Enterococcus Appears Safe.

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Introduction: Clinical & Laboratory Standards Institute guidelines recommend daptomycin doses ≥8 mg/kg for susceptible dose-dependent (SDD) *Enterococcus*. However, data remains limited on safety outcomes of SDD dosing.

Research Question or Hypothesis: High-dose daptomycin will have a higher incidence of adverse drug events than standard-dose daptomycin.

Study Design: A 2-year, single-site retrospective cohort study of patients receiving daptomycin for enterococcal infections.

Methods: Patients were included if they were ≥18 years old, received daptomycin for ≥48 hours, and had cultures growing *Enterococcus* with daptomycin minimum inhibitory concentration of 2-4 mcg/mL. Pregnant or incarcerated patients were excluded. Eligible patients were stratified by daptomycin dose into standard-dose (≤6.5 mg/kg) versus high-dose (≥7.5 mg/kg). The primary outcome was daptomycin safety based on a composite of creatine kinase (CK) elevation, peripheral serum eosinophilia, eosinophilic pneumonitis, alanine aminotransferase (ALT) elevation, and alkaline phosphatase (AP) elevation.

Results: One hundred nineteen patients were eligible for analysis. Median daptomycin doses were 6.0 mg/kg (IQR 5.4, 6.1) and 8.1 mg/kg (IQR 7.9, 9.6) in the standard- and high-dose cohorts, respectively. Median durations were 13.5 days (standard-dose) and 16 days (high-dose) (p=0.02). The composite safety endpoint occurred in 32.0% of the standard-dose group and 32.5% of the high-dose group (p=0.96). On multivariable analysis, concurrent antihistamine usage was associated with the composite outcome; however, there was no association with daptomycin dose or concurrent statin use. There were no significant between-group differences in the incidence of any individual adverse events. The most common adverse events were AP elevation (25.0%), peripheral eosinophilia (16.5%), and ALT elevation (14.9%). CK elevation was rare (2.9%), and there were no incidences of eosinophilic pneumonitis. There were 3 incidences in which daptomycin was dose-reduced or held due to adverse effects.

Conclusion: Based on this limited data, adverse events with daptomycin in the setting of enterococcal treatment were common but did not appear dose-related and rarely caused change in management.

90. The Use of Tocilizumab in COVID-19 Critically ill Patients with Renal Impairment: A Multicenter, Cohort Study.

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Introduction: Tocilizumab (TCZ) is recommended in patients with COVID-19 who require oxygen therapy or ventilatory support. Despite the wide use of TCZ, little is known about its safety and effectiveness in patients with COVID-19 and renal impairment. Therefore, this study evaluated the safety and effectiveness of TCZ in critically ill patients with COVID-19 and renal impairment.

Research Question or Hypothesis: To Evaluate the safety and effectiveness of TCZ in critically ill patients with COVID-19 and renal impairment.

Study Design: Multicenter Retrospective Cohort

Methods: A multicenter retrospective cohort study that included all adult COVID-19 patients with chronic kidney disease (eGFR<60ml/min) and admitted to the ICU between March 2020 and July 2021. Patients were categorized into two groups based on TCZuse with propensity score (PS) matching (1:3). The primary endpoint was the development of acute kidney injury (AKI) during ICU stay. Multivariable logistic, Cox proportional hazards, and negative binomial regression analysis were employed.

Results: a total of 1592 critically ill COVID-19 patients were screened, of whom 524 patients were eligible; 274 patients were included after PS matching (Control; 204, TCZ; 68). The rate of AKI was significantly higher in the TCZ group compared to the control group (74.2% versus 57.6%; OR: 2.03, 95% CI: 1.10, 3.73; p=0.02). Additionally, the length of ICU stay was significantly longer in the TCZ versus control group (16 versus12 days, beta coefficient: 0.22, 95% CI: 0.02, 0.42; p=0.028). However, ventilator-free days, 30-day and in-hospital mortality, stay in hospital, and other ICU complications were similar between the two groups.

Conclusion: In critically ill COVID-19 patients with renal impairment (eGFR <60 ml/min), TCZ was associated with a higher incidence of AKI and increased ICU length of stay with no mortality difference. Further studies are needed to confirm these findings.

Medication Safety

91. Medication Use Optimization in Critical Care Through a Pharmacy Morbidity, Mortality, and Improvement Program.

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Introduction: Pharmacy-led morbidity, mortality, and improvement (MMI) programs enhance practitioner education and improve patient-safety culture. The impact of MMI programs on process improvement (PI) outcomes is lacking, particularly within critical care.

Research Question or Hypothesis: The purpose of this report was to describe PI interventions from critical care medication errors evaluated through a pharmacy MMI program.

Study Design: Retrospective

Methods: Medication errors reported between June 2013 and August 2022 that occurred in an intensive care unit, emergency department, or procedural area were included. Error severity and potential were assessed using the National Coordinating Council for Medication Error Reporting and Prevention Medication Error Index (NCC MERP) and Harm Associated with Medication Error Classification (HAMEC), respectively. The primary outcome of PI interventions were classified as clinical update, operations change, pharmacy or hospital administration change, and/or informatics and technology (IT) updates. Electronic medical record (EMR) interventions were further classified as best practice advisory, medication order build/change, order set build/change, dose limit/alert, or infusion smart pump change. Institute for Healthcare Improvement (IHI) reliability level was evaluated as a secondary outcome.

Results: A total of 54 errors were included. Most errors were classified as NCC MERP category D (13 [24.1%]) and C (12 [22.2%]), and HAMEC 4 (26 [48.1%]; median score 3 [IQR, 3-4]) error potential. A total of 88 PI interventions were identified (median 1.5 [IQR 1-2] per error); clinical (30 [34.1%]) and IT (26 [29.5%]) updates were the most common. Order set build or change (20 [45.5%]) was the most common EMR enhancement. PI interventions were a median IHI level 1 reliability (IQR, 1-2). EMR enhancements having a median IHI level of reliability of 2 (IQR, 1-2).

Conclusion: Critical care medication errors addressed through a formal Pharmacy MMI program have high harm potential and often involve multiple PI interventions. EMR interventions generally had higher levels of empiric reliability.

92. The Impact of Pharmacist Transitions of Care Interventions in Identifying Medications Errors for Patients Discharging to a Skilled Nursing Facility.

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Introduction: Patients being discharged from acute care facilities have a high risk of hospital readmission due to medication errors. There is limited evidence evaluating the impact of pharmacists in improving patient transitions of care (TOC) to skilled nursing facilities (SNFs). Pharmacist interventions during TOC may be beneficial in identifying medication errors and improving patient outcomes when discharging to a SNF.

Research Question or Hypothesis: The objective of this study was to evaluate the impact of pharmacist interventions in reducing medication errors for patients discharging from an acute care facility to a SNF.

Study Design: Over a three-month period, pharmacists provided TOC interventions, including medication reconciliation and discharge education, to patients discharging to a SNF.

Methods: This study retrospectively evaluated documented pharmacist interventions to identify and categorize medication errors based on the potential harm for each error.

Results: Pharmacists saw 324 patients being discharged from the hospital. The pharmacists identified a total of 33 medication errors across the 324 patients. The most common errors, which accounted for 61% of the 33 identified errors, were related to incorrect dose, frequency, or route of administration. Out of the 33 total identified errors, roughly 55% of the errors had the capacity to cause temporary harm. From those 18 errors, 44% could have caused temporary harm requiring hospitalization and 6% could have necessitated intervention to sustain life. 76% of pharmacist interventions were accepted by patients' physicians or healthcare teams.

Conclusion: Pharmacists were able to identify medication errors and make recommendations to the healthcare team as patients transitioned from an acute care hospital to a skilled nursing facility. The majority of medication errors identified were related to dosing, frequency, and route of administration. Pharmacists' interventions, and communication with the healthcare team, were able to prevent medication errors with potential to cause harm, hospitalizations, and need for life-saving interventions.

93. Vancomycin and Piperacillin/Tazobactam Prescribing Patterns in a Nationally Representative Emergency Department Population.

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Introduction: Broad-spectrum antibiotic use is indicated in severe, polymicrobial infections. Vancomycin and piperacillin-tazobactam are often used as empiric therapy in the emergency department (ED). Overuse contributes to antimicrobial resistance and increases risk of nephrotoxicity compared to the use of either agent alone.

Research Question or Hypothesis: What are the prevalence and predictors of vancomycin and piperacillin-tazobactam co-prescribing patterns during ED visits?

Study Design: Retrospective, cross-sectional analysis of data from the 2014-2018 National Hospital Ambulatory Medical Care Survey

Methods: Patient demographics, diagnoses, and medications administered were collected. All patients >18 years of age receiving antibiotic therapy were included. Exclusion criteria were diagnoses of diabetic foot infection, gastrointestinal infections, febrile neutropenia, or cystic fibrosis. The primary endpoint was proportion of antibiotic-receiving visits utilizing vancomycin/piperacillin-tazobactam. Secondary endpoints were predictors of this prescribing pattern and analysis of indications for vancomycin/piperacillin-tazobactam. Predictors were identified through a multivariate regression model utilizing backward elimination.

Results: Patients were 59.6% female, 61.6% non-Hispanic White, 44.5% without underlying chronic conditions, 14.4% admitted to the hospital, and 51.5% were 18-44 years old. Vancomycin/piperacillin-tazobactam was prescribed in 1.8% (95% CI 1.5-2.1%) of antibiotic-receiving visits. This equates to 350,000 visits per year across the US. For patients admitted to the hospital, the rate increased to 9.5% (8.1-11.2%). More than 25% of visits received these antibiotics without a documented infectious indication. Age >44 years, hypotension, diabetes, skin/soft tissue infection, abscess, sepsis, hospital admission, number of chronic conditions, and patients seen by consultant providers increased the likelihood of vancomycin/piperacillin-tazobactam prescribing. A diagnosis of urinary tract infection was associated with a reduction in vancomycin/piperacillin-tazobactam prescribing.

Conclusion: Vancomycin/piperacillin-tazobactam co-prescribing in the absence of appropriate indication is common and the prevalence is increasing. These data highlight the need for more stringent antimicrobial stewardship in the ED.

94. The Risk Of UTI & Genital Mycotic Infections In The Veteran Patient Population Receiving Empagliflozin.

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Introduction: Sodium-glucose co-transporter-2 inhibitor (SLGT2i) drug class was approved by the FDA in 2014 for treatment of T2DM. These drugs decrease blood sugar by inhibiting glucose reabsorption into the proximal tubular cells of the kidneys, causing mild dysuria. Genitourinary tract infections (GUI) both bacterial and mycotic have been reported in major clinic trials for SGLT2i's. Newer studies have shown no difference in the incidence of UTI between SGLT2i groups and placebo. However, the incidence of genital mycotic infections has been higher.

Research Question or Hypothesis: Can SGLT2i's increase the risk of genitourinary infections in our elderly patient population and if so, are their comorbidities or other factors increasing their risk?

Study Design: This study was a retrospective medication use evaluation focused on safety.

Methods: Veterans were included if they were prescribed empagliflozin from January 1st 2018 to October 30th 2021. Data was retrieved for 1 year prior and post empagliflozin initiation for suspected GUI. After receiving all of the compiled data, manual chart review was used to confirm the GUI.

Results: The primary endpoint of the study was % increase risk for having a GUI after starting empagliflozin and while receiving treatment. A McNemar's test showed veterans were at a 53.6% increased risk of developing a GUI after empagliflozin was initiated (CI 1.08-2.09) P-value <0.0001. Using a backwards stepwise conditional model, secondary endpoints that were statistically significant for an increased risk of GUI included: age, female gender, benign prostate hyperplasia, chronic kidney disease, and previous GUI. Also significant, was if the patient had a prescription for an antifungal, glucocorticoid, or immunosuppressant medication within 3 months of initiation of empagliflozin.

Conclusion: In conclusion, empagliflozin increased the relative risk of having a GUI in our veteran population by 53.6% (P-value <0.0001).

Nephrology

95. Antibiotics Dosing in 4-Hour Sustained Low-Efficiency Dialysis: A Retrospective Data Review.

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Introduction: Sustained Low-Efficiency Dialysis (SLED) is characterized by a slower blood flow rate than intermittent hemodialysis (IHD). SLED is usually done over 6-12 hours and a shorter duration of 4-hour might spare more time for procedures in critical care units (ICU). However, antibiotics dosing is not well established in 4-hour SLED, and clinicians might prescribe antibiotics using IHD dosing in view of the shorter duration.

Research Question or Hypothesis: Among recipients of 4-hour SLED, dose the use of SLED dosing provide favorable clinical outcomes in comparison to IHD dosing?

Study Design: Retrospective observational study

Methods: In this single-center study, we assessed the dosing practices and clinical outcomes of antibiotics among recipients of 4-hour SLED. In-hospital mortality and recovery from sepsis were compared between those who received SLED dosing versus IHD dosing, using Cox regression and Kaplan-Meier curves. P-value <0.05 was set to represent statistical significance.

Results: A total of 107 patients who underwent 4-hour SLED and received at least one broad spectrum antibiotic were identified between 1/06/2016 to 1/06/2020. Among them, 68% were male with a mean age of 68 ± 12 years. The majority of patients were from the Middle East (81%). Around 20% had positive urine cultures, 19% had positive blood cultures, and 10% had positive sputum cultures. The majority of 4-hour SLED recipients (84%) were prescribed antibiotics according to IHD dosing, while only 16% were prescribed SLED dosing regimens. The use of SLED-based recommended dosing in 4-hour SLED resulted in significantly higher sepsis recovery [76% vs. 42%, HR= 2.02, 95 CI (1.07-3.82), p=0.030]. Interestingly, the in-hospital mortality didn't defer between the two groups.

Conclusion: Our findings suggest that patients undergoing 4-hour SLED are more likely to get prescribed antibiotics using IHD-recommended dosing, which resulted in worse clinical outcomes. These findings would encourage using SLED-recommended dosing for 4-hour SLED and might serve as basis for future quality projects.

96. Oral Urea for the Management of Hyponatremia in Hospitalized Patients.

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Introduction: Urea is a medical food that became commercially available in the United States in 2016 as an alternative treatment for hyponatremia. Since urea was not evaluated in randomized controlled trials, evidence to support its use is lacking. Despite the paucity of available literature, many institutions have added this agent to formulary due to its low-cost burden.

Research Question or Hypothesis: Is oral urea a safe and effective therapy for the management of hyponatremia in hospitalized patients?

Study Design: Single-center, retrospective, observational study

Methods: Hospitalized adult patients with plasma sodium < 135 mEq/L who received at least one dose of urea between 9/1/2020 – 11/30/22 were included. Efficacy endpoints included the change in plasma sodium from baseline to urea discontinuation or discharge, the change in plasma sodium at 24, 48, 72, and 96 hours after urea initiation, and the proportion of patients who achieved plasma sodium ≥ 130 mEq/L or ≥ 135 mEq/L. Safety endpoints included the incidence of adverse events and patient-reported side effects. Descriptive statistics were used for analysis.

Results: Urea at a median dose of 30g/day (IQR 15-30) was used on 88 occasions in 74 patients. Mean plasma sodium increased from 124.6 mEq/L (SD 7.8) at baseline to 131 mEq/L (SD 5) at discontinuation or discharge. Fifty-six (63.6%) patients achieved a plasma sodium of ≥ 130 mEq/L, and 20 (22.7%) patients achieved a plasma sodium of ≥ 135 mEq/L. Eighteen (20.5%) patients experienced a side effect or adverse event; the most common were sodium overcorrection in eight (9.1%) patients and gastrointestinal upset in seven (8%) patients.

Conclusion: Urea raised plasma sodium levels at a rate that is similar to findings from previously published studies; however, we report a higher rate of plasma sodium overcorrection. While urea appears to be effective, its use may be limited by its safety profile.

97. Does Smartphone-based Kidney Health Testing Improve Screening Rates for Chronic Kidney Disease and the Patient Experience?

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Introduction: 1 in 3 American adults is at risk for chronic kidney disease (CKD), but many don't complete their annual urine test. With

85% of Americans having access to a smartphone, leveraging this technology can transform at-home digital health for providers, payers, and patients eliminating challenges of access, physiology and time. Minuteful Kidney kit, a smartphone-enabled at-home screening test was developed to increase early screening, make it simple, convenient, non-invasive, and private.

Research Question or Hypothesis: Does an at-home, smartphone-enabled kidney test improve screening rates for CKD and enhance patient experience among a diverse, at-risk population?

Study Design: An observational study of 4956 adults with a diagnosis of diabetes and/or hypertension, no diagnosis of CKD, and no albumin-to-creatinine ratio(ACR) test in the prior 12 months between 2021-2022 were studied.

Methods: Participants were from areas with high social determinants of health needs and categorized by payer type: commercial vs. government. They were sent kits, instructions on how to download the app on smartphones and conduct the test at home. Data on completed tests and experience (net promoter score) were electronically collected via app. ACR results were assessed as normal, abnormal and high abnormal. Descriptive statistics were estimated using Excel.

Results: Completion rate was 25% [24%(564/2358) and 26% (686/2598) for commercial and government populations respectively] with 3% testing as abnormal/high abnormal. Within the commercial population, 75%, 19%, and 6% tested normal, abnormal and high abnormal respectively. For the government population, 64%, 29%, and 7% tested normal, abnormal and high abnormal respectively.

85% of those who tested abnormal/high abnormal and 84% of all participants shared their results with their doctor at a follow-up appointment. Majority (92%) reported satisfaction and that they would recommend the test.

Conclusion: At-home testing kits are a convenient affordable way to reach untested diverse at-risk populations. They may improve early screening, patient engagement and ease of access to care for CKD.

Neurology

98. Gender differences among patients with epilepsy: A comparison of socio-demographic, clinical characteristics and treatment strategies in Ministry of Health tertiary care center.

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Introduction: The overall care of epilepsy patients' needs to consider gender factor, as biological differences and social function may result in gender-related impact of epilepsy. Previous studies mainly examine the differences in seizure characteristics between gender and its pharmacotherapeutic pathways. In this study, we aimed to analyze and compare the differences in the socio-demographic characteristics of male and female patients along with differences in disease profile and treatment strategies.

Research Question or Hypothesis: Is there any difference with regards to socio-demographic, clinical characteristics and antiseizure medication (ASM) selection between genders.

Study Design: This is a cross sectional study conducted at a tertiary hospital in the central region of Malaysia.

Methods: All prescriptions containing at least one ASM from 1 January 2019 to November 2022 were preliminary screened for eligibility. Each of the subjects' follow up card was retrospectively review and all relevant data was recorded. Descriptive analysis and logistic regression were applied for statistical analysis.

Results: Male patients accounted for 51.6% (n=205) of the 397 patients included for analysis. Both smokers and ever were alcohol drinkers were mainly male patients (97.5%, p<0.001 and 96.6%, p<0.001) respectively. Among those with structural-related epilepsy etiology, 67.5% were male (X^2=9.83 df=2 p=0.007). When adjusted for seizure types, female patients were 0.53 times less likely to be initiated with sodium valproate (VPA)-based ASM regimen (95% CI:0.34-0.82, p=0.005). Folate supplementation was prescribed almost twice more frequently in female than in male patients (OR:1.92, 95%CI:1.24-2.96, p=0.003) with higher proportion of the gender to be seen by neurologist for follow up (49%, X^2=7.25 df=1 p=0.007).

Conclusion: Significant differences between both genders were observed with regards to initiating ASM therapy, co-prescription with folate and the need for neurologist monitoring for follow up care. Suggested future work include analysis of gender related factors in various therapeutic outcomes.

99. Direct Oral Anticoagulants in Cerebral Venous Thromboembolism.

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Introduction: Cerebral venous thrombosis (CVT) is a rare form of stroke associated with thrombosis of the dural sinus and/or cerebral veins. Numerous randomized trials and guidelines support the use of direct oral anticoagulants (DOACs) over warfarin for the treatment of venous thromboembolism, though evidence for DOAC use in the treatment of CVT is limited. It is unclear whether a specific DOAC is preferred.

Research Question or Hypothesis: This study aims to compare efficacy (recanalization and recurrent thrombosis) and safety (bleeding) across different DOACs for the treatment of CVT.

Study Design: Institutional review board-approved retrospective cohort study

Methods: This study included adult patients with CVT identified by ICD-9/10 codes and/or CVT diagnosis within medical progress notes between May 2019 and September 2022. The primary outcome was

rate of partial or complete recanalization. Secondary outcomes included rate of recurrent VTE, extension of CVT, death, and major or clinically relevant non-major bleeding (defined by ISTH) within 180 days after DOAC initiation.

Results: In 31 patients (21 patients received apixaban, 7 received rivaroxaban, and 3 received dabigatran), the primary composite outcome occurred in 33%, 57%, and 100% for each group, respectively (p=0.02). One patient who received apixaban had extension of CVT on MRI, and one who received rivaroxaban had an increased midline shift on MRI, possibly secondary to bleed. No other bleeding events, recurrent VTE, or death was observed.

Conclusion: This study suggests a lower recanalization rate with apixaban compared to rivaroxaban and dabigatran when used for treatment of CVT. However, these findings must be validated in larger randomized clinical trials.

100. Drug Repurposing Using Metformin to Improve the Therapeutic Outcome in Multiple Sclerosis Patients Receiving Interferon Beta 1a.

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Introduction: Multiple sclerosis (MS) is a chronic auto-immunoinflammatory neurodegenerative disorder in which the immune system demyelinates the neurons. Moreover, oxidative stress is commonly implicated in the development of brain damage. Eventually, MS can cause permanent damage to nerve fibers. Animal studies proved the effective role of metformin in neuronal remyelination.

Research Question or Hypothesis: Will adding metformin to interferon beta 1a (IFNβ-1a) improve the outcome in MS patients?

Study Design: A prospective-open label randomized controlled trial.

Methods: Eighty MS patients were divided into two groups: the intervention group who received IFNβ-1a plus metformin and the control group who received IFNβ-1a alone. The primary endpoint was the change in interleukin 17 (IL17). The secondary endpoints included the change in interleukin 22 (IL22), malondialdehyde (MDA), degree of demyelination in magnetic resonance imaging (MRI), and expanded disability status scale (EDSS). The parameters were assessed after 6 months.

Results: At baseline, there were no statistically significant differences between the two groups (P > 0.05). After 6 months, the change in the median (interquartile range) of the results for both the intervention and control group were; IL17 (-1.39 (4.19) vs -0.93 (5.48), p= 0.48), IL22 (-0.14 (0.48) vs -0.09 (0.6), p= 0.53), and EDSS (0 vs 0, p=1), respectively. For MRI results; 21 patients non-progressed and 1 progressed in the intervention arm vs 12 patients non-progressed and 4 progressed in the control arm, p=0.14. The mean (standard deviation) change in MDA for the intervention and control group was -0.93 (2.2) vs -0.5 (2.53), p=0.038, respectively.

Conclusion: Adding metformin to IFNβ-1a has the potential to improve the outcome in MS patients. We recommend larger-scale studies to confirm or negate these findings.

101. A Retrospective Study Evaluating the Role of Lacosamide in Status Epilepticus in Adult and Pediatric Patients.

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Introduction: Lacosamide is approved for treatment of focal onset and primary generalized tonic-clonic seizures but is frequently used off-label as an alternative agent for status epilepticus. It's mechanism of action is unique when compared to other antiepileptics, in that it works by enhancing the slow inactivation of sodium channels, with no effects on fast inactivation of sodium channels. It is an attractive choice due to minimal adverse effects and availability in intravenous and oral formulations. Several studies have evaluated the use of lacosamide in status epilepticus, and although some provide promising results, most are small, and few include pediatric patients.

Research Question or Hypothesis: Is lacosamide safe and efficacious for the treatment of status epilepticus?

Study Design: Single center, retrospective chart review study.

Methods: Patients included were those admitted from January 2018 to December 2022 aged 1 month to 75 years old with an ICD-10 code G40.901, indicating status epilepticus, that received lacosamide. The primary endpoint was cessation of status epilepticus. Secondary endpoints included time until cessation, improvement in seizures, antiepileptic administered after lacosamide and adverse effects. Data was collected via an electronic system and manual chart review. Statistics were not performed.

Results: 62 patients were included in this study with 3 being pediatric patients. The mean age was 53.1 years and 59% were females. 21 (33.9%) patients had cessation of status epilepticus, 20 (32.2%) had improvement in status epilepticus, and 21 (33.9%) had no response after lacosamide administration. Average time to seizure cessation was 62.3 minutes after lacosamide administration. Barbiturates were one of the most common antiepileptics subsequently added. 7 patients experienced adverse effects.

Conclusion:

Lacosamide resulted in improvement or cessation of status epilepticus in a majority of patients with minimal adverse effects. Larger studies with statistics are warranted in order to determine its role in both adult and pediatric patients.

Oncology

102. Interprofessional Collaborative Approach to Prevention and Management of Chemotherapy Toxicities/Oncology Symptom Management.

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Introduction: Interprofessional collaboration in oncology is important. Incorporating learners from different disciplines to take care of oncology patients in an ambulatory setting is novel.

Research Question or Hypothesis: Learner perceived competency and confidence will improve after course curriculum delivery and interprofessional collaboration

Study Design: This was a prospective/retrospective, single center study conducted from August 2020-April 2021. Patients aged ≥18 years and older with breast cancer receiving active chemotherapy treatment were included. Medical and pharmacy student/resident learners were paired with patients during virtual encounters to provide chemotherapy education and assess and management chemotherapy related toxicity.

Methods: Evaluate pre and post learner perceived competency and confidence via TEAM Skills, IPEC Abbreviated Survey, Teach Back Conviction and Confidence Survey and clinical competency via clinical readiness survey. Evaluate post-intervention patient satisfaction via survey and describe learner identified problems and interventions made during study period.

Results: Nine groups conducted patient encounters with a median of four encounters per group. Seventy-nine problems were identified by learners, seventy-nine interventions were made during learner inclusion period. A total of forty-four problems improved by the end of the study. The overall score distribution for learner based pre and post surveys was significantly different after the completion of patient encounters in many components. Based on patient satisfaction surveys, 100% (n=9) patients were completely satisfied by learners' involvement in their care.

Conclusion: Involvement of learners in an interprofessional care team can help learners develop confidence and competence in patient care and improve patient satisfaction, despite COVID-19 impact on in person interaction. Based on problems identified and interventions made by learners, this study will help refine chemotherapy education and toxicity and supportive care management approaches at our institution and will be used to assess potential changes to interprofessional education in the pharmacy and medical curriculum.

103. Impact of an integrated health-system specialty pharmacy oral oncolytic program on patients enrolled in clinical trials.

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Introduction: Specialty medications present a significant financial burden to oncology patients. Despite American Society of Clinical Oncology best practice recommendations to address financial barriers in patients participating in clinical trials, patients at the University of Rochester (UR) Medical Center may be expected to supply medication through their insurance.

Research Question or Hypothesis: There may be significant costs that patients in clinical trials are expected to pay out of pocket for oral oncolytics.

Study Design: A single center, retrospective cohort study of patients prescribed commercially available oral oncolytic therapy enrolled in a clinical trial at UR Medicine Wilmot Cancer Institute between August 1, 2020 and April 30, 2022.

Methods: Patients were included if the clinical trial required them to supply oral oncolytic through a commercial source. Prescription dispense data and specialty pharmacy documentation within the medical record were collected to approximate financial assistance and specialty pharmacy services. Data was collected through October 31, 2022. Total assistance was described as related to social vulnerability index by zip code.

Results: Of the 43 included patients, 18 (41.9%) received a total of $37,019 in financial assistance, a median of $1296 per patient, which resulted in a median patient out-of- pocket reduction of $1,169 over the course of therapy. Source of assistance funding was foundation/grant (50.1%), manufacturer copay cards (25.1%), and social work funds (24.8%). Financial assistance and social vulnerability index were weakly negatively correlated ($r(40) = -0.27$, $p = 0.08$). There was a median of eight clinical pharmacy consults per patient.

Conclusion: Significant financial burden is placed on patients enrolled in clinical trials and supplying commercially available oral oncolytic therapy. The UR Specialty Pharmacy team plays an integral role in coordinating financial assistance, ultimately decreasing out of pocket patient costs.

104. The Incidence of Thrombotic Events in Hospitalized Cancer Patients Despite the Application of Thromboprophylaxis in Qatar. A Nationwide Retrospective Cohort Study.

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Introduction: Cancer patients have high risk in developing Venous Thromboembolism (VTE), which is considered second leading cause of death in those patients.

Being in the hospital is a major risk factor for the development of VTE. Up to 60 % of VTE cases occur during or after hospitalization, making it a leading preventable cause of hospital death.

Research Question or Hypothesis: To identify the incidence of VTE on top of prophylaxis and the factors related to the increased risk.

Study Design: This is a retrospective cohort study. A real-world data review was performed.

Methods: All hospitalized adult cancer patients in Qatar were included. Data was reviewed to identify patients who developed any VTE incidence on top of prophylaxis, over the period of 1/1/2016 to 28/2/2018.

Demographics and risk factors for all hospitalized adult cancer patients who developed VTE were reviewed and analyzed.

Results: The retrospective data review yielded 36 patients who developed thrombotic events during hospitalization despite thromboprophylaxis. The mean age was 54 and majority of patients were of oncology specialty and male gender (78% and 56% respectively). Deep vein thrombosis (DVT) occurred in 26 (72%) patients. While, catheter-related DVT was reported in 20 (56%) patients, vs 16 (44%) patients (P-value 0.001). Thromboprophylaxis options varied. However, enoxaparin was the chosen prophylaxis in 23 (64%) patients. Among patients who developed VTE, 26 (72%) patients were actively receiving chemotherapy and 15 (42%) patients were obese.

Conclusion: Our cohort identified that patients actively on chemotherapy are at higher risk of developing VTE despite prophylaxis. Moreover, catheter related DVT events comprised three quarters of all DVT events. Hence, admitted patients on chemotherapy with an inserted catheter require additional attention. To improve diagnostic and preventative approaches of thrombotic events and help in identification of risk factors larger sample size is needed.

105. Evaluation of Methotrexate Dose Dispensing in Graft Versus Host Disease Prophylaxis in an Oncology Center in London, England.

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Introduction: Patient-specific prophylactic methotrexate bolus doses are dispensed for graft versus host disease (GvHD). Doses are currently dispensed as 2 or 3 split doses to allow for dose modification due to high bilirubin, low creatinine clearance, elevated liver function, or mucositis.

Research Question or Hypothesis: The objective was to evaluate required split doses compared to split doses dispensed for the purpose of process improvement.

Study Design: A retrospective review of methotrexate doses received by allogenic stem cell transplant (allo-SCT) recipients were reviewed between October 2021-2022.

Methods: Patient charts and dispensing records were evaluated to determine the methotrexate dose used and the necessity of a split dose. Patients were evaluated based on allo-SCT regimen received (myeloablative vs reduced-intensity), dose prescribed, body surface area, dose reduction evidence, and the pharmacy dispensed dose. Split doses dispensed were compared to split doses administered and the number of patients who received a dose reduction.

Results: Thirty-nine patients required methotrexate for GvHD prophylaxis. Of those patients, 38 (97.4%) received a reduced-intensity regimen and only one (2.6%) patient received a myeloablative regimen. There were 118 methotrexate doses dispensed. Fifty-two (44.1%) were prepared and dispensed as a split dose; 66 (55.9%) were dispensed as full dose. However, only two (1.7%) of the doses were administered as a split dose resulting in the use of only 3.8% of the split doses. Of the two split doses used, one was omitted due to elevated bilirubin, and one was reduced due to elevated liver function.

Conclusion: Doses of methotrexate indicated for GvHD prophylaxis following an allo-SCT should be dispensed as a full dose, unless otherwise informed, as split dosing is not utilized as often as it is dispensed. Dispensing full doses will increase the efficiency of the dose manufacturing, reduce supply expenses, and improve the process by creating a standard regimen.

106. Characteristics and Risk Factors of Infusion-Related Reactions to Rituximab in Patients with B-cell Non-Hodgkin's Lymphoma.

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Introduction: Rituximab is a standard component of treatment for B-cell malignancies. Although Infusion-related reactions (IRRs) are common adverse events associated with Rituximab, few real-world studies have evaluated the predictors of IRRs to Rituximab in patients with B-cell Non-Hodgkin's Lymphoma (B-NHL).

Research Question or Hypothesis: What are the characteristics and risk factors of IRRs to Rituximab in patients with B-NHL?

Study Design: Retrospective study at King Hussein Cancer Center.

Methods: Medical records of adult patients with B-NHL who received the first dose of Rituximab from August 2020 to August 2022 were reviewed. Patients' demographics, laboratory and disease-related data were collected. IRRs were defined as any signs experienced by patients during Rituximab infusion and graded according to the Common Terminology Criteria for Adverse Events version 5.0. Correlations between different variables and IRRs were assessed using Fisher's exact test and multivariate logistic regression analysis.

Results: During the study period, 334 patients were included, among them, 100 patients (30%) developed IRRs (median age 55 years; range 26-82), including 67% with aggressive lymphoma and 33 % with indolent lymphoma. Of the reported IRRs, 90% were grade II and 10%

were grade III reactions. IRRs resulted in Rituximab discontinuation in 2 % of the cases. After starting Rituximab, 38%, 47% and 15% of the reactions occurred within 60 minutes, between 60-120 minutes and after 120 minutes of starting the infusion, respectively. IRRs were significantly associated with indolent lymphoma (p=0.007), bone marrow involvement (p=0.013), splenomegaly (p=0.001), leukopenia (0.012), neutropenia (p=0.027) and thrombocytopenia (0.004). In multivariate analysis, splenomegaly [odds ratio (OR) 4.22, p=0.04] and indolent lymphoma [OR 4.27, p=0.039] were significantly correlated with IRRs.

Conclusion: The majority of IRRs were of moderate severity and rarely resulted in discontinuation of Rituximab. Patients with indolent lymphoma or splenomegaly have significant risk for IRRs and should be considered for modification of administration protocol.

107. The Effect of HER3 Mutations on Colorectal Cancer and Differential Sensitivity to Targeted Therapy.

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Introduction: Colorectal cancer is the fourth most frequently diagnosed cancer and the second leading cause of cancer deaths in the United States according to the National Comprehensive Cancer Network. There is a growing incidence among those younger than age 65; rates of advanced disease increased by about 3% annually in people younger than 50 according to the American Cancer Society. EGFR, HER2, HER3, and HER4 are all members of the human epidermal growth factor receptor (HER) family that act as transmembrane receptors that play a role in cell proliferation, differentiation, and survival. When these receptors are overexpressed or mutated in various types of cancers, including colon cancer, these can be important targets for cancer therapeutic agents.

Research Question or Hypothesis: Mutant HER3 impacts sensitivity to small molecule inhibitors in colorectal cancer.

Study Design: Cell-based MTT and Crystal Violet Quantitative Assays

Methods: Examining colorectal cancer cell lines with HER3 mutations: p.N26K mutation in DLD-1 and p.V104M mutation SNU-407 cell line sensitivity to a MET inhibitor foretinib and pan-HER inhibitors afatinib and sapitinib. MTT and crystal violet assays were used to help determine the sensitivity of colorectal cancer cell lines harboring hot spot mutant HER3 to small molecule inhibitors (i.e. Saptinib, Foretinib, Afatinib). The proliferation rate was compared between the cell lines to evaluate if HER3 mutational status affects the efficacy of small molecule inhibitors.

Results: Afatinib shows some efficacy in SNU-407 (V104M) and DLD-1 (N126K) when comparing the IC50 values from the MTT assay and percentage of proliferation rate from the crystal violet assay. Sapitinib was not shown to be efficacious in either SNU-407 (V104M) and DLD-1 (N126K) when compared to Afatinib in the MTT assays.

Conclusion: These results coupled with colorectal cancer having one of the highest frequencies of mutant HER3 shows that this target may be a promising strategy for overcoming resistance to EGFR-targeted therapies.

Other

108. Evaluation of author instructions for inclusive language guidance in highly cited medical journals.

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Introduction: Diversity, equity, and inclusion (DEI) are at the core of ACCP's culture, and language around DEI has been shown to affect patient outcomes. Inclusive language is an important piece of effective communication and is one way to demonstrate and foster a welcoming, respectful, and accessible environment. Non-inclusive terminology in research may represent implicit bias, which refers to the attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner. Implicit biases are not typically corrected through introspection; thus, a systematic approach is needed in scientific writing. The prevalence of DEI language guidance in leading medical journals is currently unknown.

Research Question or Hypothesis: Assess the prevalence and quality of inclusive language guidelines in author instructions in highly cited English language medical journals.

Study Design: Structured review of instructions for authors published in the top 100 Best Medicine Journals based on bibliometric scoring.

Methods: Accessed in January 2023, each of the top 100 journal's author instructions were reviewed for presence of any inclusive language guidelines for manuscript development. Guidelines that included specific examples of inclusive language were defined as strong. Author instructions were also reviewed for the sex and gender equality in research (SAGER) checklist.

Results: The 100 journals reviewed had an impact factor (IF) range of 3.0 – 202.7 with a median IF = 19.5 (IQR 11.95, 38.68). Inclusive language guidance was provided in 23% of medical journals reviewed. Of those, 20 (86.9%) provided strong guidance. Seven journals also recommended use of the SAGER checklist.

Conclusion: Significant gaps still exist in ensuring use of inclusive language in medical journals.

109. Analysis of Female Authorship in Critical Care Publishing.

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Introduction: According to the U.S. Bureau of Labor Statistics, women made up 77% of healthcare practitioners in 2021. However, publishing statistics do not reflect this.

Research Question or Hypothesis: To evaluate female representation as first and senior authorship in published critical care articles.

Study Design: A quantitative content analysis was conducted of the top 10 critical care journals by 2021 impact factor according to Scimago Institutions Rankings.

Methods: For every issue published for each journal, the Table of Contents was evaluated. The only articles excluded were corrections to existing articles, letters to the editor, meeting abstracts, or those not in English. The primary outcome was the prevalence of first and senior authorship in published articles. Other outcomes include funding, author credentials, and departmental listing were noted for these authors. Data was analyzed using descriptive statistics.

Results: 2784 articles were determined to be eligible publications. Most female publications were original research (63.3%). Other publications included editorials (15.5%), followed by review articles (8%), as the prominent publication types. Of the articles, 34% had female first authors and 20% had female senior authors, and 10% had both. Of the articles with female first or senior authors, 27% declared funding. The most common credentials of first authors were MD (65.4%) and PhD (19.7%).

Conclusion: This analysis determined 44% of articles in the Top 10 critical care journals were female first or senior authors. This indicates that the rate of female publishing is 33% lower than the rate of females employed in healthcare. Most articles published by women were original research. It is unclear why the amount of female authorship is disproportionally low. Additional evaluation is needed to determine the low rates and how to increase female authorship within medical literature.

110. The evaluation of iron homeostasis and the clinical outcomes of critically ill patients with COVID-19: A multicenter, cohort study.

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Introduction: Critically ill patients with COVID-19 often have cytokine storm, manifested with elevated levels of proinflammatory biomarkers and hyperferritinemia. It is well-established that systemic inflammation significantly limits the iron availability for erythropoiesis, which may disturb iron homeostasis and affect clinical outcomes.

Research Question or Hypothesis: Thus, this study aimed to evaluate the impact of iron hemostasis on the clinical outcomes of critically ill COVID-19 patients.

Study Design: A multicenter, retrospective cohort study

Methods: this study includes critically ill adult patients with COVID-19 admitted to the intensive care units (ICUs) from March 2020 to July 2021. Patients were categorized based on TSAT during their ICU stay (TSAT <20% versus ≥ 20%). The primary outcome was to compare the in-hospital mortality between the two groups. The secondary outcomes were the prevalence of iron deficiency anemia, MV duration, 30-day mortality, ICU/hospital LOS, and complications during ICU stay.

Results: After propensity score (PS) matching (1:1 ratio), 46 patients were included in the final analysis. Baseline characteristics were comparable between the two groups after PS matching. The in-hospital mortality was non-significantly lower for patients with a TSAT ≥20 (HR, 0.54; 95%CI, 0.19–1.57; $P = 0.26$). On the other hand, patients with TSAT ≥20 had a longer MV duration (beta coefficient 0.44; 95%CI, -0.22–1.10; $P = 0.19$); however, it did not reach statistical significance. Moreover, the ICU length of stay and hospital LOS were longer but not statistically significant in patients with a TSAT ≥20. Complications during the stay were comparable between the two groups.

Conclusion: Patients with TSAT ≥ 20 might be associated with lower in-hospital mortality and longer stay and MV duration; however, these findings did not reach statistically significant. Further prospective studies with larger sample sizes are needed to confirm our findings and assess iron correction's role in anemic patients and its impacts on clinical outcomes.

Pediatrics

111. IDENTIFYING DRUG-RELATED PROBLEMS IN THE NEONATAL INTENSIVE CARE UNIT AND EVALUATING CLINICAL PHARMACIST INTERVENTIONS.

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Introduction: Neonatal Intensive Care Unit (NICU) patients are at high risk for drug-related problems (DRPs). Although many studies have been reported by clinical pharmacists about identification of DRPs in adult intensive care units, there are not many studies conducted on DRPs in NICUs in Turkey.

Research Question or Hypothesis: To evaluate the percentage of potential and/or manifest DRPs and the acceptance rate of intervention proposals.

Study Design: Prospective and observational study

Methods: Study was conducted during a four-month period at a university hospital's NICU. During this time period the first consecutive 100 patients admitted to the NICU and stayed for at least 24 hours and received at least 1 drug were included in the study. Presence of any potential and/or manifest DRPs in their treatment protocol was

prospectively evaluated according to the Classification Scheme of the Pharmaceutical Care Network Europe (PCNE) v.9.1.

Results: The median (interquartile range [IQR]) duration of hospital stay, birth weight, total number of drugs used and total number of DRPs of the 100 patients were calculated as 8 (6-11.75) days, 3237.5 (2815-3495) g, 4 (3-5.75) and 0.5 (0-1), respectively. A total of 97 DRPs were identified. The most common problem was 'effect of drug treatment not optimal (44.3 %)' and the most common cause of DRPs was 'dose selection (34%)'. The most common drug-related problems about dose selection were under the heading of 'drug dose too low (19.6%)'. A total of 86 intervention proposals were made for 97 DRPs; 76.7% of them were at the drug level and 23.3% were at the other parts. Of all clinical pharmacist's intervention proposals 98.8% were accepted and fully implemented and 87.6% of the DRPs were completely resolved.

Conclusion: Clinical pharmacists play an important role in the determination and resolution of DRPs in patients admitted to the NICUs.

112. Impact of a Pediatric Antimicrobial Stewardship Program on Duration of Therapy of Antibiotics in Neonatal Culture Negative Early Onset Sepsis.

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Introduction: The treatment duration of neonatal culture negative early onset sepsis (CN-EOS) remains unclear. The purpose of this study was to evaluate the impact of a pediatric antimicrobial stewardship (PAMS) program on the duration of therapy of antibiotics in an acute neonatal population.

Research Question or Hypothesis: What is the impact of a PAMS program on durations of antibiotic therapy in neonatal CN-EOS?

Study Design: Retrospective chart review utilizing an electronic medical record including newborns born between January 1, 2018 – June 30, 2018, and January 1, 2022 – June 30, 2022.

Methods: The PAMS program is a service that began in 2020 in the neonatal intensive care unit (NICU) at MetroHealth. The primary endpoint was to compare the average duration of therapy of antibiotics in CN-EOS prior to versus after the implementation of a PAMS program. Secondary endpoints included a comparison of maternal and neonatal baseline and laboratory characteristics.

Results: A total of 131 infants met inclusion criteria. The mean gestational age in the 2018 and 2022 cohorts was 33.0 ± 5.65 and 34.2 ± 4.90 weeks, respectively. While the mean birthweights were 2150.4g ± 1120.96 and 2499.2g ± 1072.0 in 2018 and 2022 respectively at baseline. Demographic characteristics were similar between groups. There was a statistically significant difference between antibiotic duration of therapy in the control and intervention groups, 9.0 ± 4.75 days versus 7.5 ± 2.12 days, respectively (p=0.013). A multivariable linear regression model showed a significant correlation between gestational age (r=0.395, p<0.001), birthweight (r=0.343, p<0.001), and lowest glucose (r=0.265, p=0.013) as predictors of increased duration of antibiotic therapy for CN-EOS in the 2018 epoch. Of the patients who were initiated on antibiotics at birth, there was a 52.8% reduction in the number of patients who continued antibiotics for CN-EOS post intervention.

Conclusion: A PAMS program led to significantly fewer antibiotic treatment days in neonatal CN-EOS.

113. Efficacy and safety of probiotics and synbiotics for functional constipation in children: A systematic review and meta-analysis of randomized clinical trials.

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Introduction: Functional constipation (FC) is common among children. Probiotics and synbiotics have shown promising results for managing FC.

Research Question or Hypothesis: What is the efficacy and safety of probiotics and synbiotics for the treatment of childhood FC?

Study Design: Systematic review and meta-analysis (SRMA)

Methods: PubMed, Embase, and Cochrane Library were searched up to November 2022. Randomized controlled trials involving children diagnosed with FC with Rome III/IV criteria were included. Treatment success, defecation frequency, stool consistency, painful defecation, fecal incontinence, and adverse events were assessed as outcomes. Odds ratios (ORs) or standard mean difference (SMD) with 95% confidence intervals (CIs) were calculated for dichotomous or continuous variables separately. Heterogeneity was evaluated through the I^2 test. A fixed-effects model was performed unless I^2 was >50%. Cochrane risk-of-bias tool assessed the risk of bias. This SRMA was reported in line with PRISMA. The PROSPERO registration number was CRD42022376671.

Results: Sixteen RCTs with 1504 patients were included. Most studies had a high risk of bias. Compared to placebo, probiotics did not significantly improve treatment success (OR 1.54, 95%CI 0.90-2.61, I^2=0%), fecal incontinence (OR 0.53, 95%CI 0.29-0.96, I^2=0%,), painful defecation (OR 0.91, 95%CI 0.29-2.89, I^2=77%), and abdominal pain (OR, 1.05, 95%CI 0.57-1.92, I^2=0%). However, it significantly increased

defecation frequency versus placebo (SMD 0.40, 95%CI 0.10-0.70, I^2=0%). Probiotics, as add-on therapy, failed to yield a significant difference in treatment success (OR 0.82, 95%CI 0.15-4.48, I^2=52%), defecation frequency (SMD 0.13, 95%CI -0.13-0.39, I^2=0%), consistency (SMD -0.01, 95%CI -0.40-0.38, I^2=1%,), fecal incontinence (OR 0.95, 95%CI 0.48-1.90, I^2=0%), and abdominal pain (OR, 0.60, 95%CI 0.24-1.53, I^2=0%) versus laxatives monotherapy. Synbiotics plus laxatives showed no significant effect on defecation frequency (SMD -0.57; 95%CI -1.29-0.14, I^2=74%) and painful defecation (OR, 3.39; 95%CI 0.74-15.55, I^2=0%) versus laxatives alone.

Conclusion: Current evidence did not support using probiotics or synbiotics as monotherapy or add-on therapy to laxatives for managing childhood functional constipation.

Peri-Operative Care

114. Effect of pharmacoprophylaxis on pain and postoperative ileus rates, length of stay, and readmission for elective colorectal surgeries: A multisite retrospective cohort study within an enhanced recovery framework.

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Introduction: Enhanced Recovery After Surgery (ERAS) principles have demonstrated evidence-based improvement in patient outcomes worldwide; however, pharmacoprophylaxis for postoperative complications (POCs) is uncertain.

Research Question or Hypothesis: In adults undergoing elective colorectal surgery (ECRS), what are the rates of pain and postoperative ileus (POI), and what medications are associated with improved postoperative outcomes?

Study Design: multicenter randomized retrospective cohort

Methods: Using REDCap®, pharmacoprophylaxis data for pain and POI were obtained from medical records of 476 randomly selected adults undergoing ECRS during 2021 at 10 US medical centers. The primary outcome measures were pain and POI utilizing the Clavien-Dindo scale. Secondary outcomes included length of stay (LOS) and readmission rates at 7- and 30 days. Descriptive and univariate analysis were conducted to determine medication regimens associated with reductions in endpoints.

Results: Pain and POI rates were 48.5% and 11.8%, respectively. Median LOS was 4 days (IQR: 3 – 6.25 days) with an average of 5.6±4.9 days. Seven- and 30-day readmission rates were 6% (n=27) and 7.8% (n=37), respectively. Median postoperative oral morphine milligram equivalence was 67.5 (IQR: 22.5 – 180.75). The most frequently used non-opioid analgesic adjuncts were acetaminophen (n=446; 93.7%), ketorolac IV (n=143; 30.0%), and gabapentin (n=143; 30.0%). Transversus abdominis plane (TAP) block with long-acting local anesthetics, alvimopan, ketorolac IV, and pregabalin were associated with a lower rate (p<0.001). The most frequently used agents with a potentially positive impact on POI were propofol (n=436; 91.6%), gabapentinoids (n=290; 60.9%), and alvimopan (n=227; 47.7%). Alvimopan was associated with lower POI rate (p<0.001). Acetaminophen, alvimopan, and lidocaine patches were associated with shorter LOS (p<0.001), and no agents were associated with lower readmission.

Conclusion: Significant differences in pharmacoprophylaxis for pain and POI were identified. For ECRS, alvimopan may reduce POI and shorter LOS. TAP block, ketorolac IV, and pregabalin use may lead to reduced pain rate. Acetaminophen and lidocaine patches may shorten LOS.

115. Effect of pharmacoprophylaxis on surgical site infection rate and length of stay for colorectal surgeries: A multi-site retrospective cohort study within an enhanced recovery after surgery framework.

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Introduction: Enhanced Recovery After Surgery (ERAS) principles have demonstrated evidence-based improvement in patient outcomes worldwide, however pharmacoprophylaxis for postoperative complications (POCs) is uncertain.

Research Question or Hypothesis: In adult elective colorectal surgery (ECRS), what is the rate of surgical site infection (SSI) and what medications are associated with improved postoperative outcomes?

Study Design: multicenter randomized retrospective cohort

Methods: Using REDCap®, pharmacoprophylaxis regimen data to prevent SSI were abstracted from medical records of 476 randomly selected adults undergoing ECRS during 2021 at 10 US medical centers. The primary outcome measure was the rate of SSI. Secondary outcomes included length of stay (LOS) and readmission rates at seven- and 30-days. Descriptive and univariate analysis were conducted to determine medication regimens associated with reductions in endpoints.

Results: In-hospital SSI rate was 3.4% (16/464) and post-discharge infection rate was 8.2% (38/464). Median LOS was 4 days (IQR: 3–6.25 days) with an average of 5.6±4.9 days. The most frequently used single-dose IV antibiotics were combination cefazolin/metronidazole (C/M) 2 g/500 mg (n=158), ertapenem 1 g (n=80), and cefoxitin 2 g (n=76). C/M and ertapenem were associated with the shortest average LOS (5 days; $p<0.05$). Cefotetan 2 g (n=52) and ertapenem were associated with lower in-hospital SSI rates (0%, $p<0.05$). CM and cefoxitin alone or combined with ampicillin were associated with lower post-discharge infection rates ($p<0.05$). Cefoxitin and piperacillin/tazobactam were associated with longer LOS ($p<0.01$). Antibiotics were continued postoperatively in 27.2% of cases. There was a significant difference in SSI rate based on procedure performed (ileocolectomy 9.4%, small bowel resection 4.2%, colectomy 1.7%; p=0.00182) with no differences in seven- or 30-day readmission. Preadmission oral antibiotics had no impact on SSI or LOS.

Conclusion: Significant differences in pharmacoprophylaxis for SSI and LOS were identified. In adult ECRS, cefotetan or ertapenem may be better regimens for preventing in-hospital SSI, while ertapenem or C/M may lead to shorter LOS.

116. Effect of pharmacoprophylaxis on postoperative nausea and vomiting rate and length of stay for elective colorectal surgeries: A multi-site retrospective cohort study within an enhanced recovery framework.

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Introduction: Enhanced Recovery After Surgery (ERAS) principles have demonstrated evidence-based improvement in patient outcomes worldwide; however, pharmacoprophylaxis for postoperative complications (POCs) is uncertain.

Research Question or Hypothesis: In adults undergoing elective colorectal surgery (CRS), what are the rates of postoperative and post-discharge nausea and vomiting (PONV/PDNV). What medications are associated with improved postoperative outcomes?

Study Design: multicenter randomized retrospective cohort

Methods: Using REDCap®, pharmacoprophylaxis regimen data were abstracted from medical records of 476 randomly selected adults undergoing elective CRS during 2021 at 10 U.S. medical centers. Descriptive and univariate analysis were conducted to determine medication regimens associated with reductions in endpoints.

Results: PONV and PDNV rates were 47.9% and 5.9%, respectively. Median LOS was 4 days (IQR: 3–6.25 days) with an average of 5.6 ±4.9 days. Only 40.3% used any preoperative PONV risk stratification, 75.8% used PRN regimens, and 15.1% gave greater than seven PRN doses postoperatively. The most frequently used postoperative PRN rescue antiemetics were ondansetron (72.1%), promethazine (24.2%), and prochlorperazine (16.2%). While oral aprepitant was given rarely

(1%), the most frequently administered pre-induction agents were dexamethasone (39.1%), ondansetron (17.6%), and scopolamine patch (13.4%), which was associated with lower PONV (p<0.0001). Use of spinal opioids and IV lidocaine were also associated with lower PONV (p<0.05). Of those with PONV, 58.7% experienced it more than 24h post-PACU, and about 30% experienced it throughout. IV saline and ondansetron were associated with lower PDNV (p<0.05). Higher post-operative incremental morphine milligram equivalent doses increased the likelihood of PONV by 23% (p<0.0001). Promethazine was associated with a higher 7-day readmission rate (p<0.01).

Conclusion: Significant differences in PONV/PDNV rates were identified between anesthetic and antiemetic regimes. While PONV risk assessment was performed, most centers used a PRN rescue strategy instead of scheduled antiemetic administration. Preoperative scopolamine patch may lower PONV and shorter LOS. PONV was common and represents an opportunity to improve pharmacotherapy in ECRS.

117. Effect of pharmacoprophylaxis on venous thromboembolism rate and length of stay for elective colorectal surgeries: A multisite retrospective cohort study within an enhanced recovery framework.

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Introduction: Enhanced Recovery After Surgery principles have demonstrated evidence-based improvement in patient outcomes, however pharmacoprophylaxis efficacy for postoperative complications (POCs) is uncertain.

Research Question or Hypothesis: What is the rate of venous thromboembolism (VTE) in adults undergoing elective colorectal surgery (ECRS)? What medications are associated with improved postoperative outcomes?

Study Design: multicenter randomized retrospective cohort

Methods: Using REDCap®, VTE pharmacoprophylaxis data were abstracted from 476 randomly selected adults undergoing ECRS during 2021 at 10 US medical centers. The primary outcome was the rate of VTE. Secondary outcomes included hospital length of stay (LOS) and readmission rates at seven and 30 days. Descriptive and univariate analyses were conducted to determine medication regimens associated with reductions in endpoints.

Results: VTE occurred in seven (1.5%) patients. Median LOS was 4 days (IQR: 3–6.25 days). Readmission occurred in 27 (5.7%) and 37 (7.8%) patients by seven and 30 days, respectively. Enoxaparin 40 mg subcutaneously (SC) daily was the most common inpatient regimen (n=262; 55%) and was associated with lower in-hospital VTE incidence (OR: 11.3; 95% CI: 1.36-95.25; p=0.025). All VTE events occurred when unfractionated heparin (UFH) 5,000 units SC q8h (UFH) was ordered (n=7; 3.8%; p=0.004). There was no difference between enoxaparin and UFH regimens for in-hospital bleeding (p=0.19), seven-day readmission (p=0.83), and 30-day readmission (p=0.61). Average LOS for enoxaparin (5.1 days) and UFH (5.9 days) alone was significantly shorter than for sequential UFH (q8h or q12h) and enoxaparin (daily or q12h (9.7 days) (p=0.004). Discharge pharmacoprophylaxis was prescribed in 26.9% (n=128) patients, and enoxaparin 40 mg SC daily (post-discharge duration=15-22 days) was the most common regimen (n=83; 64.8%) followed by apixaban 2.5 mg PO q12h (post-discharge duration=22-28 days; n=22; 17.2%).

Conclusion: VTE rate was low. Significant differences in pharmacoprophylaxis were identified for VTE and LOS. Inpatient enoxaparin compared to UFH may reduce VTE rate and a similar LOS in adults undergoing ECRS.

118. Assessing the clinical characteristics of elective colorectal surgery patients receiving sequential oral and intravenous antibiotic prophylaxis versus intravenous-only prophylaxis for surgical site infection.

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Introduction: Administering prophylactic intravenous antibiotics (IVA) within 2 hours of the incision decreases the risk of postoperative surgical site infection (SSI) in elective colorectal surgeries (ECRS). However, the value of administering sequential oral (OA) and intravenous antibiotics to prevent SSI in colorectal surgeries is controversial.

Research Question or Hypothesis: What are the factors associated with the administration of sequential OA and IVA versus IVA-only prophylaxis for SSI prevention in adult ECRS?

Study Design: multicenter randomized retrospective cohort

Methods: Using REDCap®, pharmacoprophylaxis regimen data to prevent SSI were abstracted from medical records of 476 randomly selected adults undergoing ECRS during 2021 at 10 US medical centers. The primary outcome measure was the rate of SSI. Secondary outcomes included length of stay (LOS) and readmission rates at 7- and 30 days. Descriptive and univariate analysis were conducted to determine medication regimens associated with reductions in endpoints.

Results: 464 participants included in the analysis (52% female, 82.7% Caucasian) received antibiotic prophylaxis (97.5%) and underwent ECRS. Most surgeries were performed in the colon (64.5%), and manual surgical techniques were the most common (79.9%). Approximately 57% of the subjects received both IVA and OA (primarily a preadmission 3-dose oral metronidazole and neomycin combination). There was a significant association between race, surgical technique, and receipt of OA and IVA or only IVA. More Caucasians than blacks/African Americans (59% vs. 43%) received OA/IVA (p=0.034). Patients with robotic surgeries were 1.91 (CI: 1.34-3.23; p=0.0023) times more likely to receive both IVA and OA to prevent SSI compared to those with manual procedures. No significant differences in SSI, LOS, and readmission rates at 7- and 30 days were found.

Conclusion: Significant variation exists in antibiotic prophylaxis regimens to prevent SSI in ECRS patients. The type of surgical technique (robotic vs. manual) and patients' race are significant determinants of the choice of antibiotic prophylaxis in ECRS patients.

Pharmacoeconomics/Outcomes

119. A QUANTITATIVE APPROACH INVESTIGATING HOW THE UNIQUE AND DIRECT ROLE OF PHARMACIST INTERVENTION CAN IMPACT MERIT-BASED INCENTIVE PAYMENT SYSTEM/ MEDICARE ACCESS and CHIP REAUTHORIZATION ACT IN PRIMARY CARE CLINICS.

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Introduction: Medicare Access & CHIP Reauthorization Act of 2015 (MACRA) provides a platform for clinician reimbursements by utilizing quality measures (eCQMS) of the Merit-Based Incentive Payment System (MIPS). MIPS is based on a composite performance score of 100-points which determines reimbursements. Providers need to report minimum six eCQMs; to include outcome or high priority measure(s). Pharmacist-collaborations benefit providers and patients by working on these outcome/high priority eCQMs; consequently, reducing clinical burden, improving health outcomes, and increasing reimbursement.

Research Question or Hypothesis: Investigate impact of pharmacist-intervention on health outcomes in clinics, managing chronic conditions (hypertension, diabetes), reducing use of high-risk medications (DURs). This is done over 12-months by impacting the score of four high-priority CMS quality metrics: CMS22v10, CMS165v10, CMS122v10, CMS156v10, and investigating the effect of MIPS and reimbursements.

Study Design: A retrospective cohort study was conducted within two Virginia-based multidisciplinary primary care clinics using EHR data. Patients ranged from 65-100 years old, on Medicare and diagnosed with hypertension and/or diabetes.

Methods: Study composed of 167 randomly chosen patients. 82 patients received pharmacist-intervention; 85 patients received other healthcare professional interventions. Patients were followed-up until they achieved blood pressure and A1C control per CMS guidelines which impacted MIPS. Patients' medication profiles were also screened for high-risk medications and intervened accordingly.

Data Analysis:

Measure	Statistical analysis
HTN/diabetes	Chi Square
DUR	Fisher exact*
Quality Metrics/MIPS Correlation	Spearman Rank Correlation

* https://www.socscistatistics.com/tests/fisher/default2.aspx

Results: 76% of patients in the pharmacist-intervention group and 53% of the non-pharmacist-intervention group achieved hypertension control (P = 0.00442). 89% of patients in the pharmacist-intervention group and 67% of the non-pharmacist-intervention group achieved control (P = 0.0049). Pharmacist-intervention resulted in a 35 MIPS point average increase which increased MIPS performance and a +1 Spearman's rank correlation with each quality measure.

Conclusion: Pharmacist-intervention on these four high-priority eCQMs help improve patients' outcomes and provide bonus points which increases MIPS score and office reimbursements.

120. Assessing the value of pemigatinib versus gemcitabine/cisplatin therapy in patients with cholangiocarcinoma: A cost-effectiveness analysis.

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Introduction: Biliary tract cancers are characterized by aggressive and chemo resistant malignancies with poor long-term survival. The aim of this study is to the evaluate the value of pemigatinib compared to gemcitabine/cisplatin as first-line therapy in patients with cholangiocarcinoma (CCA).

Research Question or Hypothesis: Pemigatinib is cost-effective in the treatment of patients with cholangiocarcinoma.

Study Design: A Markov decision cost-effectiveness model was used.

Methods: We developed a 40-cycle Markov decision model using a hypothetical cohort of patients with cholangiocarcinoma to compare pemigatinib versus the combination of gemcitabine/cisplatin. We utilized Progression Free Survival (PFS) and Overall Survival (OS) data from recently published studies related to the treatment of CCA. The mean total cost of each therapy was calculated considering direct costs of a treatment cycle and average costs associated with the treatment of grade 3/4 adverse events reported with either therapy. The incremental cost-effectiveness ratio (ICER) was computed and compared to a willingness-to-pay (WTP) threshold.

Results: Following completion of 40 cycles using simulated cohorts, total costs for the cohort using pemigatinib were $298,564 with a Quality-Adjusted Life Year (QALY) of 8.12, and total cost for the cohort using the gemcitabine/cisplatin combination were $54,066 with a QALY of 6.27. The calculated ICER was $132,247 per QALY. Considering a WTP threshold from a U.S. perspective (intermediate value: ICER US$50,000–150,000/QALY), the utilization of this new technology is considered somewhat cost-effective.

Conclusion: Pemigatinib has a higher cost but is also more effective than gemcitabine/cisplatin in terms of QALY. Pemigatinib appears to have intermediate value for the treatment of patients with CCA.

Pharmacoepidemiology

121. Evaluating the appropriateness and the factors associated with SGLT2is prescribing in Qatar.

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Introduction: Sodium glucose co-transporter 2 inhibitors (SGLT2is) are the most recently approved class of antidiabetic drugs (ADDs). This study aims to assess the appropriateness of prescribing SGLT2is according to the American and Canadian labeling standards, and to investigate the factors associated with SGLT2is prescribing compared to other oral ADDs in Qatar.

Research Question or Hypothesis: Are SGLT2is appropriately prescribed, and what are the factors associated with their prescribing?

Study Design: Descriptive, retrospective cross-sectional design.

Methods: 650 patients newly initiated on SGLT2is (n=400) and/or any oral ADDs (n=250) during 2020 were included. Data including demographics, clinical characteristics, comorbidities, medications, and SGLT2is' (dapagliflozin and empagliflozin) indication and dose were extracted from Hamad Medical Corporation's electronic medical record system (Cerner©). Multivariable logistic regression was conducted to investigate associations with prescribing SGLT2is.

Results: SGLT2is were prescribed for appropriate indication in 400 (100%) patients, while inappropriate dosing was found in 13 (3%) patients. Males were more likely to start an SGLT2i compared to females (odds ratio [OR], 1.69; 95% confidence interval [CI], 1.02–2.82). Patients with a baseline glycated hemoglobin ($HbA1_c$) >7% and atherosclerotic cardiovascular disease (ASCVD) were more likely to be prescribed SGLT2is (OR, 3.22; 95% CI, 1.84–5.64) and (OR, 2.18; 95% CI, 1.05–4.52), respectively. Patients on metformin (OR, 7.56; 95% CI, 4.46–12.80), sulfonylureas (SUs) (OR, 2.30; 95% CI, 1.16–4.56), and dipeptidyl Peptidase 4 inhibitors (DPP4is) (OR, 3.43; 95% CI, 2.00–5.87) were more likely to start an SGLT2i. Patients with chronic kidney disease (CKD) were less likely to be prescribed SGLT2is (OR, 0.36; 95% CI, 0.15–0.87).

Conclusion: SGLT2is were very likely to be prescribed at an appropriate dose and indication. Males with baseline $HbA1_c$>7% and ASCVD, were most likely to start an SGLT2i, while those with CKD were less likely to be prescribed this class. SGLT2is were likely to be added to metformin, SUs, or DPP4is.

Pharmacokinetics/Pharmacodynamics/Drug Metabolism/Drug Delivery

122. Agreement between one- and two-concentration estimates when utilizing Bayesian modeling to dose vancomycin in patients with obesity.

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Introduction: Bayesian modeling can be utilized to provide 24-hour area under the curve (AUC24) estimations using one or two vancomycin concentrations. Utilizing one concentration could alleviate cost and logistical concerns. However, no studies have assessed the agreement between one- and two-concentration AUC24 estimates in patients with obesity.

Research Question or Hypothesis: What is the agreement between one and two-concentration AUC24 estimates in patients with obesity receiving vancomycin dosed by Bayesian modeling?

Study Design: This retrospective cohort study included patients with obesity who had two vancomycin concentrations within the same dosing interval. Patients were excluded due to vancomycin duration less than 48 hours or renal dysfunction. The primary outcome was

AUC24 agreement with one- versus two-concentrations. Secondary outcomes included percentage of therapeutic AUC24 and time to target attainment.

Methods: First, the two-concentration AUC24 estimate was recorded. Subsequently, the first concentration was hidden from the dosing software to record the one-concentration AUC24 estimate. Agreement between AUC24 estimates was assessed by Bland Altman plot with 95% limits of agreement, and bias was assessed via linear regression. Statistical analyses were performed using SPSS (version 20.0).

Results: A total of 31 patients were included. The mean difference in AUC24 between one versus two-concentrations was 11.4 mg*h/L (95% LOA -72 to 95 mg*h/L). Linear regression indicated the presence of proportional bias at higher AUC24 values (β=0.16; P=0.015). There was no difference in the percentage of therapeutic AUC24. Time to target attainment was reduced with two concentrations (40.1 hours versus 46.8 hours, P=0.037).

Conclusion: This study demonstrated overall agreement between AUC24 estimates when utilizing one versus two vancomycin concentration in patients with obesity, though proportional bias was detected at higher AUC24. Future studies with larger sample sizes are needed to confirm these results.

123. Post-Discontinuation Antibiotic Exposure in Neonatal Late-Onset Sepsis.

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Introduction: Infants are at risk for late-onset sepsis (LOS), most notably bacteremia. Antibiotic duration varies when cultures are negative.

Research Question or Hypothesis: To minimize unnecessary exposure, we sought to determine how long antibiotic exposures were therapeutic after the last dose.

Study Design: We performed a pharmacokinetic-pharmacodynamic simulation study using data from infants within the Pediatrix Medical Group NICUs.

Methods: From the Pediatrix Medical Group Clinical Data Warehouse, we performed a retrospective cohort study of simulated antibiotic exposures using published population PK models within drug-specific cohorts of preterm and term infants, postnatal age (PNA) 7 to 60 days, exposed to cefepime, piperacillin-tazobactam, or tobramycin in the neonatal intensive care unit. Monte Carlo simulations (NONMEM 7.3) were used to predict steady-state exposures after a 72-hour antibiotic course per Neofax® dosing. Exposure was assessed relative to drug-specific minimum inhibitory concentration (MIC) targets between 1 and 16 mcg/mL for Pseudomonas and Enterobacteriaceae species. Post-discontinuation antibiotic exposure (PDAE) was defined as time from the last dose to when the antibiotic concentration decreased below a specific MIC.

Results: The piperacillin-tazobactam, cefepime, and tobramycin cohorts included infants with median gestation age (GA) 29, 32, and 33 weeks and PNA of 17, 19, and 16 days, respectively. The mean PDAE was 19 to 68 hours, depending on specific antibiotic/MIC combination. PDAE was longer for infants < 28 days old, preterm (vs term) infants, and organisms with lower MIC. Cefepime exhibited the longest mean PDAE 68 hours, well beyond the 12-hour dosing interval. Tobramycin had a short mean PDAE 19 hours, less than the 24-hour dosing interval. Table 2 provides the PDAE for drug/organism combinations.

Conclusion: PDAE is an important consideration for antibiotic stewardship among hospitalized infants, particularly premature infants and those within first month of life.

Psychiatry

124. A Comparison of Prescription Stimulant Misusers versus Non-Stimulant Users among Adult Video Gamers.

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Introduction: The Video Gamer 500 confirmed adult video gamers misuse prescription stimulants for performance enhancement. Stimulant misusers were defined as gamers without a legal stimulant prescription or who used larger doses of their prescription than originally prescribed. Little is known about the impact of prescription stimulant misuse on adult video gamers.

Research Question or Hypothesis: The objective of this study was to compare and contrast video gamers who misuse prescription stimulants as a performance enhancing drug (PED) versus gamers who do not.

Study Design: Internet-based survey

Methods: Between May and June 2019, adult gamers were recruited from 16 video game-based Internet discussion boards or social forums to the complete The Video Gamer 500. The 40-item survey assessed demographics, video gaming patterns, prescription stimulant use patterns, other non-prescription stimulant PED use, illicit drugs, excessive alcohol consumption, psychiatric disorders, and Internet Gaming Disorder (IGD).

Results: Of the 526 participants, 52 legitimate stimulant users were excluded, leaving a final cohort of 26 stimulant misusers and 448 non-stimulant users. More stimulant misusers utilized non-prescription stimulant PEDs (in particular caffeine pills and caffeinated/energy drinks), illicit drugs (88.5% vs. 38.0%, p<0.001), took part in binge drinking (46.2% vs. 12.3%, p<0.001) and heavy drinking (42.3% vs. 10.5%, p<0.001), and had a diagnosis of attention-deficit hyperactivity disorder (42.3% vs. 8.5%, p<0.001) or major depressive disorder (26.9% vs. 11.2%, p=0.026) in the past 12 months than non-stimulant users.

Conclusion: Adult gamers who misuse prescription stimulants to enhance gaming performance reported more non-prescription PED and illicit drug use, excessive alcohol consumption, and psychiatric diagnoses compared to non-stimulant users.

Pulmonary

125. Assessment of COPD medication regimen complexity in ambulatory patients to identify interventions to improve adherence.

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Introduction: Non-adherence is common and linked to poor COPD outcomes. Medication regimen complexity index (MRCI) affects other chronic diseases outcomes. Little is known about implications of MRCI in COPD.

Research Question or Hypothesis: Secondary analysis was done to calculate MRCI scores to assess relationship to symptoms, disease severity, and health literacy (HL) to identify potential interventions optimizing therapy and adherence.

Study Design: Secondary analysis conducted of prior cross-sectional, non-randomized survey data.

Methods: Participants completed a survey of demographics, exacerbations, symptoms (COPD Assessment Test (CAT)), and self-reported COPD regimens. COPD severity was classified into GOLD ABCD categories using exacerbation history and CAT. CAT scores were categorized low (<10), high (>10) and very high (>20). A 1-year proportion of days covered (PDC) was calculated. MRCI calculator used to score regimens (primary endpoint). MRCIs were categorized as low (≤4), medium (5-8) and high (> 8) and inhaled device polypharmacy (IDP) as ≥3 devices using published cut points. Risk for low HL was assessed using Single Item Literacy Screener. Descriptive and Chi-squared statistics were used.

Results: Participants' (N=709) PDC for 1 maintenance medicine averaged 0.43±0.37; 28.7% were adherent (PDC ≥ 80%). CAT scores were very high in 54.6% and high in 35.8%. Distribution of GOLD categories were A(6%), B(35%), C(4%) and D(55%). High, medium and low MRCI were 85%,14% and 9% respectively. Mean devices per regimen was 2.05±0.8; IDP was 28%. MRCI and IDP increased with worsening CAT scores and severity per GOLD category (p<0.05), but not low HL.

Conclusion: MRCI for COPD regimens increased with COPD severity and symptoms. Adherence was low overall despite high symptom scores; high MRCIs could contribute. All COPD medication classes are available in multiple devices, combinations, and daily formulations; there is potential to simplify regimens. Prospective studies are needed to evaluate if interventions minimizing MRCI improves adherence and COPD outcomes.

126. Outcomes of Daily versus Twice Daily Intrapleural Administration of Alteplase and Dornase Alfa.

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Introduction: Patients with complicated pleural effusions, have historically been administered alteplase/dornase alfa via chest tube twice daily for 3 days. Mehta, et al, explored the use of once daily administration- 92.7% of patients were successfully treated without surgery.

Research Question or Hypothesis: Our institution recently defaulted to a once daily administration of intrapleural alteplase/dornase alpha. The purpose of this study is to evaluate if this change is providing non-inferior clinical outcomes at decreased cost.

Study Design: This is a single-health system, multicenter, IRB-reviewed determined exempt, pre-post study evaluating the change from a standard of administering intrapleural alteplase/dornase alfa twice daily to once daily.

Methods: Patients ≥18 years old were included if they received > 1 dose of alteplase/dornase alpha. Data was derived from chart review of patients with empyema and complicated pleural effusion who received intrapleural therapy. Primary outcome: evaluation of the noninferiority of once daily intervention versus historical twice daily on hospital length of stay. Secondary outcomes: video-assisted thoracoscopic surgery (VATS), antibiotic length of therapy, drug acquisition cost, and incidence of bleeding.

Results: 107 patients were evaluated, 69 were included for analysis (32 twice daily, 37 once daily). There was a decrease in hospital LOS of 8.29 days evaluated using Wilcoxon rank sum test (p=0.02). There was no significant difference between groups in the incidence of VATS (6 twice daily, 4 once daily) (p>0.05). In the once daily group, the antibiotic length of therapy decreased by 5 days, however this was not significant (p>0.05). Comparing drug acquisition cost, there was a decrease of $107.85 per patient in the once daily group. There was no significant difference between groups when analyzing the incidence of bleeding (2 twice daily, 3 once daily) (p>0.05).

Conclusion: Administration of once daily intrapleural alteplase/dornase alfa is safe, effective, and represents a non-inferior option to

twice daily administration for the management of empyema and complicated pleural effusion.

Substance Abuse/Toxicology

127. A Pharmacist-Led Fentanyl Test Kit Pilot Program for Veterans Engaged in Addiction Treatment Services.

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Introduction: During the coronavirus pandemic, fentanyl-involved overdose deaths in San Francisco County sharply increased from 69 deaths in 2018 to 391 in 2021. Use of test strips to check drugs for fentanyl is an emerging harm reduction strategy to reduce overdose risk. This pilot project aimed to 1) provide Veterans education on fentanyl, overdose risk mitigation, and fentanyl test kits and 2) evaluate Veteran feedback and use of fentanyl test kits.

Research Question or Hypothesis: Does providing education and fentanyl test kits lead to high perceived importance of use and utilization of harm reduction strategies?

Study Design: Prospective single-arm cohort quality improvement project.

Methods: Veterans in San Francisco Addiction Treatment Services were offered participation via telephone, fliers, and referrals. A pharmacist provided 30 minute in-person and virtual education on illicit fentanyl, overdose risk reduction, and how to use a test kit. Veterans were offered free fentanyl test kits, free naloxone kits, and up to $35 for completion of pre-/post-education surveys, education class, and one-month follow-up survey.

Results: Among 57 Veterans participants January to October 2020, 56 (98.2%) accepted ≥1 fentanyl test kit, and 25 (43.9%) accepted a naloxone kit. Among 54 post-education surveys, 44 (81.5%) rated the fentanyl test kit as extremely important to use. Among 50 one-month follow-up surveys, 11 (22.0%) used ≥1 test strip, and 15/31 (48.4%) test strips used were positive for fentanyl. Common harm reduction strategies reported included discarding the drug, giving back to seller, and using a smaller dose.

Conclusion: Veterans engaged in San Francisco Addiction Treatment Services who participated in a one-time, pharmacist-led education class reported high importance for using fentanyl test strips. While only 22% used a test strip, over 48% of tests were positive for fentanyl, and strategies to reduce harm were commonly utilized. Offering harm reduction education and fentanyl test kits is a quick and meaningful intervention for pharmacist-provided clinical care.

Transplant/Immunology

128. Association of High Intrapatient Tacrolimus Trough Variability and Donor-Derived-Cell-Free DNA (dd-cfDNA) in Kidney and Kidney-Pancreas Transplant Recipients.

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Introduction: High tacrolimus (TAC) trough variability has been linked to a higher risk of dnDSA, acute rejection and graft loss. Similarly, elevated dd-cfDNA is an early signal of injury associated with eGFr decline, dnDSA and rejection.

Research Question or Hypothesis: What is the relationship between intrapatient TAC trough variability and dd-cfDNA levels in kidney transplant (KT) and simultaneous pancreas-kidney (SPK) transplant recipients?

Study Design: Single-center, retrospective, observational study

Methods: Patients who received a KT or SPK and longitudinal dd-cfDNA (AlloSure, CareDx) surveillance between Jan 2020 and Sept 2021 were retrospectively identified by electronic medical record review. Intrapatient TAC variability (TAC %CV) was assessed via patient-specific mean coefficient of variation (%CV=[variance/mean] *100) measured between 1 and 12 months post-transplant. High TAC %CV was defined as ≥30%.

Results: A total of 98 patients with 455 dd-cfDNA levels and 2559 tacrolimus troughs were included for analysis. Patient demographics were similar between groups. Of the 98 patients, 16 were found to have TAC CV≥30%. In the first-year post-transplant, the median dd-cfDNA level was significantly higher in patients with TAC %CV≥30% compared to <30% (0.26% [IQR 0.12%-0.16%] versus 0.18% [IQR 0.12%-1.8%], p=0.0142) as shown in Table 1. The median peak dd-cfDNA level for patients with TAC %CV≥30% was higher at 0.54% (IQR 0.12%-16%) compared to 0.33% (IQR 0.12%-7.7%) for TAC %CV<30%, though this was non-significant likely due to small sample size.

Table 1. dd-cfDNA by TAC %CV

	Total	TAC % CV < 30	TAC % CV ≥ 30	Overall p-value
Total number of patients	98	82	16	
dd-cfDNA median				0.0142
Median (IQR)	0.2 (0.12, 16)	0.18 (0.12, 1.8)	0.26 (0.12, 16)	
dd-cfDNA peak				0.0655
Median (IQR)	0.37 (0.12, 16)	0.33 (0.12, 7.7)	0.56 (0.12, 16)	

Conclusion: Our findings demonstrate that high dd-cfDNA levels may be associated with high intrapatient tacrolimus variability.

129. Effect of Tacrolimus Metabolism Rate on Renal Function among Hispanic Kidney Transplant Recipients.

David Min, MS, Pharm.D.
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Introduction: Tacrolimus (TAC) is important immunosuppressant given for graft survival after renal transplant. Recent studies have proposed TAC metabolism rate (blood concentration normalized by TAC daily dose or C/D) may affect kidney outcome.
Research Question or Hypothesis: Does TAC metabolism rate affect kidney function in the Hispanic kidney allograft recipients?
Study Design: A retrospective study design was used for this study.
Methods: Of the 303 kidney allograft recipients last 5 years in our institution, a total of 165 self-reported Hispanic kidney recipients were included in the study. Study populations were divided into fast (C/D ratio <1.54) and slow (C/D ratio ≥1.55) metabolizer group. The renal function was evaluated by creatinine clearance (CrCl) using Cockcroft-Gault nomogram.
Results: Slow metabolizers showed that TAC doses were significantly lower than fast metabolizers through the one-year follow-up period ($p<0.05$). The mean TAC trough levels of slow metabolizers were significantly higher than those of faster metabolizers at 1month and 6 months (1 month: 7.0 ± 2.3 vs. 6.0 ± 2.0 ng/mL, $p=0.003$; 6 months: 6.7 ± 2.4 vs 5.9 ± 1.8 ng/mL, $p=0.012$) Compared with fast metabolizers, slow metabolizers showed significantly lower CrCl at discharge (ml/min) (28.0 ± 21.6 vs. 35.6 ± 25.6, $p=0.04$), 1 month (52.0 ± 16.6 vs. 61.4 ±22.4, $p=0.03$), 3 months (58.3±18.7 vs. 64.9±18.1, $p=0.025$) and 12 months(61.7±23.5 vs. 68.9±21.0, $p=0.045$) after transplantation.
Conclusion: This study demonstrated that TAC slow metabolizers exhibit significantly poor kidney function compared to fast metabolizers in Hispanic patients. We may predict the renal outcome following renal transplantation with using C/D ratio.

130. Efficacy and Toxicity of Once-Daily Tacrolimus Compared to Twice-Daily Tacrolimus in Kidney Transplant Patients.

David Min, MS, Pharm.D.
College of Pharmacy, Western University of Health Sciences, Pomona, CA

Introduction: Tacrolimus, a potent immunosuppressant, has been used for kidney transplant more than 20 years. However, it shows unpredictable pharmacokinetics, and causes serious toxicity such as renal failure or tremors. It is reported that once-daily tacrolimus (ODT, Envarsus XR), has a more consistent pharmacokinetic profile, with lower total daily dose (TDD) compared to traditional twice-daily tacrolimus (TDT). We evaluated the efficacy and safety of ODT therapy compared to TDT in kidney transplantation.
Research Question or Hypothesis: Efficacy and safety of ODT are not significantly different compared to those of TOT in the kidney transplant recipients.
Study Design: A retrospective study design was used.
Methods: Kidney transplant recipients switched from TDT to ODT from 2011– 2017 at our institution were included. The time to switch from TDT to ODT was the baseline.
Results: Among 64 patients who met inclusion criteria, 53 patients were included in this study. For demographics of the study patients, the mean (±SD) age was 61 (±18) yrs; 70% were male; 87.5% were Hispanic. Most common cause for switching TDT to ODT was side effects of tremors and insomnia (30.2%). The mean TDD of TDT and ODT was 2.79 ± 2.70mg/day and 1.15± 0.87mg/day ($P<0.0001$), respectively. For kidney function measured by serum creatinine, it has significantly improved after switching from TDT to ODT [base line (1.64±0.63), 3 months (1.16±0.51, $p=0.012$), 6 months (1.15± 0.56, $p=0.005$), 9months (1.13±0.48, $p=0.013$), 12months (1.16±0.49, $p=0.016$)]. For the mean TAC levels, it has significantly reduced after switching from TDT to ODT [base line (6.92±2.95 ng/ml), 3 month (4.13±2.05, $p<0.0005$), 6month (3.70±1.63, $p<0.0005$), 9month (4.61 ± 1.51, $p<0.0005$), 12month (4.02± 1.72, $p<0.0005$)]. Most of side effects, especially tremors or insomnia had disappeared after switching from TDT to ODT.
Conclusion: Our study demonstrates that switching from TDT to ODT has significantly improved overall kidney function with better safety profiles in kidney allograft recipients.

131. Assessment of Infection and Malignancy in Elderly Lung Transplant Recipients to Guide Age-Adjusted Immunosuppression.

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Introduction: There is an increasing trend of older aged lung transplant recipients (LTRs), which is linked to increased malignancy with lower rates of rejection due to immunosenescence. Despite this well documented phenomenon, there is little data guiding providers to adjust immunosuppression based on patient's age The aim of this study is to compare incidence of infections and malignancy in older versus younger cohorts of lung transplant recipients to guide immunosuppression.
Research Question or Hypothesis: Elderly lung transplant recipients experience increased rates of infection and malignancy, thus supporting the need for age-adjusted immunosuppression.
Study Design: Single-center retrospective chart review
Methods: This study included adult LTRs transplanted between January 1, 2017 and June 30, 2021. Patients were excluded if they were multi-organ transplants, re-transplants, or expired within 90 days. The primary endpoint compared the incidence of infections and malignancies in patients ≥65 (elderly) vs <65 years (younger).

Secondary endpoints included incidence of acute and chronic rejection, 1- and 3-year mortality, and incidence of adverse drug reactions (ADRs).

Results: Forty-two percent (n=69) of LTRs were considered elderly. Overall major bacterial, fungal, and viral infections were not significantly different (79.7% vs 79.2%; p=.932), however older age was associated with higher incidence of malignancy (30% vs 13.5%; p=.014). There was no difference in incidence of rejection, but younger patients were more likely to develop de novo donor specific antibodies (20.3% vs 36.5%; p=.025). One-year and 3-year incidence of mortality in the elderly versus younger cohorts were (0% vs 5.2; p=.054) and (29% vs 16.7%; p=.059), respectively. There was no significant difference in incidence of ADRs.

Conclusion: Older age was not associated with increased rates of major infections; however, malignancy was more prevalent in the elderly LTRs which may warrant a need for individualization of antimetabolite dosing.

132. High-dose intravenous (IV) thiamine to reduce post-operative delirium in liver transplant recipients with alcohol-related liver disease.

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Introduction: Thiamine depletion can lead to delirium in liver transplant recipients (LTR) with alcohol-related liver disease post-operatively. Einstein Medical Center created an order sentence for high-dose IV thiamine for our liver transplant (LT) population.

Research Question or Hypothesis: Does high-dose IV thiamine reduce post-operative delirium after LT in recipients with alcohol-related liver disease?

Study Design: Retrospective, pre/post cohort study. Patients were split into "no thiamine" and "thiamine" groups based the thiamine order sentence implementation. Thiamine was dosed at 500mg IV 3 times daily for 6 doses. Patient charts were reviewed to determine incidence of delirium.

Methods: Adults with alcohol-related liver disease requiring LT from 2014-2022 were included; excluded if they had: a prior LT, history of schizophrenia or bipolar disorder, primary non-function after LT or were re-transplanted within 30 days. The primary outcome was the incidence of delirium defined as: use of medications, physical restraints, 1:1 observation, or psychiatric consult ordered within 7 days of LT. For 80% power, 149 subjects were needed in each group to detect a 50% reduction in delirium. P-values were obtained using Fisher's Exact and student's t-tests for continuous parametric data; Mann-Whitney U tests for non-parametric data. Multiple logistic regression was performed to evaluate possible confounders associated with delirium.

Results: 306 patients were enrolled (no thiamine n=150, thiamine n=156). Baseline demographics were similar between groups. Post-operative delirium occurred in 41(27.3%) patients in the no-thiamine group and 72(46.2%) patients in the thiamine group[p=0.001]. Results from the multiple logistic regression demonstrated that ICU length of stay, but not high-dose thiamine, was independently associated with post-operative delirium.

Conclusion: IV thiamine did not reduce the incidence of post-operative delirium in LTR. Increased ICU length of stay after LT was associated with delirium development. A prospective, randomized controlled trial is needed to determine the benefit of high-dose thiamine to prevent post-operative delirium.

133. Perioperative daptomycin for prophylaxis of vancomycin-resistant *Enterococcus* infection in colonized liver transplant recipients.

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Introduction: Infection with vancomycin-resistant *Enterococcus* (VRE) in liver transplant recipients (LTR) is associated with negative outcomes.

Research Question or Hypothesis: Will the use of perioperative daptomycin prevent VRE infections in VRE-colonized LTR?

Study Design: Retrospective chart review conducted from 6/2018 to 11/2022 included adult LTR who were VRE-colonized.

Methods: VRE colonization was identified by VRE rectal swab or positive VRE culture prior to transplant. Analysis was separated into two groups, daptomycin vs. no daptomycin. All LTR received perioperative piperacillin-tazobactam for 24 hours. If VRE-colonized, one dose of daptomycin (6 mg/kg) is given pre- and post-operatively. Demographics, clinical characteristics, risk factors for VRE infection, and daptomycin dose were collected. The primary outcome was VRE infection at 14 and 90 days post-transplant. Secondary outcomes were acute rejection, 90-day mortality, intensive care unit (ICU) and overall length of stay (LOS), and ICU readmission.

Results: There were 36 VRE-colonized LTR; 19 received daptomycin and 17 did not. Baseline characteristics and risk factors for VRE infection were similar between groups. There were more VRE infections in the no daptomycin group within 14 days post-transplant (24% vs. 0%, p=0.01), but at 90 days post-transplant there was no significant difference (29% vs 16%, p=0.43). One death occurred in the daptomycin group. ICU and overall LOS were longer in the daptomycin group (p=0.04 and p=0.10). Acute rejection and ICU readmissions were similar between groups. The average daptomycin dose was 7.1 mg/kg.

Conclusion: Perioperative daptomycin reduced the rate of VRE infections in VRE-colonized LTR within 14 days post-transplant but not 90 days. Increased LOS in the daptomycin group were driven by 3 patients with VRE infections occurring after 14 days post-transplant. Recent evidence has shown that daptomycin doses greater than 9 mg/kg is associated with improved mortality. Future studies should evaluate if higher doses of perioperative daptomycin can reduce VRE infections beyond 14 days post-transplant.

134. Evaluation of Sodium Glucose Transporter 2 Inhibitors versus Insulin in Liver Transplant Recipients with Diabetes.

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Introduction: There is a lack of evidence evaluating sodium-glucose transporter 2 inhibitors (SGLT2is) in diabetic liver transplant recipients (LTRs) on metabolic and renal outcomes.
Research Question or Hypothesis: What is the impact of SGLT2is on weight loss, glycemic control, and renal function in diabetic LTRs?
Study Design: This was a retrospective cohort study of diabetic LTRs at VCUHS between 01/2016 and 08/2021.
Methods: The primary outcome was change in weight(kg) at 12 months post-SGLT2i and/or insulin initiation. Secondary outcomes included change in hemoglobin A1c (HgbA1c) and eGFR at 12 months post-initiation. Safety outcomes assessed number of urinary tract infections (UTIs), diabetic ketoacidosis(DKA) episodes, amputations, and cardiovascular events. Data analysis included ANOVA.
Results: A total of 39 LTRs were included – 18 on insulin, 12 on SGLT2is, and 9 on SGLT2is plus insulin. There were no significant differences between BMI, HgbA1C, age, and race/ethnicity among the groups. There was a clinical trend towards greater mean (SD) weight loss at 12 months post-initiation in patients on SGLT2is[-9.7 (6.6)kg] compared to insulin[-1.0 (4.4)kg] and insulin plus SGLT2is[9.6(6.3)kg]; p=0.12. There was a clinical trend towards increase in eGFR at 12 months post-initiation in patients on SGLT2is[11.7(7.0)] compared to insulin[0.5(5.0)] and insulin plus SGLT2is[-11.9(7.1)]; p=0.08. HgbA1c at 12 months post-initiation was similar among those on SGLT2is[-0.05%(0.9)] compared to insulin[0.7%(0.6)] and insulin plus SGLT2is [1.4%(0.8)]; p= 0.31. There were no UTIs or amputations in the SGLT2i group. No cardiovascular events or DKA occurred in all groups. Most patients were on concomitant anti-diabetic agents within 12 months, including metformin, DPP-4 inhibitors, and GLP-1 receptor agonists.
Conclusion: There were clinical trends towards more weight loss and improvement in eGFR in LTRs on SGLT2is. Being that most were on multiple antihyperglycemic agents by 12 months, it was difficult to assess the impact of SGLT2is alone. Future larger studies are needed to validate these results.

Women's Health

135. Concept Mapping to Develop a Hormonal contraceptive Access via Pharmacist-Prescribing Implementation (HAPPI) Package.

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Introduction: Although pharmacists are allowed to prescribe hormonal contraceptives in 1 in 4 states, a minority of pharmacies are providing and few patients are utilizing this service. We aimed to gather insights from pharmacists and pharmacy owner/executives to build an implementation package (HAPPI package) to support expansion of this service where policies permit.
Research Question or Hypothesis: Participatory based research methods will be able to identify and prioritize tools/resources to be included in the implementation package to support pharmacist-prescribing of contraception.
Study Design: Concept mapping is an integrative, mixed methods participatory approach made up of focus groups and sorting and rating data (captured via survey).
Methods: Eligible participants included pharmacy staff end-users (frontline pharmacists in managerial or staff roles, pharmacy technicians) OR decision-makers (chain pharmacy executives and independent pharmacy owners), from states where at least one chain pharmacy has implemented pharmacist-prescribed contraception services, and aged ≥18 years. Participants were recruited between existing relationships of the Birth Control Pharmacist and national/state pharmacy organizations. Focus groups participants responded to a prompt designed to elicit necessary tools and resources to ease, as well as barriers to, implementation of pharmacist-prescribed contraception services in their pharmacies. During the follow-up survey, participants sorted statements by similarity and rated each statement in terms of importance and feasibility on a scale from 1 (not important/not feasible) to 4 (very important/very feasible). Focus groups occurred from 12/2022-3/2023, with the follow-up survey occurring in 3/2023.
Results: Six focus groups were conducted; 29 participants ranked 50 statements representing potential resources to improve implementation in terms of importance and feasibility. These statements were ranked across the following categories: financial, documentation/paperwork, advertising/marketing/raising awareness, staff, patient education/resources, workflow/procedures, training/education, connection to other birth control pharmacists, legislation/advocacy.

Conclusion: Concept mapping has provided items for development of an implementation toolkit that will be further evaluated and assessed in future research.

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

Ambulatory Care

136. Comparison between Pharmacist- involved anticoagulation care and Conventional Care in Tuen Mun Hospital.

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Service or Program: Tuen Mun Hospital(TMH) has implemented a Pharmacist Anticoagulation Clinic (PAC) in September 2019. In PAC, pharmacist cooperate with medical doctors for the care of warfarin treatment in patients.

Justification/Documentation: In mid 2022, approximately half of the warfarin patients in Tuen Mun Hospital were take care in PAC while the remaining warfarin patients continued conventional care.

We analyzed data from April 2021 – March 2022, we aim to compare conventional care and pharmacist-involved anticoagulation care in terms of time in therapeutic range (TTR) and percentage of patients who had at least one hospitalization due to bleeding or thromboembolic events. Patients under conventional care were defined as all warfarin patients in Tuen Mun Hospital without a future PAC appointment as at March 2022. The TTR were drawn from laboratory data and calculated by Rosendaal method. Hospitalization records were collected from electronic patient record (EPR) and reviewed by two pharmacists. Only hospitalization due to bleeding event or thromboembolic event were included in this study.

Adaptability: In October 2022, all patients on warfarin in TMH was referred to PAC.

Significance: A total of 1364 patients were included, a total of 679 and 685 patients were classified as under PAC care and conventional care respectively. The TTR for patients under PAC care and conventional care was 73.1% and 68.3% respectively. Percentage of patients who had at least one hospitalization due to bleeding event was 3.1% for patients under PAC care and 7.5% for patients under conventional care. Percentage of patients who had at least one hospitalization due to thromboembolic event was 0.4% for patients under PAC care and 2.2% for patients under conventional care. This showed the utilization of pharmacist expertise in the management of warfarin therapy is valuable.

Education/Training

137. MyDispense Inpatient Electronic Medical Record Platform, an International Collaboration.

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Service or Program: MyDispense is a freely accessible online pharmacy simulation tool that allows learners to practice the role of a pharmacist in a safe environment. The original platform was built through collaboration between educational software developers and content experts in pharmacy education and practice. Since inception in 2010, MyDispense has significantly impacted pharmacy teaching globally and is utilized in 231 schools of pharmacy across 41 countries, helping over 50,000 pharmacy students worldwide. With the success of the community-based MyDispense platform, the opportunity to develop an inpatient, electronic medical record platform was identified. Development of this inpatient platform is ongoing and provides an environment for students to experience inpatient order verification.

Justification/Documentation: MyDispense Inpatient Electronic Medical Record Platform meets the need that schools of pharmacy globally have; to simulate order verification and clinical documentation within the inpatient pharmacy setting. MyDispense allows learners to receive immediate feedback on learning outcomes and can be used for formative and summative assessments.

Adaptability: MyDispense offers integrative active learning experiences where learners engage in real-world scenarios. With the addition of the inpatient electronic medical record platform to MyDispense, it allows expansion of simulations that encompass community, inpatient, and transitions of care. Simulations provide the integration of hands-on experiences into didactic curriculum assessments, as well as support introductory and advanced pharmacy practice experiences. Exercises can be shared among educators and adapted to fit the needs of learners.

Significance: Simulation is an effective method to complement didactic and experiential learning. The inpatient MyDispense platform will provide exercises to pharmacy learners that mimic hospital practice, further expanding the platform's scope. Pharmacy schools can utilize MyDispense to assess students on learning outcomes, improving preparation before hospital-based experiential education, and licensure. International collaboration within this platform further allows pharmacists and educators to share best practices.

138. Colombia – Purdue Partnership: The Development of a Pharmacy Practice Visiting Clinician Scholar Program.

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Service or Program: The Pharmacy Practice Visiting Clinician Scholar Program at Purdue University is an innovative educational curriculum, designed to provide advanced pharmacy practice experiences for Colombian pharmacists and pharmacy students. Through this program, scholars can learn about the American pharmacist model. They can also enhance their language and clinical skills and foster cultural exchange among the student body.

Justification/Documentation: This program was conceived in the framework of the Undergraduate Research Experience Purdue-Colombia (UREP-C), a platform for Colombian students across different disciplines to participate in research at Purdue University. The six-month curriculum consists of: experiences in primary care clinics and at health equity events as a bilingual provider and interpreter, support for the Spanish Language Track program (helping student pharmacists to be more confident and proficient at providing care in the language) and participation in research related to clinical pharmacy and global health services.

Adaptability: This is a robust educational program, with different fields of action and flexibility in tasks, that can be adjusted according to the career goals of the candidate. Since it is an adaptation of the advanced pharmacy practice experiences already part of the Pharm.D. curriculum, this model can be easily replicated in other pharmacy schools across the United States.

Significance: The Visiting Clinician Scholar Program is envisioned as an opportunity to strengthen relationships and cooperation with Colombian pharmacy schools and strategic pharmacy allies, serving as a pathway to further clinical pharmacy training. It can also become a decisive steppingstone for scholars interested in pursuing a postgraduate degree. It is worth highlighting that the role of scholars in clinics has been beneficial, especially in the Hispanic/Latino population, mixing the figure of an interpreter and their acquired clinical skills to improve health outcomes, thus contributing to reducing disparities in healthcare.

Oncology

139. Implementation of Pharmacist-Led Cancer Clinics (PLCCs) with Collaborative Prescribing Model at the National Cancer Center in Qatar.

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Service or Program: The first Pharmacist -Led Cancer Clinics (PLCCs) in MENA region were initiated at the National Center for Cancer Care & Research (NCCCR) in 2020, to augment the level of clinical pharmacy services provided for cancer patients. Dedicated board-certified oncology clinical pharmacists provided consultations for referred patients without additional fees. The services included thorough medication profile review, assessment and optimization of medication adherence, and chemotherapy education. The PLCC started with Breast Cancer (BC) in 2020, followed by Bone Marrow Transplantation (BMT) in 2021. Services were expanded to Multiple Myeloma (MM) in 2022, with an innovative approach to pharmacist prescribing. A collaborative practice agreement was established in MM clinic, to allow clinical pharmacists to manage patients through issuing refills for active antineoplastic and supportive medications and ordering the necessary laboratory tests. In 2023, the service was extended to include all oncology (i.e. solid tumor) patients.

Justification/Documentation: Interprofessional patient care showed superiority over physician-only care in multiple settings. The design of the PLCC aimed to provide a structured and accessible link to patients, considering the complexity of their treatment protocols. In 3 years, 321 unique patients were referred to the BC clinic. Twenty-four referrals to the BMT clinic, with multiple follow-ups each, were done over 2-year period. Within one year, 22 patients were referred to the MM clinic with a total of 76 visits. Overall, 25 refill prescriptions were ordered by clinical pharmacists for MM patients.

Adaptability: Oncology and hematology PLCCs provided a robust and timely link to patients. The newly implemented collaborative prescribing model in MM clinic encouraged the expansion of pharmacy services in other PLCCs. Our collaborative model could potentially be applied to different cancer settings to optimize safe, efficient and effective patient care.

Significance: PLCCs are expected to improve the overall care for cancer patients at NCCCR's ambulatory setting.

140. A Compassionate Use Scheme Tool for Generating Monthly Reports at an Oncology Center of Excellence in London, England.

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Service or Program: Compassionate use (CU) is a treatment option that allows the use of an unauthorized medicine for patients who have a disease with no satisfactory authorized therapies and who cannot enter clinical trials. The current management of this scheme at St. Bartholomew's Hospital (Barts) in London, England involves the use of a Microsoft Excel® spreadsheet created by oncology pharmacists at Barts that requires manual reports to be generated each month to track, analyze, and optimize the therapies. Through collaboration with an Advanced Pharmacy Practice Experience (APPE) student from Purdue University College of Pharmacy, the log was updated to a tool that includes an automated reporting process.

Justification/Documentation: CU documentation involves many patient-specific factors and is not part of a streamlined authorized process. The use of unauthorized medicines for certain indications requires additional labor to organize and maintain data at the institutional level. Previously, Barts pharmacists manually counted each item to complete required monthly reports. Barts pharmacists can use this updated tool to aid in more efficient clinical decision-making regarding CU schemes.

Adaptability: This revised tool is adaptable to any institution involved with oncology CU. As long as the required inputs are met, the formulas can aid providers in generating automated counting for reports.

Significance: The need for an automated process of CU reporting at Barts led to a review of the current log system and addition of formulas to create a useable reporting tool. This tool was updated by an APPE student, allowing Barts oncology pharmacists to direct more time and focus towards other responsibilities including optimizing CU schemes utilizing trends identified with the reports.

141. A Golden Step Towards Saving Lives: The Antibiotics Sepsis Kit.

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Service or Program: The National Center of Cancer Care & Research (NCCCR), the leading cancer hospital in Qatar, has recently established the Sepsis Program; aiming to improve early recognition and outcomes of sepsis among cancer patients through implementation of the 'Sepsis Six' care bundle. One of the core pillars of this program was timely administration of the appropriate antibiotic(s). In line with this, NCCCR Pharmacy Department introduced the innovative "Antibiotics Sepsis Kit".

Implementation of the sepsis kit was challenging. A group of predefined antibiotics (i.e. Amikacin; piperacillin-tazobactam; meropenem; ceftriaxone; vancomycin) was placed in the automated dispensing cabinets (ADC) located in different hospital units. Along with that, a Sepsis Golden-Hour Order Set, including the six care bundle tasks, was designed and incorporated into the electronic health information system "Cerner". From which, the empirical antibiotic order can be activated then nurses can withdraw the vials required for preparation of the first dose from the ADC without pharmacy verification.

Justification/Documentation: After implementation of the NCCCR Sepsis Kit initiative, 100% compliance to antibiotics' administration within the golden hour was achieved and maintained to date. The median time of antibiotics administration was reduced to 24 minutes only in comparison to 106 minutes at baseline.

Adaptability: NCCCR Pharmacy has circulated detailed preparation guidelines for all antibiotics available in the sepsis kit, besides delivering brief sessions to physicians and nurses to discuss the process workflow. Moreover, frequent audit visits were performed by Pharmacy staff to ensure and maintain the proper utilization of the Antibiotics Sepsis Kit.

Significance: Global attention has been paid towards the best strategies for reliable early recognition of sepsis permitting timely and effective management. One of the recommended approaches was the implementation of 'Sepsis Six' care bundle within an hour of sepsis recognition; including prompt delivery of antibiotics, which was successfully achieved in this project.

Other

142. Clinical Pharmacy Consultation in a Rural Kenyan Hospital.

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Service or Program: We describe the implementation of a clinical pharmacy consultation service for a 295-bed, county referral and teaching hospital in rural Kenya over a one-year period. The goal was to track utilization of clinical pharmacy services in a resource-constrained setting in a way that could be replicated in similar contexts.

Justification/Documentation: In Kenya, there are few clinical pharmacists, most of whom are concentrated in urban, private hospitals. It is well documented that clinical pharmacists' participation in multidisciplinary patient care lends to positive patient outcomes, increases patient safety, and decreases cost. Demonstrating the value of clinical pharmacy services in low- and middle-income countries, especially in rural facilities, will hopefully lead to the growth of adaptable clinical pharmacy consultation programs when both medical and human resources are limited.

Adaptability: This model allowed the clinical pharmacist to float amongst medical, pediatric, and critical care services depending on attending physicians' schedules for bedside rounding. This granted the clinical pharmacist the flexibility to balance time between clinical activities and departmental operations as is often required in low-resource facilities that are frequently understaffed.

Significance: From January 4, 2022, to December 30, 2022, 944 consultations were documented in the categories of medication addition, de-escalation or discontinuation of antibiotics, medication discontinuation, dose administration, dose optimization, drug information, duration of therapy, escalation of antibiotics, laboratory monitoring and logistics surrounding sourcing medications. An average of 5.7 recommendations were made by a single clinical pharmacist per rounding day. The most common recommendations were regarding dose optimization (35.1%), drug information (14.3%), and medication discontinuation (13%). A single clinical pharmacist participated in multidisciplinary rounds 166 out of 192 (86.5%) workdays over the one-year period, with the remaining days dedicated solely to departmental projects and education.

143. Implementation of Pharmacist Training for a Phase 1 Clinical Trial in Liberia Utilizing an Interactive Videoconferencing Platform During the COVID-19 Pandemic.

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Service or Program: NIAID's Division of Clinical Research (DCR) pharmacists support implementation of clinical trials in collaboration with the PREVAIL site in Liberia. During January-June 2022, DCR pharmacists provided remote-based training to PREVAIL pharmacists for the first Phase I trial executed in Liberia.

Justification/Documentation: As an in-person training was not possible during the COVID-19 pandemic, performing remote implementation training for a Phase 1 Lassa Fever vaccine trial (sponsored by International AIDS Vaccine Initiative) became necessary. Utilizing a virtual interactive videoconferencing platform, 15-20 hours of training was provided to 4 PREVAIL site pharmacists to describe, demonstrate, and observe/assess preparation of mock injections and trial processes. Continued communication via weekly videoconferencing and email occurred throughout the trial. Measures of success included completion of competency checklists, demonstration to trainers, zero pharmacy protocol deviations to date, and self-reported improved pharmacist confidence.

Adaptability: Using a virtual platform as remote training proves to be a feasible and successful tool during launch of a complex protocol. For this method to be effective, site pharmacists must have a sufficient knowledge base, pre-training on videoconferencing tools, with infrastructure to support the training technology, and adaptable to clinical trial needs. Remote training has applicability to capacity building in research pharmacy, improving sterile compounding skills, and implementing international trials when onsite interaction is not feasible. Establishing a culture of self-assessment by providing clear and factual feedback is key.

Significance: Research pharmacy staff play a critical role in the execution of clinical trials. Onsite training for clinical trials is ideal, but given the challenges of pandemic travel, creative application of remote videoconferencing and mock preparation was used to train pharmacists for a clinical trial. This successful virtual training shows the potential of training multiple sites simultaneously.

VPS CLINICAL PHARMACY FORUM

Ambulatory Care

144. Initiation of SGLT2-inhibitors in Patients with Heart Failure and/or Chronic Kidney Disease at CrossOver Healthcare Ministry.

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Service or Program: A pharmacist-led cardio-renal program was developed at CrossOver Healthcare Ministry (CrossOver), a charitable primary care clinic, to augment current comprehensive medication management services provided under a collaborative practice agreement. The primary goal of this program was to initiate patients on the optimal SGLT2-inhibitor therapy based on recent guideline changes and new indications for the management of heart failure (HF) and/or chronic kidney disease (CKD).

Justification/Documentation: Modeling studies estimate the impact of initiating SGLT2-inhibitor therapy in all patients with heart failure with reduced ejection fraction (HFrEF) in the United States would prevent 34,125 deaths per year. Since receiving an FDA indication for HFrEF, multiple studies showed similar risk reductions in

cardiovascular and renal outcomes in people with CKD and other types of HF. We determined that 51 patients at CrossOver Health Ministry would benefit from SGLT2-inhibitor therapy for HF and/or CKD.

Adaptability: The cardio-renal program was established to assess patients with HF and/or CKD for the initiation of SGLT2-inhibitors in the primary care setting. In this program, pharmacy team members prospectively evaluated potential patients in the electronic health record for referral. Because of the successful implementation of the program, prospective review by a pharmacist should not be required. Instead, the referral process can be adapted with pre-specified criteria for primary care providers to refer patients to pharmacist-led clinics similar to other chronic conditions.

Significance: It is well documented that SGLT2-inhibitors are underutilized for HF and CKD in the United States. Initially, 23% (n=16) of eligible patients at CrossOver were on SGLT2 inhibitors for HF and/or CKD. From March 1st 2022 to March 1st 2023, the number of patients at CrossOver on SGLT2 inhibitors for HF and/or CKD increased to 47.76% (n=32) due to the cardio-renal program.

Education/Training

145. Injecting Creativity: Enhancing pharmacist education through the use of escape-rooms to promote competence and confidence.

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Service or Program: This competency session utilizes a medical escape-room to provide training to inpatient pharmacists. This escape-room was created by an emergency medicine pharmacist at Boulder Community Health and incorporates high acuity, low frequency patient scenarios into a time sensitive and high pressure simulation. Escape-room modules include rattlesnake envenomation, malignant hyperthermia, PALS, anaphylaxis and ischemic stroke. This escape-room utilizes unique pedagogy that appeals to learners with audio, visual, and hands-on learning preferences. The escape-room was delivered in person to 14 pharmacists in small groups.

Justification/Documentation: Pharmacists are uniquely situated to perform as highly integrated team-members for patients that require life-saving and stabilizing medications. These patients may not be encountered with high frequency and the potential for decreased proficiency and confidence within this skill set exists. While traditional didactic presentations are often utilized to document competencies, they may not mimic high pressure and time sensitive scenarios. By implementing an escape-room in lieu of traditional didactic training, we hope to improve pharmacist confidence and competence in high-acuity situations. Participants were assessed by successful completion of the escape room and if they provided positive feedback for this new training methodology.

Adaptability: For institutions seeking unique training sessions to improve pharmacist competence in high acuity scenarios, escape-rooms provide a useful alternative to traditional presentations. Escape-rooms can be written for specific scenarios or in some instances even downloaded as a complete package. They can be delivered in the same amount of time as a lecture and provide training that more realistically matches real life patient scenarios.

Significance: Overall, the utilization of escape-room training was an opportunity to harness the powers of creativity to provide meaningful training scenarios that improve pharmacist competence. The overarching goal of optimizing patient care and motivating pharmacists to immerse themselves in a non-traditional learning modality qualitatively improved confidence and competence for participants.

Infectious Diseases

146. Outcomes of a telehealth antibiotic stewardship quality improvement program.

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Service or Program: Few studies have assessed impact of antibiotic stewardship interventions on telehealth prescribing. Babylon Health is an international, digital-first, healthcare provider that began serving US patients in 2020 and treated over 60,000 patients in 2022. Infectious diseases accounted for 5 of the top 10 most frequent diagnoses. Appropriate antibiotic usage was identified as key area of clinical quality. Clinical pharmacy was tasked with oversight of the US antibiotic stewardship program. Inappropriate Fluoroquinolone (FQ) use for urinary tract infections (UTI) was selected as a priority condition. FQ's are not recommended by FDA or clinical guidelines as first-line for UTI due to adverse events and antibiotic resistance.

Justification/Documentation: In 2021, an antibiotic stewardship committee developed and initiated a series of quality improvements projects using a Plan-Do-Study-Act (PDSA) model to improve UTI care. Over 18 months, the committee developed dashboards of antibiotic prescribing, group training was provided to staff and eventually a targeted approach for high fluoroquinolone prescribers. In the targeted approach, staff identified as high FQ prescribers were given their antibiotic prescribing rate compared to national benchmarks, coaching by their clinical lead and educational handouts. Overall, this program reduced FQ prescribing from 17% of UTI prescriptions in Q1-2021 to 6.65% in Q4-2022. Use of appropriate first-line antibiotics for UTI rose from 74% in Q1-2021 to 84% in Q4-2022.

Adaptability: This program was able to scale antibiotic stewardship for a national US telehealth program with staff working remotely

across multiple states. This program could be adapted to other healthcare organizations and not just telehealth.

Significance: This program demonstrated that developing dashboards and implementing individualized, digital interventions can reduce inappropriate antibiotic use in the telehealth environment.

Managed Care

147. Design and implementation of a virtual pharmacy care management program for a self-funded employee health plan: Focus on adherence outcomes.

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Service or Program: A multicenter non-profit health system established a virtual pharmacy care management service for its employee health plan. Pharmacists and pharmacy technicians provide telephonic medication support for members through medication adherence outreach, medication therapy management (MTM), and chronic medication management (CMM) services. Pharmacists and technicians are licensed in the states they cover. The service complements other plan-provided care management services and is funded through a per member per month (PMPM) agreement with the plan. Members receive this service free of charge.

Justification/Documentation: Initial implementation focused on improvement in proportion of days covered (PDC) for diabetes, statin and blood pressure medications. A consistent decline in PDC was noted until the program began in mid-2022. At the end of 2022, diabetes adherence was 81.3%, hypertension 84.5% and statins 85% (goal PDC > 80%). The team provided 3,172 interventions for 3,214 unique adherence patients. The most common interventions were patient education, assisting with adherence tools and switching to 90-day fills. Further data collection will focus on total cost of care and patient satisfaction.

Adaptability: The virtual pharmacy care management program serves as an alternative option for reimbursement of outpatient pharmacy services and provides opportunities for pharmacy collaboration with other care management services. Organizations or health plans can customize contracts to provide pharmacy care for members. Ongoing efforts include expanding this team's services to Medicare Advantage plans. In the future this service will be offered as part of the telehealth elective rotation for our pharmacy residency programs.

Significance: Utilizing technicians allows the pharmacists to focus on in-depth clinical services, enabling the entire team to work at the top of their licenses. The breadth of services (adherence, MTM and CMM) provided is more extensive than most self-funded employee health plans. Remote work allows flexibility both professionally and personally.

Oncology

148. Incorporation of Immunosuppression Toxicity Management (ISTM) into a Pharmacist-Led Immune Related Adverse Event (irAE) Management Service.

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Service or Program: Oncology clinical pharmacy specialists (CPS) and Oncologists developed a comprehensive, guideline-based, pharmacist-led immune related adverse event (irAE) service for patients requiring systemic immunosuppression. CPS developed electronic health record tools to communicate with patients and providers, recommend immunosuppression and dosing, monitor irAE treatment effects, and perform immunosuppression toxicity management (ISTM). The service was piloted at one clinic before expansion to all Kaiser Permanente Colorado (KPCO, an integrated health-system) Oncology clinics.

Justification/Documentation: Adequate irAE monitoring and treatment, including ISTM, are integral to quality care per the 2021 American Society of Clinical Oncology irAE management guidelines. CPS are well positioned within the Oncology team to manage irAE treatment and anticipate, assess and manage immunosuppressant toxicities - frequently high-dose corticosteroid toxicities including hyperglycemia, insomnia, infections, gastric/duodenal ulcers and bone loss. Quantitative data and the Plan-Do-Study-Act model were used to evaluate and refine this quality improvement project.

Adaptability: Pharmacist-led irAE management services are becoming more prevalent due to increased immune checkpoint inhibitor use and can maximize CPS practice scope while improving clinic efficiency. ISTM can be incorporated into pharmacist-led irAE services to improve care quality.

Significance: From May 28, 2019 to February 28, 2023, 44 patients received high-dose prednisone and were enrolled. CPS recommended additional immunosuppression in 5 patients. Patients completing CPS management (n=40) were followed for median 75 days (range 6-298) with median 13 outreaches (range 2-49). ISTM was evaluated in 44 patients; interventions occurred in 43 (97.7%) patients, including gastric/duodenal ulcer prophylaxis in 40 (90.9%), Pneumocystis jirovecii pneumonia prophylaxis in 34 (77.3%), zoster prophylaxis in 25 (56.8%), insomnia management in 22 (50%), bone health interventions in 18 (40.9%), glucose monitoring +/- management in 18 (40.9%), and other immunosuppression toxicities in 4 (9%). Seventeen (38.6%) patients received irAE symptom management. Our work

illustrates the opportunity to incorporate proactive ISTM into pharmacist-led irAE management services.

149. Optimizing care through the implementation of a specialty pharmacy-driven telehealth Polycythemia Vera Clinical Support program.

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Service or Program: This program is a non-prescription based telemedicine service whereby pharmacists at the Specialty Pharmacy Service at Atrium Health (SPS) perform comprehensive clinical reviews on polycythemia (PV) patients. This program identifies patients not at a goal hematocrit (>44) for specialty pharmacist review. The pharmacist team then screens patient medical records for adherence/ compliance trends, symptom assessments, supportive care considerations, and pharmacotherapy options (hydroxyurea dose titration, subsequent line recommendations/ benefits investigation).

Justification/Documentation: Levine Cancer Institute (LCI) is a multi-site major referral center for hematologic malignancies across the Charlotte Metro region. Patients with PV are seen across the system and despite clinical pathways the LCI Leukemia faculty identified variability in practice that may benefit from a centralized and coordinated support program. The PV clinical support program was implemented to assist in identifying opportunities to optimize PV patient outcomes and offer clinical pharmacist support.

Adaptability: Patients are enrolled on identification of last hematocrit if >44 via a report built in the EPIC medical record system that captures diagnosis code and hematocrit threshold. This report is run monthly, and patients identified are enrolled to be reviewed by specialty pharmacists over the course of the following month. Treating physicians can also directly engage the consult service for patients as needed, even if hematocrit is at goal. The SPS telehealth model is an evolution of the model previously used for a similar myelofibrosis program and could easily be applied across all the disease states services by SPS and similar consultative services at other institutions.

Significance: PV is a myeloproliferative neoplasm (MPN), and like others there are few pharmacist-directed practice models in the literature that offer insight into managing these often-complex patients. We hope this program encourages the utilization of pharmacist telemedicine as part of a multidisciplinary approach to virtual care.

Pharmacoeconomics/Outcomes

150. Ambulatory Intensive Pharmacotherapeutics: An Innovative Rural Population Health Initiative.

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Service or Program: Intensive pharmacotherapeutics (IP) is defined as the application of evidence-based medicine at the patient-specific level in an effort to optimize the medication treatment plan. Ambulatory Intensive Pharmacotherapeutics (AIP) is an innovative population health program where pharmacists target primary care patients within Bassett Healthcare Network (BHN) in an effort to improve health outcomes and reduce healthcare costs.

Justification/Documentation: Pharmacists perform detailed chart reviews and send recommendations to providers. Individuals are identified via risk stratification reports which consider key comorbidities, medication count, comorbidity count, recent ED/hospital visits, and upcoming provider appointments. Potential cost-savings are estimated by categorizing the preventable outcome as a hospital encounter (i.e. ED, inpatient, or ICU) and assigning a length of stay based on Centers for Medicare and Medicaid Services (CMS) national hospitalization data. Estimated daily hospital charges are standardized based on encounter type (ED visit = $1,000, inpatient = $500/day, and ICU = $1,500/day) to account for the likelihood of actually preventing the event. Interventions may also include efforts to improve formulary adherence for further cost savings. Interventions are reviewed periodically for implementation for 1 year and then considered final.

Adaptability: Since the AIP program expanded in September 2020 and as of September 2022, 2,530 individual reviews have been completed including a total of 3,701 interventions (average 1.5 interventions per review). Of these interventions, 1,646 (44.5%) have been implemented thus far. Total estimated potential cost avoidance was $5,858,493.70, and actual cost avoidance based on implementation was $2,453,746.09 (41.9%).

Significance: The AIP program identifies individual pharmacotherapeutic intervention opportunities across the healthcare network. These findings demonstrate the potential impact pharmacists have in improving the health of the community and reducing healthcare costs by avoiding undesirable health outcomes and improving formulary adherence.

VPS CASE REPORTS

ADR/Drug Interactions

241. Exploring the Impact of Phenytoin and Chronic Kidney Disease on Apixaban Plasma Concentrations: A Case Series.

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Introduction: While therapeutic drug monitoring (TDM) is not routinely done for direct oral anticoagulants (DOACs), plasma concentrations are obtainable. It is unclear how simultaneous drug-drug and drug-disease interactions impact DOAC plasma concentrations and clinical outcomes. This case series describes two patients with chronic kidney disease (CKD) prescribed phenytoin (PHT) and apixaban without negative outcomes.

Case: Patient 1: 35 year old female with end stage renal disease on hemodialysis was admitted for foot gangrene. Home medications included apixaban 5 mg BID and PHT 200 mg BID. PHT was continued on admission, but not apixaban. On Day 33, the patient underwent revascularization of the femoral artery with stent placement, and apixaban 2.5 mg BID was started. On Day 55, apixaban trough level was obtained 13 minutes before the evening dose and was within the reference range (29 ng/mL, 23-109 ng/mL), so apixaban was continued. On Day 64, patient was discharged on apixaban and PHT.

56 year old female with CKD stage 5 was admitted for confusion and worsening renal dysfunction. Home medications of PHT 200 mg BID and apixaban 2.5 mg BID were continued on admission. On Day 5, apixaban level was obtained 3.5 hours after the morning dose (68 ng/mL; peak: 69-221 ng/mL; trough: 34-162 ng/mL). Apixaban was continued. On Day 14, patient was transitioned to warfarin for "worsening renal dysfunction." On Day 21, patient was discharged on warfarin and PHT.

Discussion: Apixaban levels are expected to be subtherapeutic with concomitant PHT; however, apixaban levels in these cases were within the reference range, possibly offset by the presence of CKD.

Conclusion: There is a paucity of literature surrounding the role of TDM for DOACs with offsetting interactions. This case series highlights the opportunity for future research.

242. Thrombosis secondary to intravenous dicyclomine administration: a case report.

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Introduction: Dicyclomine is an antimuscarinic agent approved for treatment of irritable bowel syndrome-associated abdominal pain which can be administered orally and intramuscularly. Intravenous administration should be avoided due to potential for thrombosis, but real-world evidence is generally lacking. This case report presents a thrombotic complication associated with inadvertent intravenous administration of dicyclomine.

Case: A 43-year-old man with a history of chronic colitis with recurrent Clostridioides difficile infections presented to a community hospital complaining of moderate-severe suprapubic abdominal pain and nausea/vomiting/diarrhea for 5 days. Computed tomography showed descending colonic wall thickening and proctitis, without perforation or abscess. Initial orders consisted of ketorolac 15mg intravenously and dicyclomine 20mg intramuscularly. The nurse inadvertently mixed both ketorolac and dicyclomine in the same syringe and administered them simultaneously. The ulcerative proctocolitis was subsequently treated with mesalamine enemas 4grams rectally at bedtime, dicyclomine 20mg orally four times daily, and methylprednisolone 40mg intravenously once daily. Ultrasound confirmed a non-occlusive right axillary vein thrombosis and an occlusive superficial right basilic vein thrombosis. The patient was started on enoxaparin 60mg subcutaneously twice daily. Because he was uninsured, he was enrolled in a patient assistance program, enabling him to be discharged on rivaroxaban, dispensed from the hospital's outpatient pharmacy.

Discussion: Dicyclomine is more selective for the M1 and M3 receptor subtypes, and the M3 receptor causes nitric oxide activation. As dicyclomine was unintentionally injected intravenously, the inhibition of nitric oxide activation could potentially lead to clotting. The patient was also simultaneously administered ketorolac, which causes vasoconstriction through cyclo-oxygenase-2, further predisposing the patient toward clots. Naranjo algorithm assessment indicated "probable" potential for a drug-induced adverse event. Pharmacy staff also submitted an adverse drug reaction report based on this incident.

Conclusion: Thrombotic complications are possible following intravenous dicyclomine administration and pharmacy personnel must consider safeguards to prevent inadvertent administration.

243. Renal protective or harmful? A case-report of empagliflozin-induced acute kidney injury.

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Introduction: The risk of acute kidney injury (AKI) with SGLT2-i's has been controversial. In 2016, the FDA released a drug safety communication for risk of AKI with certain SGLT2-i's, but studies have demonstrated otherwise. Our practice site recently observed a case of empagliflozin-induced AKI that required extra monitoring and adjustment of medications, highlighting the need for evaluation of specific risk factors.

Case: Patient is a 61-year-old with hypertension, T2DM, and Stage 3a CKD with proteinuria. Baseline labs include serum creatinine (SCr) 1.05 mg/dL and A1C 10.1%. Pertinent medications include benazepril 20 mg daily. Empagliflozin 10 mg was initiated and SCr increased to 1.45; it was discovered the patient was also using naproxen. She was instructed to stop naproxen, hold benazepril, and drink fluids. SCr checked 1 week later decreased to 1.19 mg/dL and 4 weeks later was 1.12 mg/dL. Benazepril was restarted at 5 mg daily. Two weeks later, SCr was 1.32 mg/dL. Empagliflozin was discontinued and SCr returned back to baseline at 1.08 mg/dL.

Discussion: This case highlights that close monitoring is warranted when an SGLT2i is initiated in patients with comorbidities and concomitant medications that predispose to AKI. We also identify the degree of hyperglycemia (A1C >10%) upon initiation of an SGLT-2i as a potential risk factor. With higher levels of blood glucose, greater osmotic diuresis can occur, resulting in a greater potential risk for hypovolemia. Current recommendations for SGLT-2i monitoring include checking SCr at baseline and periodically during treatment but lack specific guidance. Expert opinion suggests reducing diuretics, increasing fluid intake, and holding SGLT-2i for SCr increases >30%.

Conclusion: Despite evidence of SGLT-2i's being renoprotective long-term, patients with risk factors for AKI need to be closely monitored upon initiation. In addition to traditional risk factors for AKI, the degree of hyperglycemia at time of initiation should also be considered.

244. A Case Report of Involuntary Nystagmus Following Intravenous Lidocaine Injection.

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Introduction: Lidocaine is an amide anesthetic used for local and topical anesthesia, as an antiarrhythmic, and with ketamine for multimodal analgesia. Adverse reactions can vary with routes and site of administration. Lidocaine can classically cause central nervous system effects, while cardiovascular and respiratory reactions are also reported. We report a case of involuntary nystagmus following lidocaine administration for multimodal analgesia.

Case: A 52-year-old male presented with sudden onset of severe pain in the chest and back. He was admitted and diagnosed with an esophageal perforation and underwent esophageal perforation repair. Postoperatively, he was placed on IV ketamine and lidocaine for pain control. After receiving IV lidocaine at a rate of 1 mg/min for approximately 22 hours, the patient endorsed nystagmus. He had no previous IV lidocaine exposure during this encounter. The patient described the nystagmus as most intense at its onset with ocular manifestations of vertical up and down movement. The lidocaine was promptly stopped, and the nystagmus gradually ceased within 72 hours.

Discussion: The patient's nystagmus was likely due to lidocaine. High lidocaine levels are reported to cause nystagmus, slurred speech, hallucinations, muscle tremors, and seizures. No lidocaine levels were ordered in this case, and he had normal hepatic function. The development of nystagmus was possibly related to lidocaine with a Naranjo score of 4.

Conclusion: Lidocaine led to a suspected case of nystagmus. Further evaluation of lidocaine related central nervous system side effects is warranted as the mechanism of action is not clearly understood.

Family Medicine

245. Use of a Continuous Glucose Monitor in the Management of Diabetes Mellitus in a Patient with Hereditary Spherocytosis: A Case Report.

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Introduction: Hereditary spherocytosis (HS) is a hemolytic disease that causes rapid splenic clearance of erythrocytes and erythropoiesis. In patients with HS and diabetes mellitus (DM), a discordance between glycated hemoglobin (HgbA1c) and serum glucose levels is seen, where the HgbA1c reflects an average glucose drastically lower than serum glucose readings. This case report proposes a novel method of evaluating DM in patients with HS, of which there is a paucity within the current body of literature.

Case: A 61-year-old man with HS presented to the clinical pharmacist for DM management with a discordant HgbA1C of 7.5% and fasting serum glucose of 317 mg/dL. He placed a continuous glucose monitor (CGM) sensor for fourteen days which showed a glucose management indicator (GMI) of 10.0%, time in target range (TIR) (70-180 mg/dL) of 0%, high (181-250 mg/dL) of 28%, and very high (> 250 mg/dL) of 72%. The patient started a glucagon-like peptide 1 receptor agonist which was titrated to a goal TIR of > 70%. After six months of continued follow up in the pharmacy clinic, the patient's TIR was 82% with a GMI of 7.0%.

Discussion: There are limited data available surrounding CGM use in patients with DM and hemoglobinopathies. Traditional glycemic monitoring tools are not ideal given the burden of frequent fingersticks and the unreliability of HgbA1C in HS. A fructosamine may more reliably measure glycemia in HS but was not available in this case. By incorporating a CGM, patients may eliminate the need for fingersticks and providers can reliably trace glycemia using objective measurements. Future studies could be designed to directly determine if DM

assessments using CGMs versus traditional fingersticks result in improved glycemic control.

Conclusion: Data on CGM use in patients with HS is limited. Future studies are needed to assess the utility of CGM use in these patients.

Hematology/Anticoagulation

246. Practical Considerations in Navigating Ticagrelor's Interference with Functional Heparin-Induced Thrombocytopenia (HIT) Assays: A Case Report.

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Introduction: *In vitro* studies suggest ticagrelor may induce false-negative results with functional heparin-induced thrombocytopenia (HIT) assays. Ticagrelor is expected to interact with the serotonin release assay (SRA). A false-negative SRA result could have detrimental clinical consequences. We present a patient receiving ticagrelor who had a positive immunoassay result and a negative SRA result.

Case: A 69-year-old female with a past medical history of stroke and extensive cardiac comorbidities was admitted to the hospital for treatment of an acute coronary syndrome (ACS). Allergic history included a reaction to clopidogrel (hives). Platelet count upon admission was 245 K/uL. The patient was treated medically until day 6 when she received multiple coronary stents. Soon after stent placement, the patient developed cardiogenic shock requiring advanced supportive measures to maintain hemodynamic status. On Day 11, the platelets decreased to 58 K/uL. The medical team ordered a HIT immunoassay (HemosIL®) which returned positive (1.0 U/mL), prompting the initiation of argatroban and SRA testing. Although the SRA was negative, the patient was being treated with ticagrelor for her ACS. Clopidogrel and prasugrel were not viable therapeutic alternatives due to patient's history of allergy and stroke, respectively. With the patient's recent ACS, the risks of holding ticagrelor outweighed the benefits of avoiding this interaction. Repeat HIT immunoassay on Day 16 was negative. Due to clinical unfamiliarity with this drug-laboratory interaction, the SRA result was assumed to be unreliable, and the patient was treated with a presumed diagnosis of HIT. The patient's platelets recovered, and she was eventually discharged.

Discussion: Ticagrelor may cause false-negative SRA results. In the absence of clear guidance for managing this interaction, clinicians should not base their assessments solely on the SRA in patients concomitantly receiving ticagrelor.

Conclusion: Clinicians should be aware of ticagrelor's interaction with the SRA. Further research is needed to provide strategies to manage this interaction.

Pediatrics

247. Case report of venlafaxine-induced hypothermia as part of a presentation of neonatal abstinence syndrome in two neonates.

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Introduction: Venlafaxine exposure *in utero* has been associated with Neonatal Abstinence Syndrome (NAS). We describe two neonates who were admitted to the hospital with hypothermia and other non-specific symptoms of NAS requiring an extensive medical work-up. In both cases the mothers were not using breastmilk to feed their newborn infants. Breast milk was introduced to manage this syndrome.

Case: Two neonates were admitted to the Pediatric Intensive Care Unit on 5 and 6 days of life with hypothermia, lethargy, and irritability. Both patients were exclusively fed infant formula. Extensive medical work-ups were reported as negative. One mother was receiving high doses of venlafaxine and trazodone, the other mother only received venlafaxine at lower doses. The clinical pharmacist suspected venlafaxine as the etiology and recommended breastmilk to treat NAS, since there is no dosing data on venlafaxine in neonates. Upon initiation of feeding breastmilk, the patients markedly improved.

Discussion: On both occasions, the patients were admitted after being discharged home from delivery in the hospital. This lag time between birth and admission discounted the possibility of maternal medications contributing to the etiology. Venlafaxine crosses the placenta with umbilical cord levels to maternal serum levels of 80 to 170% and breast milk by 3.2 to 7.6%. In such cases, breastmilk was effective and reliable as a therapeutic option to treat NAS.

Conclusion: Both patients shared the unusual presentation of hypothermia as part of NAS symptoms. The incidence of NAS due to venlafaxine is low, likely due to variation in breastfeeding practices among new mothers. In our patients who were not breastfed, the introduction of breastmilk was successful at reversing all presenting symptoms of NAS. We hope these case reports emphasize the importance of assessing *in utero* exposure to medications beyond the immediate newborn period and their possible role in causing unusual symptoms in the newborn baby.

248. Case report of ecthyma gangrenosum due to a spider bite complicated by a carbapenem-resistant *Pseudomonas aeruginosa* and ceftolozane/tazobactam associated thrombocytosis in an infant.

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Introduction: An infant developed extensive skin and soft-tissue infection following a spider bite complicated by *Pseudomonas aeruginosa* bacteremia. She required multiple surgical debridements. After treatment with meropenem, she developed carbapenem resistance and was treated with 4-weeks of ceftolozane-tazobactam (C/T) with a successful outcome. During therapy she developed a possible dose-dependent thrombocytosis. This has not been previously reported.

Case: A 5-month-old female with no significant past medical history was brought to the emergency department (ED) following a spider bite on her left thigh. She had fever of 103F, reduced oral intake, and urine output. The area was necrotic, with an erythematous ring and lymphangitic spread. The patient developed septic shock, was intubated, and transferred to the pediatric intensive care unit. Supportive care, piperacillin-tazobactam, clindamycin and vancomycin were initiated for suspected necrotizing fasciitis, and she underwent multiple surgical debridements of the left thigh. *P. aeruginosa* with reduced susceptibility to piperacillin-tazobactam was isolated. She was diagnosed with ecthyma gangrenosum. Antibiotic therapy was changed to meropenem and vancomycin. Subsequent wound cultures exhibited fulminant carbapenem resistance, likely secondary to upregulation of MexAB-OprM efflux pump and reduced expression of OprD porin channel. Meropenem was changed to C/T. She developed thrombocytosis 48 hours later. A graft was placed over the area, she was extubated, and discharged home. To date, there is no immunologic explanation for the patient's course.

Discussion: We believe this is the first case report of C/T-dose-associated thrombocytosis, likely from using the patient's admission weight for dosing, not considering weight changes during hospitalization. Once adjusted, thrombocytosis resolved. There were no other explanations for the patient's thrombocytosis and no rechallenge to verify a drug-induced etiology.

Conclusion: This case report highlights the need for timely treatment and pharmacotherapy in an aggressive wound infection, with consideration for rapidly developing antimicrobial resistance and drug-induced causes of unexplained thrombocytosis.

249. Oral ibuprofen dose-escalation for the treatment of patent ductus arteriosus, a case report.

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Introduction: The ductus arteriosus (DA) is a vascular connection present during fetal development that diverts blood from the main pulmonary artery into the aorta and generally closes within the first 72 hours of life. In preterm infants, a patent ductus arteriosus (PDA) may occur where the DA fails to close resulting in pulmonary overcirculation and systemic hypoperfusion. When hemodynamically significant PDA occurs, pharmacologic treatment to induce closure is warranted and includes acetaminophen, ibuprofen, or indomethacin.

Case: We present a case of a 23-week gestational age female with heart murmur noted on physical exam and development of metabolic acidosis on day 3 of life. Echocardiogram revealed small to moderate PDA progressing in size over the following 10 days warranting pharmacotherapy. The initial treatment strategy utilized standard-dose oral ibuprofen 10 mg/kg, followed by 5 mg/kg for a total of three doses. Results of repeat echocardiogram were unchanged, and a second course of treatment was initiated at an escalated dose of 20 mg/kg, followed by 10 mg/kg for an additional three doses. Over the treatment course, no adverse drug events/reactions were observed including, but not limited to, renal insufficiency, necrotizing enterocolitis, intraventricular hemorrhage, etc. Repeat imaging conducted four days after completion of the second course of treatment resulted in a reduction in the size of the PDA.

Discussion: There are multiple pharmacologic options available exhibiting similar efficacy. Current literature has demonstrated the efficacy of high-dose oral ibuprofen compared to standard-dose therapy for reduction in size and/or closure of PDA in preterm neonates. However, insufficient data exists regarding ibuprofen dose-escalation after initial treatment failure with standard-dosing strategies.

Conclusion: The case report described above suggests that there may be a relationship with the outcome of interest, a reduction in size of PDA and dose-escalation of oral ibuprofen therapy after treatment failure with standard dosing strategies.

Substance Abuse/Toxicology

250. Case report of plasma exchange in rivaroxaban overdose and severe traumatic brain injury.

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Introduction: The management of rivaroxaban overdose in critically ill patients is not clear. Real-time, serum rivaroxaban concentration assays are not available making the role of specific treatment modalities such as andexanet alfa (AA), prothrombin complex concentrates (PCCs), and plasma exchange (PLEX) unproven.

Case: A 36-year-old female presented to the hospital following suicide attempt, initially presumed from an insulin overdose, and severe traumatic brain injury (sTBI). Imaging demonstrated bifrontal contusions and 6mm left subdural hematoma. Admission INR and TEG reaction time were 4.8 and 85, respectively, but chromogenic low-molecular weight heparin anti-Xa (AXA) concentration was low at <0.1 units/mL.

Thirty-four units/kg of PCCs and 10 mg of vitamin K were administered. Despite this, the coagulopathy did not improve, and her neurologic exam declined over the next 11 hours. Further history revealed possible rivaroxaban overdose. Repeat AXA was >1.8 units/mL and AA was administered. A decompressive hemicraniectomy was deemed necessary but the 3-hour post-reversal AXA remained >1.8 units/mL. PLEX was emergently initiated prior to surgery for drug removal. Serum rivaroxaban concentrations pre- and post-PLEX were 534.6 ng/mL and 256.8 ng/mL, respectively. PLEX effluent AXA was >1.8 units/mL suggesting rivaroxaban removal. The patient received a hemicraniectomy without intra-operative or post-operative bleeding complications.

Discussion: Providing hemostatic substrate and reversal agent have demonstrated promise in medical and traumatic intracranial hemorrhage with PCCs and AA, respectively. However, rivaroxaban overdose in sTBI is lacking in the literature. PLEX may be a viable adjunctive treatment for drug removal as rivaroxaban is highly protein bound. One prior case report demonstrated ~50% drug removal based on AXA, but that was likely at a therapeutic concentration whereas this case demonstrated removal at supratherapeutic concentration.

Conclusion: This case documents the management of rivaroxaban overdose in the setting of sTBI including PCCs, AA, and PLEX. PLEX may be an important adjunct to consider for rivaroxaban removal.

251. Management of Massive Intentional Warfarin Overdose with Phytonadione.

Amanda Weber, Pharm.D.
VA Northeast Ohio Healthcare System, Cleveland, OH

Introduction: Guidelines exist for management of elevated international normalized ratio (INR) however these do not address acute intentional warfarin overdose.[1-2] Limited case reports describe massive warfarin ingestion (greater than 300 milligrams) with varying management approaches.[3-6] This case describes an adult ingestion of warfarin 500 milligrams (mg) managed with multiple doses of intravenous and oral phytonadione (vitamin K).

Case: A 62 year old male with a past medical history significant for depression, polysubstance use, and recurrent pulmonary embolism (on chronic warfarin) presented to the emergency department 5 hours after ingestion of approximately 500 mg of warfarin in a suicide attempt. There were no known co-ingestions and no signs of bleeding. Initial INR was 3.28, hemoglobin was 16.7 and computed tomography scan of his head was negative for bleeding. He received intravenous phytonadione 10 mg, poison control was contacted, and he was admitted to the hospital. Over the first 5 days, he received multiple doses of oral and intravenous phytonadione in response to INR trend (40 mg total). INR peaked at greater than 14 approximately 48 hours after the ingestion, fell to less than 4 then increased again to a max of 8.55 around 90 hours after the ingestion. He remained without signs of bleeding and was transferred to inpatient psychiatry. INR decreased to less than 2 ten days after the overdose.

Discussion: A similar case demonstrated successful management of a massive warfarin overdose (more than 400mg) with a phytonadione only strategy.[3] The patient also had two INR peaks and received a total of 22.5 mg phytonadione. This type of strategy can avoid risks and costs associated with other reversal options including fresh frozen plasma and prothrombin complex concentrates.

Conclusion: This case adds to the literature describing management of massive warfarin overdose using multiple doses of phytonadione in a non-bleeding patient.

VPS ENCORE PRESENTATIONS

Cardiovascular

252. Managing Type 2 Diabetes in patients with Cardiovascular Disease.

Beryl Lai, MClinPharm, PGCertPharm, BPharm and Johnny Nguyen, GradCertPharmPrac, BPharm
Department of Pharmacy, Royal Melbourne Hospital, Royal Melbourne Hospital, Parkville, VIC, Australia

Presented at The Society of Hospital Pharmacists of Australia (SHPA) National Conference, December 1-3, 2022 in Brisbane, Qld.

253. Evaluation of Post-Surgical Discharge Amiodarone Monitoring and Toxicities at a Cardiac Care Center in the United Kingdom.

Natalie Kinstler, Pharm.D. Candidate[1], Ellen Schellhase, Pharm.D.[2], Monica L. Miller, Pharm.D., MS[3], Sotiris Antoniou, FFRPS, MRPharmS, MSc, Dip Mgt, IPresc[4], Sadeer Fhadil, MFRPSI MRPharmS IPresc[5] and Paul Wright, MFRPSII MRPharmS IPresc[6]
(1)College of Pharmacy, Purdue University, West Lafayette, IN (2)Purdue University, West Lafayette, IN (3)Department of Pharmacy Practice, Purdue University College of Pharmacy, West Lafayette, IN (4) Department of Pharmacy, Barts Health, London, United Kingdom (5)Barts Health NHS, London, United Kingdom (6)Saint Bartholomew's Hospital, London, United Kingdom

Presented at ASHP Midyear Clinical Meeting and Exhibition, Las Vegas, NV, December 5, 2022.

Education/Training

255. Pharmacogenomics Education in U.S. Doctor of Pharmacy Programs: A Cross-Sectional Survey Study.

Megan Geesaman, Pharm.D. Candidate[1], Sarah Goldsmith, Pharm.D. Candidate[1] and Kevin T. Fuji, Pharm.D., MA[2]

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Presented at the American Pharmacist Association Annual Meeting, Phoenix, AZ, March 24, 2023

Endocrinology

256. Effects of Ertugliflozin on Uric Acid and Gout-Related Outcomes: Post Hoc Analyses from VERTIS CV.

Vikas Sridhar, MD[1], Francesco Cosentino, MD, PhD[2], Samuel Dagogo-Jack, MD, DSc[3], Richard Pratley, MD[4], Robert Frederich, MD, PhD[5], Margaret Noyes Essex, Pharm.D.[6], Mario Maldonado, MD[7], Chih-Chin Liu, PhD[8], James P. Mancuso, PhD[9] and David Z. I. Cherney, MD, PhD[1]

(1)Department of Medicine, Division of Nephrology, University Health Network and University of Toronto, Toronto, ON, Canada (2)Unit of Cardiology, Karolinska Institute & Karolinska University Hospital, Stockholm, Sweden (3)University of Tennessee Health Science Center, Memphis, TN (4)AdventHealth Translational Research Institute, Orlando, FL (5)Pfizer Inc., Collegeville, PA (6)Global Medical Affairs, Pfizer Inc, New York, NY (7)MSD Limited, London, United Kingdom (8)Merck & Co., Inc., Rahway, NJ (9)Pfizer Inc., Groton, CT

Presented at the ADA's 82nd Scientific Sessions, New Orleans, LA, June 3–7, 2022.

Gastroenterology

257. Efficacy and Safety of Investigational Microbiota-based Live Biotherapeutic RBX2660 in Individuals with Recurrent *Clostridioides difficile* Infection from 5 Prospective Clinical Studies: An Update.

Adam Harvey, PhD, *Beth Guthmueller, AS* and Lindy Bancke, Pharm.D.
Rebiotix Inc., a Ferring Company, Roseville, MN

Presented at American Society of Health-system Pharmacists Midyear Clinical Meeting and Exhibition, Las Vegas, NV, December 4-8, 2022.

Infectious Diseases

258. SAFETY AND EFFICACY OF RBX2660 IN REDUCING RECURRENT *CLOSTRIDIOIDES DIFFICILE* INFECTION IN IMMUNOCOMPROMISED PARTICIPANTS.

Erik Dubberke, MD, MSPH[1], Monika Fischer, MD[2], Glenn Tillotson, MS, PhD[3], *Monique Bidell, Pharm.D.*[4], Beth Guthmueller, AS[5], Frederikke Høyer, MS[6] and Carolyn Alonso, MD[7]

(1)Washington University School of Medicine, St. Louis, MO (2)Indiana University Health, Indianapolis, IN (3)Medical Affairs Department, GST Micro LLC, Henrico, VA (4)Ferring Pharmaceuticals Inc, Parsippany, NJ (5) Rebiotix Inc., a Ferring Company, Roseville, MN (6)Ferring Pharmaceuticals Inc., Copenhagen, Denmark (7)Division of Infectious Diseases, Beth Israel Deaconess Medical Center, Boston, MA

Presented at Digestive Disease Week, Chicago, IL, May 6-9, 2023.

Medication Safety

259. Medication Usage Evaluation of Vigabatrin to Assess Adherence to REMS Criteria.

Huinan Xia, Doctor of Pharmacy
Duke University Hospital, Durham, NC

Presented at the American Society of Health System Pharmacists Midyear Clinical Meeting & Exhibition, Las Vegas, NV, December 4-8, 2022.

Substance Abuse/Toxicology

260. Community First Responder Program.

Anita Jacobson, Pharm.D. and Abiodun Ologunowa, BS
Pharmacy Practice, University of Rhode Island, Kingston, RI

Presented at the American Pharmacists Association Annual Meeting, Phoenix, AZ, March 24-27, 2023.

VPS SYSTEMATIC REVIEWS/META-ANALYSIS

Critical Care

268. Implications of opioid sparing effects for critically ill patients: a scoping review.

Gabriella Gambadoro, Pharm.D.[1], Brian Erstad, Pharm.D.[2] and Brian Kopp, Pharm.D., FCCM[3]

(1)Department of Pharmacy, Banner University Medical Center - Tucson, Tucson, AZ (2)University of Arizona, Tucson, AZ (3)Department of Pharmacy, Banner - University Medical Center Tucson, Tucson, AZ

Background: The aim of this scoping review was to conduct an updated analysis of potential opioid-sparing agents in heterogeneous populations of critically ill patients in the intensive care unit (ICU) setting.

Methods: Eligible studies included randomized controlled trials (RCTs) published between October 1, 2019, and January 1, 2023, with attention to non-opioid agents utilized in adult patients admitted to the ICU. This criterion was selected to capture trials published since the

last systematic review published in 2020. The most recent search was done in collaboration with an experienced medical librarian in February 2023. The bibliographic database search included PubMed and Cochrane Library and was supplemented by reviewing references of key articles. The data charting process was completed in accordance with previous scoping review protocols, and discussions were held with two other reviewers for a consensus on included articles.

Results: Of the 252 titles and citations identified, 215 titles remained after duplicates were removed. There were 196 excluded at title and abstract screening. Of the 33 articles left for full-text review, only six met inclusion criteria. The most common reasons for exclusion were due to article type and non-ICU initiation of study medication. Three studies compared two non-opioid agents and the other three compared one non-opioid agent to placebo or control. Four of the six studies showed a difference in opioid consumption.

Discussion: The primary limitation of this scoping review is the potential for missing studies. Limited evidence from recent RCTs suggest that non-opioid agents may reduce opioid requirements but data demonstrating direct patient benefits, such as reducing opioid-related adverse effects are lacking. Additional studies are needed to determine more tangible benefits of utilizing opioid-sparing strategies in critically ill patients.

Other: No funding was received.

Hematology/Anticoagulation

269. Topical intrapleural application of tranexamic acid in thoracic surgery: A systematic review and meta-analysis of randomized controlled trials.

Amer Alzahrani, MD[1], Hadeel Alkofide, Msc, PhD[2], Hala Joharji, Pharm.D.[3], Ghazwa Korayem, BSc Pharm, Pharm.D., BCPS[4], Sarah Aljohani, Pharm.D.[5], *Mashael AlFaifi, Pharm.D., BCPS*[6] and Khalid Al Sulaiman, B.Sc Pharm, BCCCP, BCNSP, MBA[7]

(1)King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia (2)Department of Clinical Pharmacy, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia (3)King Faisal Specialist Hospital and Research Centre Organ Transplant Center of Excellence, Riyadh, Saudi Arabia (4)Department of Pharmacy Practice, College of Pharmacy, Princess Nourah Bint Abdulrahman University, Riyadh, KSA, Saudi Arabia (5)Department of Pharmaceutical Services, King Abdulaziz University Hospital, Jeddah, Saudi Arabia (6)Pharmaceutical Care Department, King Saud Medical City, Riyadh, Saudi Arabia (7)Pharmaceutical Care Department, King Abdulaziz Medical City, Riyadh, KSA, Saudi Arabia

Background: Bleeding remains a common complication post-thoracic surgery. Although intravenous tranexamic acid (TXA) has been shown to decrease blood loss, its use has been associated with several adverse effects. Accordingly, topical TXA has been proposed as an alternative to reduce bleeding with fewer systemic complications.

Methods: We searched Medline, Embase, and Cochrane Central databases for randomized controlled trials (RCTs) comparing topical TXA versus control (i.e., placebo) in patients undergoing lung surgery. The primary outcome was total post-operative blood loss at 24 hours. Secondary outcomes included were number of red blood cell (RBC) transfusions, and hospital length of stay (LOS). Meta-analyses were pooled using mean difference with inverse-variance weighting and random-effects.

Results: Of 575 unique records screened, three RCTs totaling 399 patients were included. Two studies (67%) were rated low risk of bias. The primary outcome of 24-hour post-operative blood loss was significantly lower in patients who received TXA (mean difference [MD] −93.6 ml, 95% CI −121.8 to −65.4 ml, I^2=45%). In addition, the need for RBC transfusion was significantly lower in the topical TXA group compared to control (MD −0.5 units, 95% CI −0.9 to −0.9 units, I^2=60%). However, there was no significant difference in the hospital LOS (MD −0.3 days, 95% CI −0.9 to 0.4 days, I^2=0%). These results remained consistent after several sensitivity analyses.

Discussion: We found a significant reduction in our primary outcome of postoperative blood loss in patients who were randomized to topical TXA. Secondary outcomes such as need for RBC transfusion, was lower in the TXA group, however, there was no difference in the hospital between groups.

Conclusion: Topical intrapleural TXA reduced blood loss and the need for blood transfusion in lung surgery. However, larger trials are needed to validate these findings and evaluate different TXA dosages on safety and efficacy outcomes.

Other: Topical intrapleural tranexamic acid in thoracic surgery

HIV/AIDS

270. Lenacapavir in the treatment regimen for HIV-1 infections: a systematic review.

Na Yi, Pharm.D. Candidate

Philadelphia College of Osteopathic Medicine, College of Pharmacy, Suwanee, GA

Background: Lenacapavir (SUNLENCA) is a capsid inhibitor that was FDA-approved in 2022 for the treatment of human immunodeficiency virus type 1 (HIV-1) infection. The purpose of this systematic review is to evaluate the efficacy and safety of lenacapavir in patients who have HIV-1 infection.

Methods: To conduct this systematic review, a literature search was done in February 2023 through PubMed, ClinicalTrials.gov, and Cochrane, using the terms "lenacapavir," "GS-6207," and "SUNLENCA." Studies with primary and/or secondary endpoints of a HIV-1 viral load of < 50 copies/mL were included. Preclinical trials and studies evaluating lenacapavir for other indications, such as pre-exposure prophylaxis (PrEP) were excluded. Risk of bias was assessed using Risk of Bias 2 in RevMan Web.

Results: Two notable trials were included. CALIBRATE, a phase 2 trial with 182 participants, had a primary outcome of percentage of patients with < 50 copies/mL of HIV-1 at week 5 of the study, and

CAPELLA, a phase 2/3 trial with 72 participants, had a secondary outcome of a HIV-1 RNA load of £ 50 copies/mL at week 4 of the study. While the CALIBRATE study showed no statistically significant difference between cohorts, the CAPELLA trial showed a statistically significant difference of 70.8% (95% CI 34.9%-90.0%, p < 0.0001), showing favorable results for lenacapavir.

Discussion: Lenacapavir received an expedited FDA approval as it was the first capsid inhibitor to display significant antiviral activity in studies. Despite this, the number of studies are limited, and both evaluated in this review were only conducted for approximately 52 weeks. Furthermore, only the CAPELLA trial was published to show favorable results for lenacapavir. Due to this, more research should be conducted to further evaluate efficacy and safety of lenacapavir for HIV-1 patients, especially for long-term use beyond one year.

Other: This study had no source of funding, conflicts of interest, or study registration.

Medication Safety

271. Impact of Pharmacist-Led Medication Safety Interventions for Older People Living in Nursing Homes: Systematic Review and Meta-Analysis of Randomized Controlled Trials.

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(1)College of Pharmacy, Qatar University, Doha, Doha, Qatar (2) Department of Plastic Surgery, Hamad Medical Corporation, Doha, Qatar

Background: Medication management is challenging in older people given the change in physiological functions. We aim to evaluate the impact of pharmacist-led intervention on medication safety compared to usual care among nursing home (NH) residents.

Methods: This study included randomized controlled trials (RCTs) evaluating pharmacist-led interventions targeting potentially inappropriate medications (PIMs) and hospitalizations among older people residing in NHs. Medline, Embase, Web of Science, CINAHL databases were searched. Search was supplemented by Google Scholar, clinicaltrials.gov, WHO-ICTRP, Cochrane Central Register of Controlled trials, and reference lists. Screening, extraction and risk of bias assessment (Cochrane's risk of bias tool for randomized trials) were done independently by the 3 investigators. Data analysis was performed using random-effects meta-analysis with effect sizes expressed as standardized mean differences with 95% confidence intervals (CIs). Sensitivity analysis and missing data estimation were conducted, and certainty of evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach.

Results: Nine RCTs assessing the efficacy of pharmacist-led interventions among 6378 residents of 188 NHs were included. Participants were mainly females with ages older than 65 and noticeable polypharmacy (n ≥ 5 medications). Compared to usual care, pharmacist-led interventions did not reduce PIMs (SMD = -0.15; 95% CI = − 0.34 to 0.03; I2 = 65.11%; p = 0.1; moderate certainty), or hospitalizations (SM = -0.11; 95% CI = − 0.25 to 0.03; I2 = 66.26%; p = 0.1; very low certainty).

Discussion: Results were not in favor of the pharmacists-led interventions compared to usual care among older adults. However, the focus on two outcome measures may not be sufficient to provide evidence on the impact of medication safety interventions. Included studies also had serious biases. Further robust studies are warranted to evaluate pharmacist-led interventions on clinical endpoints.

Other: The review was registered with PROSPERO, ID# 363809. No funding was received.

Oncology

272. A systematic review of safety and efficacy of the de-escalation of denosumab and zoledronic acid from every 4 weeks to every 12 weeks in cancer patients.

Sara Yin, Pharm.D. Candidate 2023[1], Alexandra Van-Slageren, MPharm[2], Abigail Mitchell, Pharm.D. Candidate 2023[1], Monica L. Miller, Pharm.D., MS[3] and Ellen Schellhase, Pharm.D.[1]

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Background: The majority of patients with multiple myeloma (MM), breast, or prostate cancer with bone metastases have evidence of skeletal-related events (SREs). Denosumab and zoledronic acid (ZA) are used for this due to their osteoclast activity inhibition. The Food and Drug Administration has approved both for every 4-week dosing. However, different intervals are seen in practice such as every 12 weeks. This systematic review targets the question: What data exists on the safety and efficacy for the de-escalation of denosumab and ZA from every 4 to every 12 weeks in cancer patients? Extended schedules of these agents beyond the approved 4 weeks was not significantly different with median time to first SRE.

Methods: ClinicalTrials.gov and PubMed were systematically searched through February 2023 for studies assessing denosumab or ZA therapy de-escalation in cancer patients. Eligibility criteria included cancer type, denosumab or ZA de-escalated therapy comparison, and efficacy or safety endpoints. Bias risk was assessed regarding randomization, blinding, and allocation sequence concealment among others.

Results: The denosumab review identified seven studies involving 1,083 participants, and the ZA review included six studies involving 4,096 participants. Parameters evaluated included mean time to first SRE, median overall survival, and median percent reduction in urine N-telopeptide/creatinine. Patients evaluated either had MM, breast, or prostate cancer. Both treatments demonstrated efficacy for a de-escalated regimen that was non-inferior to standard therapy.

Discussion: Meta-analysis for denosumab compared short-interval (<5 week) dosing with medium (5-11) and medium with long (>11 weeks). Because these were both non-inferior, but short and long dosing were not directly compared, it may be impactful to consider the medium interval. For many trials, only MM, or metastatic prostate or breast cancer patients were included. The review outcomes demonstrate favorable efficacy and safety data that could be utilized to support the consideration of extended dosing intervals.
Other: No funding nor COI.

Pharmacoeconomics/Outcomes

273. Heart Failure Mortality in United States Counties where Guideline Influencing Studies were Conducted: A Systematic Review.

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Medical University of South Carolina College of Pharmacy, Charleston, SC

Background: Heart failure (HF) is a leading cause of death in the United States (US). Whether US counties utilized for heart failure clinical trial sites differ from counties where these trials are not conducted in terms of heart failure burden and severity is unknown.
Objective: To compare HF mortality rates in US counties with and without clinical trial sites.
Methods: Randomized-controlled trials cited in the 2022 AHA/ACC/HFSA Guidelines for the Management of Heart Failure were assessed for inclusion. Studies were included if they were published in the year 2000 or later, evaluated a pharmacologic treatment for chronic HF, included ≥1 study site in the US, and reported study site location information on clinicaltrials.gov. HF death rates within each US county were ascertained, and those counties with and without clinical trial sites were compared.
Results: Twenty-seven clinical trials with sites in 439 US counties were identified for inclusion. In the 439 counties with clinical trial sites, the median of the age-standardized HF death rate per 100,000 was 197 (IQR, 164.1-225.1) versus 222.3 (IQR, 193.7-253.6) in counties without clinical trial sites. When all US counties were stratified into quartiles by increasing HF death rate, 93.8% (n=737) of the counties in the top quartile were counties without clinical trial sites versus only 6.2% (n=49) were counties with a clinical trial site.
Discussion: HF death rates are significantly higher in US counties without clinical trial sites. More deliberate selection of clinical trial sites may be needed to better study individuals at highest risk of heart failure mortality.
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