CONTINUITY OF CARE

Pharmacy Society of Wisconsin

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Poster Presentation Abstracts

Impacting Patient Perception of Quality of Life in Independent Specialty Pharmacy

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Background: Established in 2015, altScripts Specialty Pharmacy is an independent regional specialty pharmacy focused on providing specialty services to patients and health care providers helping to simplify complex medication therapies and ensure patients receive quality, timely care, and medication therapy management. All specialty referrals processed at altScripts Specialty Pharmacy are documented in a web-based software platform called Asembia1 utilized to optimize pharmacy operations, improve overall patient management, and capture real-time actionable data for patient-centered treatment evaluation. As patient advocates, we take a personal approach to monitoring for optimal therapy with recurring assessments reviewing patient perceived quality of life scores. In light of current trends of US Centers for Medicare & Medicaid Services focus on value-based outcome measures, we aim to further explore the impact of our services on patient's lives.

Methods: The specialty documentation platform allows the pharmacy to create individual action plans for scheduling patient-specific interventions and tracking outcomes. One of the targeted measures includes patients' perception of the impact their illness has on their quality-of-life, which is evaluated at the start of treatment and again at 3-6 month health assessment intervals throughout the course of treatment. We are evaluating the impact we have found in improving our patient's perception of quality of life scores during treatment.

Results: Preliminary data below suggests a significant improvement in QOL scores when comparing values from before and during treatment with various therapies.

Implementation of an Anticoagulation E-service

McKinsey Clark, PharmD, Julie Bartell, PharmD, BCACP

Background: To improve patient and provider satisfaction while increasing provider efficiency and expediting International Normalized Ratio (INR) results and instructions to patients who are followed remotely.

Methods: Patients who have previously been referred for anticoagulation care at the Monroe Clinic Pharmacotherapy Department, are currently participating in telehealth INR monitoring, and have been stable on warfarin therapy for 6-8 months will be included in the pilot. Participating patients will first fill out a questionnaire online sent to them through Epic's MyChart®. They will answer questions pertaining to missed or extra warfarin doses, diet and lifestyle changes, and changes in over-the-counter or prescription medications. Questionnaires will be assessed by a pharmacist who will subsequently release an INR order to the Monroe Clinic or other pre-specified health system subsidiary. Once the INR result is received by the pharmacist, they will assess the INR and make any necessary changes to warfarin therapy via online MyChart® communication. Patients will be required to attend a clinic office visit rather than use online services for further assessment or triage if one or more of the following criteria are met: critical INR (INR >4.5 or < 1.5), recent serial dose changes as defined by more than one permanent dose adjustment in a row, or signs and symptoms of bleeding or thromboembolism. We will measure change in patient and provider satisfaction on a Likert scale. Lastly, we will conduct a time study comparing pharmacist hours spent on telephone versus online services and changed in elapsed time to patient notification of INR result. All data will be de-identified and maintained confidentially.

Implementation of Clinical Pharmacist within a Peripheral Arterial Disease Care Team

Michael Heltne, 2020 PharmD Candidate, Catherine Lea, RPh, BCACP, Andrew Calvin, MD, MPH, FACC

Background: Peripheral arterial disease (PAD) is a chronic vascular condition that encompasses a multitude of contributing factors yet receives limited attention compared to other atherosclerotic cardiovascular diseases. The mainstay of treatment is risk factor modification, which typically involves chronic disease state management with medications. There may be challenges regarding medication adherence, drug-drug interactions, and disease burden. Pharmacists are trained in chronic disease management and can be a highly beneficial member of the care team focusing on optimizing medication use. We hypothesized that incorporating a primary care clinical pharmacist into the PAD care team at Mayo Clinic Health System- Eau Claire would enhance adherence to the six tenants of PAD care set by the American Heart Association, along with increasing pharmacist interventions, and positively impacting cost of care.

Methods: After determination of potential benefit from a clinical pharmacist appointment from their primary cardiologist, patients were referred to see a pharmacist. Patients underwent Medication Management Services (MMS) appointments, and pharmacist interventions were documented and tracked within a shared electronic medical record. All medication changes were completed through a collaborative practice agreement.

Results: We studied 22 patients, who averaged 7 pharmacist interventions per patient over the study period with a range of 3-15 interventions per patient within the group. These interventions ranged from patient education on their medications and adherence strategies, to initiating or stopping medications. These interventions were estimated to provide cost savings/avoidance of $28,000 for the group.

Conclusion: Future directions of this analysis may be conversion to a controlled trial, as well as expanding pharmacist involvement with the PAD care team to maintain positive changes long-term

Opting for an "Opt Out" Approach to Enhance Tobacco Cessation

Kyle Arnoldussen, PharmD, Lindsey Crubaugh, PharmD, Julie Bartell, PharmD, BCACP

Background: In 2012, the Joint Commission initiated tobacco cessation measures in response to reports of less than one third of tobacco users receiving assistance with tobacco cessation at hospital discharge. These measures recommend all hospitalized patients identified as tobacco users, receive tobacco cessation services, and have follow up within one month of discharge. The purpose of this study is to implement an “opt out” approach to tobacco cessation services for all hospitalized patients who use tobacco at the Monroe Clinic, and determine the impact on utilization of the tobacco cessation clinic and overall cessation rates at 3 and 6 months.

Methods: Hospital pharmacists will assess patients admitted to the Monroe Clinic Hospital for tobacco use in the last 30 days during the initial patient interview. Individuals who have smoked tobacco products in the past month, are over the age of 18, and have seen a Monroe Clinic provider within the past 12 months will be automatically referred for tobacco cessation services at discharge. Before discharge, the hospitalist providing care will discuss the referral to the tobacco cessation clinic with the patient. Patients can decline treatment at that time, thereby opting out of the service.

Results: From October 1st, 2019 through December 31st, 2019, 82 of the 101 patients referred to the tobacco cessation clinic were from inpatient providers. In comparison, 10 patients were referred over the same time span in 2018. This indicates the implementation of the “opt out” approach has increased the referrals placed by 720%.

Conclusion: Use of the “opt out” approach has substantially increased the referrals placed for tobacco users to the Monroe Clinic Tobacco cessation clinic. More data is needed to assess its impact on no show rates and overall cessation rates at 3 and 6 months.

Development and Implementation of a Pharmacist-led Respiratory Service

Taylor Mills, PharmD, Dan Wilk, PharmD

Background: Diabetes is a complex disease that requires multiple approaches to help patients achieve optimal outcomes. A support group that focuses on diabetes-related topics may help patients manage their disease and be actively involved in their healthcare which may result in better outcomes. The purpose of this project was to measure the outcomes of a pharmacist led diabetes support group that utilized both an established curriculum and guest speakers for patients from an urban, underserved population with type 2 diabetes. The institutional review board approved this study and this study received Concordia Intramural Research Grant funding.

Objectives: The primary objective was to assess if patients' A1C values would decrease after attending a pharmacist led diabetes support group for twelve months. Secondary objectives included assessing if patients' knowledge of diabetes, health literacy, and quality of life changed after attending a pharmacist led diabetes support group.

Methods: The curriculum and meeting logistics were finalized. The pharmacist leading the support group completed Healthy Interactions US Diabetes Conversation Map® Tools training. Guest speakers were contacted and confirmed. Patients were recruited from the clinic population. Patients received incentives for attending each monthly meeting. Patients' A1c values were gathered and the Newest Vital Sign Health Literacy Assessment Tool and Diabetes Quality of Life Brief Clinical Inventory were completed at baseline and 12 months. Patients' knowledge was assessed before and after each of the four Conversation Map sessions. Patients completed an end of year survey and were queried about what they enjoyed most and what they wanted to do more/less of during the meetings.

Results: Of five patients enrolled, two completed the 12-month support group. The diabetes support group was composed of a 58-year-old African American male and a 69-year-old African American female. At 12 months, one patient's A1c remained unchanged at 7.1% and the other patient's A1c increased from 6.6% to 6.8%. Participant scores improved by an average of 18% from the pre to post assessments of diabetes knowledge. Scores on the health literacy assessment deteriorated from baseline to 12 months. Participants expressed improved quality of life in terms of time management, self-discipline, diabetes knowledge and level of burden placed on their family members due to diabetes. After the completion of the diabetes support group, patients felt confident performing self-management strategies and were motivated to manage their diabetes.

Conclusions: A pharmacist led diabetes support group may improve participants' understanding of diabetes and quality of life; however, health literacy declined which is likely not a true assessment based on the small number of participants and the assessment's focus on arithmetic skills. In the future, a more robust support group population is needed to provide a more thorough analysis of quality of life and health literacy trends.

Leveraging Pharmacy Technicians to Improve Immunization Rates in Outpatient Pharmacies

Sarah Misselhorn, PharmD, Christopher Klink, PharmD, BCPS, Amy Mahlum, PharmD, BCACP

Background: Vaccines are essential to help prevent disease, protect the health of communities, and save lives. The city of Milwaukee's immunization rates lag those of Wisconsin as well as the Healthy People 2020 goals. Aurora Pharmacy is actively involved in the provision of immunizations; however, it currently relies on patient and provider referrals and age-based immunization recommendations. A more comprehensive immunization assessment could be facilitated through the use of available vaccine assessment tools that are based on the HALO factors (health, age, lifestyle, and occupation). Additionally, while by Wisconsin law pharmacists or interns must administer immunizations, pharmacy technicians can complete non-judgmental tasks to free up pharmacist time and improve efficiency. One of these tasks could be the administration of a vaccine assessment tool to patients to proactively identify needed immunizations and expand the scope of vaccinations provided.

Methods: Resources were developed to improve immunization rates and broaden the scope of vaccines provided in two Aurora Pharmacies. Technicians were leveraged to aid in this effort. The project was carried out in three phases. Phase 1 involved identification of ways to increase technician involvement in immunization services, identification of available vaccine assessment tools, and development of a proposed workflow. Phase 2 involved education of pharmacy staff and refinement of the immunization workflow and related resources. Phase 3 involved implementation of the technician-driven vaccine assessment tool workflow and data collection. The primary endpoint was the total number of non-influenza/non-recombinant zoster vaccines administered over a 3-month post-implementation period as compared to a similar pre-implementation timeframe. Key secondary endpoints included the change in scores from a 5 question pre- and post-implementation survey of pharmacy staff, the total number of vaccine screens performed, number of vaccine recommendations made to patients, and rate of vaccine refusal over the 3-month post-implementation period.

Results: Based on preliminary data for the primary endpoint there have been 23 non-influenza/non-recombinant zoster vaccines administered over six weeks at two Aurora Pharmacies. This is compared to 50 non-influenza/non-recombinant zoster vaccines administered over the 3-month pre-implementation period. For the secondary endpoints, there have been a total of 15 vaccine screens performed and 30 vaccine recommendations made to patients over six weeks. There have been 21.1% of people who declined the survey. Of the people that completed the survey, 77.8% refused to have vaccines administered.

Conclusion: Uptake of the vaccine assessment tool by pharmacy staff has been slower than expected leading to a lower than anticipated preliminary number of non-influenza/non-recombinant zoster vaccines administered. This indicates the need to improve pharmacy staff engagement. Additionally, the high rate of vaccine refusal indicates the need for training of pharmacy staff on how to overcome vaccine hesitancy.

Effects of Pharmacist Interventions Related to Safe and Appropriate Chronic Opioid Use in High-risk Primary Care Clinic Patients

Sarah Lopina, PharmD, Elyse Weitzman, PharmD, BCACP, Lei An, Garret Newkirk, PharmD, MS, BCPS, Bethany Seeboth, JD, Christopher Sobczak, MD, FACP, FAAP

Background: In 2018, Froedtert & the Medical College of Wisconsin (F&MCW) completed a study identifying opportunities for risk reduction among patients receiving chronic opioids (≥ 3 months of use) in primary care clinics across the enterprise. Opioid prescribing patterns and patient characteristics were described and opportunities for risk reduction according to The Centers for Disease Control and Prevention (CDC) 2016 Guideline for Prescribing Opioids for Chronic Pain were identified in respect to: high daily Morphine Milligram Equivalence (MME), concomitant benzodiazepine use, regular urine drug screens, tapering opioids, and naloxone prescribing. This study aims to evaluate if pharmacist intervention can be used to support protective parameters and promote appropriate opioid prescribing in the primary care setting.

Methods: This study uses software-generated reports to identify patients prescribed chronic opioids with an upcoming primary care appointment within two pilot clinics. Patients are then screened to include only those with an MME ≥ 90. Chart review is used to identify gaps in comparison to the CDC opioid prescribing guideline, and recommendations for protective interventions are made to providers via the electronic health record. Patient characteristics are also gathered such as age, use of alternative pain medications, and presence of protective factors and risk factors for opioid-related harms. Patients with active cancer, being prescribed opioids from an oncology clinic, or being managed by hospice and/or palliative care or a pain management clinic are excluded.

Results: Data collection and analysis are ongoing. To date, seventy-five patients taking chronic opioids were identified for screening from November 1st, 2019 to January 8, 2020 and 39 (52%) have been deemed eligible for inclusion. Patients were prescribed an average daily MME of 141.8, and 25 (64%) patients had one or more additional risk factors for opioid-related harms. Six patients (15%) were prescribed concomitant benzodiazepines. Twenty-seven opioid-related recommendations have been made for a total of 14 patients, with a 48.1% provider acceptance rate. A majority of recommendations involved tapering opioids (n = 12; 44%) or prescribing naloxone (n = 11; 41%).

Conclusion: In addition to evaluating the value of pharmacist recommendations regarding opioid use, this study also provides insight on the transformation of opioid prescribing trends at F&MCW since release of the CDC guideline and completion of the F&MCW 2018 opioid risks study. From data collection thus far, it appears that many of the high-volume chronic opioid prescribers have altered their opioid prescribing habits, and the need for pharmacist intervention may be reduced compared to what was originally expected.

Pharmacist-Directed Preoperative Antibiotics at Aurora BayCare Medical Center

Jacob Ellerbrock, PharmD, David Reeb, PharmD, BCPS

Background: To measure the impact on preoperative antibiotic guideline compliance post collaborative practice agreement allowing pharmacists to manage preoperative antibiotics at Aurora BayCare Medical Center.

Methods: All surgical departments at Aurora BayCare Medical Center were presented a collaborative practice agreement that would allow pharmacists to manage the preoperative antibiotic orders for their surgical patients. The departments that signed the agreement, had their patients' preoperative antibiotics assessed by a pharmacist the day before their surgery. Compliance with guideline based preoperative antibiotic therapy was ensured and changes were made by the pharmacist if necessary. The rate of compliance with guidelines and the rate of surgical site infections were collected for a three-month period (November 26th 2019 – February 26th 2020) and compared with three months' worth of data from 2018-2019 (October 1st 2018 - December 31st 2018).

Evaluating the Efficacy of Elastomeric Ropivacaine Pumps in Post-surgical Patients

Stephanie Bishop, PharmD, Jessica Benjamin, PharmD, Joshua Rekoske, PharmD

Background: The elastomeric ropivacaine pump continuously delivers local anesthetic to a patient's surgical site. It contains a rate controller that allows the flow rate to be changed according to patients' pain relief requirements and a bolus option that allows for breakthrough pain relief as necessary.

The purpose of this study is to determine the impact of the elastomeric ropivacaine pump compared to standard of care based on the following characteristics: length of inpatient stay, administration of inpatient pain medications, administration of pain medications post-discharge, and post discharge pain scores. Milligram Morphine Equivalent (MME) will be calculated for post-discharge pain medication administration to standardize the amount of opioids administered as different agents may be used.

Methods: Eligible patients are those greater than 18 years of age admitted to St. Mary's Hospital receiving elective ankle or shoulder surgery from January 1, 2020 through February 29, 2020. A retrospective chart review will be conducted to determine inpatient administration of opioids in the post-operative period. A MME will be calculated for each patient and the patient's length of stay will also be recorded. A standard questionnaire will be utilized to collect the post-discharge information. Patients will be contacted to answer questions about their pain score and pain medication utilization. MME will also be calculated for pain medication administration post-discharge. The primary outcome is pain medication use post-surgery. Secondary outcomes are length of inpatient stay and pain score. Patient identifiers and all protected health information (PHI) will be kept within an encrypted computer database housed within the hospital network system. All PHI identifiers will be removed in the database during data analysis.

Risk of Nephrotoxicity Associated with Vancomycin Therapy in Combination with Piperacillin-Tazobactam or Cefepime

Tanya Haasbeek, PharmD, Steven Lai, PharmD, Kelly Sylvain, PharmD

Background: Concomitant use of vancomycin with piperacillin-tazobactam (VPT) is frequently used in the inpatient setting as a broad-spectrum antibiotic combination to treat infections empirically, as these antibiotics cover Pseudomonas aeruginosa and methicillin-resistant Staphylococcus aureus (MRSA). An alternative option with similar broad-spectrum coverage is vancomycin with cefepime (VC). Multiple studies have demonstrated that there is a higher incidence of acute kidney injury (AKI) with VPT compared to VC. The purpose of this project is to determine the risk of nephrotoxicity in patients on concurrent pharmacologic therapy with VPT versus VC in order to educate providers on preferred broad-spectrum antibiotic use to avoid AKI.

Methods: This is a single center, retrospective chart review of patients admitted to St. Mary's Hospital from September 2018 to October 2019 on concurrent antibiotic therapy with either VPT or VC. Patients were included if they were: >18 years of age, started on the concurrent antibiotics within 24 hours of each other and remained on concurrent therapy for at least 48 hours with at least one vancomycin trough level documented, and a baseline serum creatinine level was obtained within 24 hours of antibiotic initiation. Patients were excluded if they were: pregnant, had a baseline serum creatinine (SCr) of >1.5 mg/dL, on dialysis at baseline, or had structural kidney disease. The primary outcome is the rate of AKI in patients on VPT versus VC, defined as an increase in SCr by ≥ 0.3 mg/dL or 50% from baseline within 7 days of antibiotic initiation. Secondary outcomes include the time from first dose of combination therapy to AKI, in-hospital mortality, hospital length of stay, hospital readmission rate within 30 days, and percentage of patients requiring renal replacement therapy. Data analysis between these two groups will be made after propensity matching has been done to eliminate possible confounding.

Medication Access Team - Decentralized Support Pilot

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Background: Froedtert & the Medical College of Wisconsin (F&MCW) Pharmacy services has a centralized team of certified pharmacy technicians that are dedicated to assisting with medication prior authorizations, financial assistance, and refill requests for patients. The team reviews benefits (pharmacy and medical), works with providers to obtain medication authorizations, approve refills and secures co-pay assistance as needed. In addition, the team will find alternatives when co-pay assistance is not available.

It was identified that these services at the F&MCW - Pulmonary Clinic had grown significantly, which strained current resources and the teams capacity to complete PA requests efficiently for timely completion of medication orders, appointment scheduling, and overall patient satisfaction.

Methods: To address these stressors, a multidisciplinary workgroup of both pulmonary clinic and pharmacy staff sought opportunities to create a more efficient and effective Medication Access Services support model. The new model consisted of deploying a certified pharmacy technician into the Pulmonary clinic to facilitate medication access responsibilities and was piloted for 3 months. The technician was located within the RN office with a dedicated workstation to foster optimal communication between team members.

The primary goals for the pilot were to reduce the administrative burden to clinic staff, improve efficiencies for all stakeholders (RNs, Pharmacy, and Providers) and maximize Top-of-License work.

Results/Conclusion: The pilot demonstrated a significant shift in workload off the local care team which resulted in realized top-of-license work the RN staff were able to direct towards direct patient care activities. Efficiencies around 'first touch times' and 'time to authorization on file' were realized and sustained through the pilot. Additional medication access services were also able to be offered through this model. These services consisted of the technician being able to obtain provider signatures, facilitating direct communication with stakeholders in real time, and having the ability to proactively enter medication referrals. These changes led to greatly improved workflows and staff satisfaction. As a secondary outcome of this model, medication fill rates nearly doubled, providing a revenue neutral addition of a pharmacy technician to the Pulmonary staff.

Evaluation of an Updated Pharmacist-driven Community-acquired Pneumonia (Cap) Care Pathway Process in Improving Patient Outcomes

Charina Ruiz, PharmD, Kelly Sylvain, PharmD, Yan Mao, PharmD, James Levin, MD

Background: Overutilization of antimicrobials in the healthcare system is a major driver of antimicrobial resistance. Antimicrobial resistance is associated with higher rates of mortality and morbidity, longer hospital length of stay, and increased healthcare costs. A CAP Care Pathway Process implemented at St. Mary's Hospital-Madison integrates the following antimicrobial stewardship practices into pharmacist workflow: discontinuing unnecessary antibiotics, transitioning from intravenous to oral antibiotic therapy, and shortening the duration of antibiotic therapy. These principles are all essential in preventing antimicrobial resistance which, in turn, improves patient outcomes.

The purpose of this study is to evaluate the impact of pharmacist-led antimicrobial interventions based on the CAP Care Pathway pre- and post-implementation of an updated CAP Pathway process.

Methods: Eligible patients include adult patients age 18 years or older admitted to St. Mary's Hospital with a diagnosis of CAP between November 2018 to January 2019 and November 2019 to January 2020. Exclusion criteria are as follows:

a. Patients admitted to the emergency department, intensive care unit, short stay unit, or labor and delivery unit

b. Patients admitted for an acute COPD exacerbation

c. Patients with an underlying lung disease such as cystic fibrosis, bronchiectasis, or empyema

d. Patients with a positive blood culture during the hospitalization

e. Patients in which antibiotics were broadened

f. Patients with any additional indication for antibiotics

Thirty patients from each of the following cohorts will be randomly selected:

a. Patients placed on the CAP Care Pathway during the pre-implementation period

b. Patients not placed on the CAP Care Pathway during the pre-implementation period

c. Patients placed on the CAP Care Pathway during the post-implementation period

d. Patients not placed on the CAP Care Pathway during the post-implementation period

A retrospective chart review will be performed for 120 patients and data will be analyzed according to the primary and secondary outcomes. Subgroup analyses will be performed between the pre- and post-implementation groups and between the CAP Pathway and non-CAP Pathway patients. The primary outcomes are average days of intravenous antibiotic therapy and the rate of azithromycin discontinuation based on a negative Legionella urine antigen. Secondary outcomes include average total days of antibiotic therapy (inpatient plus outpatient antibiotics), average days of azithromycin therapy, all-cause readmission rate within 30 days, and hospital length of stay. Patient identifiers and all protected health information will be maintained in an encrypted computer database housed within the hospital network system.

Assessment and Optimization of Vasopressin Use in Critical Care Patients at an Academic Medical Center

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Background: Vasopressin is a potent vasoconstrictor used in hypotensive patients to increase systemic vascular resistance and mean arterial pressure. Guidelines and medical literature have recommended best practices for the agent's use within clinical care. The objectives of this study are to define appropriate use of vasopressin based on literature review and expert opinion, evaluate the vasopressin prescribing and administration patterns in the intensive care units at Froedtert Hospital, and then compare the two practices in order to identify any potential gaps. Areas for improvements in cost-effective care will be identified and optimization strategies will be developed and implemented.

Methods: This single center retrospective study utilized pharmacy charge records to identify patients admitted to Froedtert Hospital who received vasopressin in the TICU, NICU, SICU, MICU, or CVICU between January 1, 2019 and March 31, 2019. Patients receiving vasopressin for organ donation or diabetes insipidus, pediatric patients (<18 years of age), and pregnant patients were excluded. Electronic medical records for each patient were manually reviewed and key data points and patient demographics were built into a data collection tool.

Results: Data collection and analysis is still underway. However, one recommendation of the study group was already implemented. Starting January 15, 2020 Froedtert Hospital changed its standard vasopressin sepsis infusion rate from 0.04 units/min to 0.03 units/min to align the organization's clinical practice with recommendations from the Surviving Sepsis Campaign and clinical trial evidence. This change is estimated to save $155,755 annually in regards to vasopressin use.

Standardization of Medication Repackaging and Non-sterile Medication Preparation in Preparation for USP <795>

Edward Conlin, PharmD, MBA

Background: United States Pharmacopeia (USP) published the updated version of USP <795>, a set of developed standards for the compound of nonsterile medications, first published in 2000. USP <795> standards were developed to help reduce risks of contamination, infection, or incorrect dosing of non-sterile products.

To ensure compliance with the updated version if USP <795>, policies and procedures will need to be updated or designed ensuring compliance. AdvocateAurora Health (AAH) operates 25 hospitals and over 70 outpatient sites, which will require updated policies and procedures to help them remain compliant with USP <795>. The project's goal is to understand the overall needs of the system and provide organizational support from system-level assuring compliance.

Methods: To ensure AdvocateAurora Health (AAH) is compliant with USP <795>, changes will need to be made to our non-sterile policies and procedures. To identify which changes will need to be made, we first identified the policies and procedures currently in place. Using a gap analysis survey sent out to all 25 AAH hospital inpatient pharmacy managers, packaging center, and district managers of outpatient retail pharmacies, we were able to assess the current state of compliance. A workgroup of pharmacy directors was assembled to help advise on the policies and procedures, along with any education for pharmacy personnel that will need to be created.

Overall, the project will result in a standard set of policies and procedures sites in the system shall follow on non-sterile compounding. The new set policies and procedures will be used to train new technicians and pharmacists on how to properly compound non-sterile products according to local regulations and USP <795>. After the adoption of updated policies and procedures, the initial gap analysis will be resent to the same pharmacy managers throughout the system. The gap analysis should show a shift away from practices that are non-compliant with the updated version of USP <795>.

Results: The desired results of the project are 100% compliance with the new USP <795> guidelines throughout the system, measured by the original gap analysis survey. The results will be shared after the conclusion of the project.

Determination of New Adult Premix Parenteral Nutrition Standard Formulations at Wisconsin Sites of Advocate Aurora Health

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Background: To determine new adult premix Parenteral Nutrition (PN) standard formulations based on historical use of commercially available premix PN formulations. In June 2019, Wisconsin sites of Advocate Aurora Health began using Central Admixture Pharmacy Services (CAPS), an external compounding pharmacy, to prepare all PNs. A premix PN standard formulation from CAPS would allow for extended beyond use dating, reducing the need for daily transportation of all PNs from the CAPS facility in Northern Illinois to all Wisconsin sites.

Methods: Patients at Wisconsin sites of Advocate Aurora Health who received PN between January and May 2019 were reviewed to determine how many patients transitioned from standard PN formulation to a custom PN formulation. All modifications from standard to custom PN formulations during this timeframe will be analyzed for commonalities.

Results: Between January through May 2019, there were 317 patients who received PN, resulting in 2976 PNs dispensed. Of the 317 patients, 70 (22.1%) transitioned from standard to custom PN formulation. The PN formulations were modified for the following reasons: 49 for electrolyte changes with potassium increase and sodium decrease being most prevalent, 26 for volume reduction (25 to minimum volume), 8 for dextrose changes (7 decreased), and 5 for protein increases. Modifications to PNs may have fit into more than one category. Additionally, 192 (60.6%) of 317 patients were maintained on a standard PN formulation for the length of therapy. Of those 192 patients, 83 (43.2%) received 2-liter standard PN formulation.

Safety of Empagliflozin in Veterans with Type II Diabetes

Sydney Whitaker, 2020 PharmD Candidate, Magdalena Siodlak, PharmD, Jessica Acker, PharmD

Background: Empagliflozin is a sodium-glucose cotransporter-2 (SGLT-2) inhibitor that works by decreasing the reabsorption of glucose in the kidneys. The American Diabetes Association supports the use of SGLT-2 inhibitors as an adjunct to first-line therapies, particularly in patients with chronic kidney disease, heart failure, or other atherosclerotic disease, as there may be added benefits to using this medication for renal and cardiovascular protection. While this new and innovative medication has many benefits, there are potential adverse events to consider including acute kidney injury, hypotension, urinary tract infections, ketoacidosis, and Fournier's gangrene. Further, there is limited data on the prevalence and risk of adverse events in the Veteran population, which may be at higher risk for adverse drug events due to medical complexity and older age. The purpose of this study was to evaluate the safety of utilizing empagliflozin in the Veteran population.

Methods: Patients with type II diabetes who had an active prescription for empagliflozin at the time of chart review (December 2019) and were at least 18 years of age were included in this retrospective electronic chart review. Out of these patients, 100 patients were selected and randomized via a random number generator and compiling it into a patient list. Excluded from this review were patients who were prescribed an SGLT-2 inhibitor from a provider outside of the VA system. The primary outcomes are to assess the safety of empagliflozin by analyzing the incidence of acute kidney injury, hypotension, urinary tract infections, ketoacidosis and Fournier's gangrene. Data will be summarized using descriptive statistics.

Implementation of a Clinical Decision Support Ordering Menu to Facilitate Deprescribing of Proton Pump Inhibitors

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Background: Long-term proton pump inhibitor (PPI) use has been associated with drug-drug interactions and an increased risk of nutritional deficiencies, infections, dementia, and chronic kidney disease. The purpose of this study is to evaluate the implementation of a clinical decision support menu for PPIs and adjunctive antacid therapies on deprescribing of inappropriate PPIs.

Methods: This pre-post quasi experimental study evaluated veterans prescribed VA formulary PPIs, omeprazole or pantoprazole, who received pharmacy services through the Milwaukee Veterans Affairs Medical Center. Data collected included demographic information, indication for PPI use as documented in the electronic medical record, and PPI prescribed, including dose, frequency, and duration of use based on fill data. A clinical decision support (CDS) ordering menu was developed, incorporating guideline-recommended therapy regimens and adjunctive therapies for conditions which may require PPI use. Baseline data was collected prior to implementation. At the beginning of the intervention period, PPIs were restricted to ordering within the CDS menu, compelling providers attempting to order new PPI prescriptions to utilize the CDS menu to assist in choice of therapy. Education was disseminated to providers at primary care clinic meetings prior to implementation about the existence and utilization of the new ordering menu. Additionally, a clinical reminder system was implemented, notifying providers when patients were prescribed a PPI for greater than 12 weeks for any indication, prompting reassessment. The interventions were implemented in a step-wise order, with the ordering menu going live prior to ordering restrictions. The primary outcome of this study was proportion of patients with appropriate PPI prescriptions, assessed by comparing collected data to guideline-recommended dosing regimens for given indications. The secondary outcome was the total number of PPI prescriptions before and after implementation of the study intervention.

Evaluation of the Effect of Dexmedetomidine on Ventilator Liberation and Hemodynamic Instability in Critically Ill Surgical Patients

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Background: Sedation and analgesia are often needed to improve critically ill patients' tolerance of intubation and mechanical ventilation assistance. The sedative agent selected may influence a patient's ability to wean off the ventilator and subsequently, their length of stay in the intensive care unit. Dexmedetomidine provides light sedation and negligible respiratory depression, making it a reasonable option for mechanically ventilated critically ill patients. These properties allow patients to participate in cares and providers to better assess readiness for ventilatory weaning. However, it carries its own set of risks, including dose-limiting bradycardia and hypotension. The purpose of this study was to assess the efficacy of dexmedetomidine-facilitated mechanical ventilator weaning and determine the incidence of hemodynamic instability in surgical critical care patients.

Methods: A retrospective study of adult patients at least 18 years of age who were admitted to the Surgical Intensive Care Unit (SICU), mechanically ventilated, and received a minimum of six hours of continuous dexmedetomidine therapy between January 2019 and May 2019 was conducted. The primary outcomes evaluated were ventilator liberation within 24 hours of initiating dexmedetomidine and a composite incidence of a single hemodynamic unstable event. An unstable hemodynamic event was defined as: 1) bradycardia with a heart rate less than 60 bpm, 2) hypotension with a systolic blood pressure less than 90 mmHg, diastolic blood pressure less than 50 mmHg, or a mean arterial pressure less than 65 mmHg, or 3) an increase of more than 0.04 mcg/kg/min of norepinephrine continuous infusion or an equivalent vasopressor. Patients were excluded if they were admitted to any other intensive care or general medicine unit, pacemaker dependent, or treated exclusively for nocturnal use for associated agitation during sleep or upon waking. Data collection included patient demographics, comorbidities, and admission diagnosis. Clinical variables collected at hours 0, 1, 2 and 4 included sedative and vasopressor doses, duration of dexmedetomidine until successful liberation from the ventilator and total, hemodynamics, Richmond Agitation Sedation Scale (RASS) level targeted and achieved, confounding administered medications, presence of infection, and mechanical ventilation settings. The patients' mean arterial pressure (MAP) and percent change from baseline for hemodynamic variables were calculated.

Pharmacy-Led Preoperative Medication Histories in Elective Cardiology Procedures

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Background: Patients undergoing elective coronary acute bypass graft procedures typically require postoperative inpatient monitoring for approximately five days or more, depending on additional complications. At Froedtert Memorial Lutheran Hospital (FMLH), procedures occur and can contribute to a high hospital admission influx. The pharmacy staff is expected to complete medication reconciliation within 24 hours of admission.

Patients present to clinic a week prior to planned procedures at FMLH, where they are seen by a provider and discuss which medications need to be held before surgery. After surgery, patients are admitted to FMLH and pharmacy staff conducts medication histories in order to provide a medication reconciliation concordant with FMLH's policies and procedures. Some post-surgical medication histories are not able to be completed within the desired time frame given the patient's status or other factors. This study aims to have pharmacy staff complete medication histories via phone before patients undergo elective cardiology procedures in order to improve patient safety, increase efficiency completing timely reconciliations, and provide an accurate home medication record.

Objective: Obtain pharmacy-led medication histories via phone prior to scheduled operative cardiology procedures.

Methods: A prospective phone call to adult patients scheduled for an elective cardiology procedure was conducted to complete a medication history prior to hospital admission. Patients with a high likelihood for admission were prioritized along with those who had complex home medication lists or home anticoagulation/antiplatelet medications. Medication histories were completed one week prior to a patient's scheduled surgery via phone call. Changes to home medication lists were assessed using descriptive statistics.

Results and Conclusion: To date, 12 patients were contacted as part of a Pilot data collection phase. Of these, 10 had medication histories obtained (83%) prior to admission. There were a total of 27 interventions made on 9 of the patients' medication lists. Two of the patients had questions that were triaged to another healthcare provider prior to their procedure. Pharmacist satisfaction measures are pending. Data collection is currently ongoing and results with final conclusions are pending.

Effects of Morphine Milligram Equivalent Mailing on Provider Opioid Prescribing: A Retrospective Observational Study

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Background: In March 2016, the Centers for Disease Control and Prevention (CDC) published new guidelines for prescribing opioids for chronic pain in response to rising opioid-related overdose deaths. Overdose risk is directly associated with daily dose morphine milligram equivalent (MME), and the recommendations suggest that clinicians carefully justify exceeding 90 MME per day, unless warranted by a cancer diagnosis or hospice care. Pharmacy benefit managers can optimize patient safety using retrospective drug utilization review to identify high-risk members and their providers. The purpose of this study was to examine the effects of a member-specific MME mailing on opioid, naloxone, and potentiator medication prescribing.

Methods: Participants were included if they received an average of ≥90 MME per day over a four-month period (3/1 – 6/30/2019) but excluded if they had a cancer diagnosis, were receiving hospice care, filled a prescription at a long-term care or oncology pharmacy and/or filled a prescription written by a hematologist or oncologist. Letters were mailed in July 2019 to providers managing patients in the intervention group, while providers managing patients in the control group were not contacted. The mailing was comprised of two pieces: an informational letter and prescriber-specific patient profiles with prescription data and average MME/day. Pharmacy claims data were acquired to compare four-month periods pre- and post-mailing.

Results: 1,012 members were identified, with 142 in the control group and 870 in the intervention group. 44 members were excluded, 7 from the control group and 37 from the intervention group, due to insurance ineligibility post-mailing. Repeated measures ANOVA with Tukey's post hoc comparisons revealed that a greater proportion of members in the intervention group had a reduction in average daily MME to <90 than in the control group, but the difference was not statistically significant (20.2% vs 17.8%, p=0.518). However, the intervention group declined significantly ($p<0.05$) in number of opioid fills, total quantity filled and days' supply over the four-month intervention period when compared to the control group. The potentiator count increased slightly in the intervention group (0.91+0.03 vs 0.95+0.03) while declining significantly ($p<0.05$) in the control group, but remained higher than the intervention group over the duration over the study (1.35+0.07 vs 1.21+0.08). Naloxone fills were similar between groups prior to the mailing, but the control group had greater fills following the mailing (control:0.074+0.013, intervention:0.012+0.005, $p<0.05$).

Conclusion: A reduction in average daily MME to <90 was seen in 20% of the intervention group. The decline in number of opioid fills, quantity filled and days' supply indicates initial benefits of an MME mailing and demonstrates the value of pharmacy benefit manager as part of the healthcare team to promote patient safety. Further research is warranted to determine the long-term effects of MME mailings on opioid use.

Alterplase Replacing "TPA" Across a Health System for Medication Safety

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Background: The primary objective of this project is to reduce or eliminate substitute terms for alteplase across the UW-Health system in order to enhance medication safety and alignment with national guideline changes and Institute for Safe Medication Practices (ISMP) recommendations. The secondary objective of this project is to determine the frequency of the use of substitute terms to refer to alteplase by profession in order to direct the audience of the intervention.

Methods: Quality improvement occurred in three different documentation domains across the health system from: the online database, pre-populated data within the electronic health record (EHR), and EHR documentation. The use of substitute terms to refer to alteplase was investigated within each domain using basic search functions and the search terms “tPA”, “t-PA”, “rtPA”, “rt-PA”, “tissue plasminogen activator”, and “recombinant tissue plasminogen activator”. Substitute terms were eliminated and corrected upon detection in the online database and pre-populated data within the EHR. EHR documentation was investigated using the search function of the patients’ charts within the first two days of hospital stay. A total of 15 patient charts were analyzed pre-intervention and post-intervention. Inclusion criteria of these 15 patients includes a discharge with a diagnosis of ischemic stroke during the admission and five of these patients were required to have received alteplase. Subgroup data was collected from patient charts to determine the incidence of substitute term use according to profession. This data will be categorized by providers (MD, APP, PA), pharmacists, nurses, and other.

Evaluation of Dexmedetomidine Usage in Critical Care Settings in an Academic Medical Center

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Background: Although dexmedetomidine (DEX) is recommended to sedate critically ill, mechanically ventilated patients, there is no consensus regarding optimal dosing. FDA approved doses range from 0.2 – 0.7 mcg/kg/hour, landmark trials allowed dosing up to 1.5 mcg/kg/hour, and infusion rates as high as 2.5 mcg/kg/hour have been reported in the literature. Vizient data showed Froedtert Hospital uses larger quantities of DEX than other comparable academic medical centers. The primary objective of this study was to assess the percentage of critically ill patients at Froedtert Hospital who received DEX at doses exceeding 1.5 mcg/kg/hr.

Methods: This was a single center retrospective study analyzing DEX dosing in critically ill adults between April 1, 2019 and September 30, 2019. Patients receiving DEX were identified via pharmacy charge records. Electronic health records for each patient identified with DEX charges were manually reviewed. Patients were excluded if they had a tracheostomy while on DEX. Secondary outcomes included potential cost savings associated with restricting DEX to doses ≤ 1.5 mcg/kg/hr and percentage of patients who experienced clinically relevant bradycardia on high dose (> 1.5 mcg/kg/hr) DEX versus lower dose DEX.

Results (preliminary as of 1/13/2020): During the specified time frame, 594 patients received DEX. Of those, 481 patients were adults in an intensive care unit (ICU) and did not have a tracheostomy. Only 3 patients (0.62%) received DEX at a rate greater than 1.5 mcg/kg/hr. These patients were receiving DEX while not mechanically ventilated, which is an off-label indication, and were taking other sedative/hypnotics either scheduled or as needed. During this 6-month period, the estimated cost savings if DEX doses were capped at 1.5 mcg/kg/hr instead of allowing higher rates was $478.50. None of these patients maintained on DEX at a rate of >1.5 mcg/kg/hr experienced clinically relevant bradycardia.

Conclusion: The DEX dosing observed in this study was at or below 1.5 mcg/kg/hr in nearly all critically ill patients evaluated. These results do not explain high institutional use of DEX. Further evaluation will be performed to determine if DEX utilization is driven by use in non-FDA approved indications such as alcohol withdrawal and sedation in patients who are not mechanically ventilated.

Assessment and Modification of QTc Alert within Electronic Health Record

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Background: Complete a retrospective review of the QTc best practice alert to assess the impact on cardiac monitoring and adjustments to medication therapies for patients and modify the alert to enhance its effectiveness.

Methods: Eligible patients included those who had an elevated risk score for QTc prolongation. A report was pulled from the electronic health record (EHR) for four Wisconsin sites over a two-week time frame. A retrospective review of 112 alerts was done. The primary outcome was to determine: if EKGs were ordered from the alert, if medications were discontinued using the alert, and additional cardiac monitoring following the alert. The secondary outcome was to review the risk factors causing the alert to fire most often and the percentage of providers providing reasoning behind bypassing the alert. Recommendations were made to the informatics team in order to optimize the alert to increase use. The plan is to reassess outcomes at 6 hospitals in Advocate Aurora Health in the future.

Results: Initial results from four Wisconsin sites. Primary objective results: 3.5% of EKGs ordered using the alert; 7.1% of medications removed while using the alert; and 27% of EKGs ordered within 48 hours after the alert firing.

Development and Implementation of a Fixed Dose Kcentra® Protocol in a Rural Hospital

Ashley Moore, 2020 PharmD Canidate, David Dulak, PharmD, BCPS

Background: Four-factor prothrombin complex concentrate (4F-PCC) is the preferred agent to be administered with intravenous vitamin K for the reversal of vitamin K antagonist (VKA) therapy in life threatening bleeds or urgent need for surgery. Current Fort Memorial Hospital anticoagulation reversal guidelines mirror the FDA approved dosing regimen for VKA reversal and include weight-based expert opinion dosing recommendations for factor Xa inhibitor reversal. In recent years, fixed dose 4F-PCC has become an area of interest due to potential for simplified administration and similar efficacy and safety profiles. Our task was to determine if switching from a weight-based dosing to a fixed dose protocol would be appropriate for our rural hospital setting.

Methods: A literature review was performed to assess fixed dose versus weight-based 4F-PCC dosing. In total, nine studies that included reversal of VKAs and two studies that included reversal of direct oral anticoagulants (DOACs) were included in the review. A retrospective evaluation and cost analysis were also performed for patients who received Kcentra® (4F-PCC) between the dates of 01/01/2017 to 12/01/2019 at Fort Memorial Hospital.

Evaluation findings and new dosing recommendations were initially presented to the Emergency Department Committee for approval due to the relative high usage of 4F-PCC in that patient care area. These approved recommendations are then to be discussed at upcoming Hospitalist and Surgery Committee meetings before final approval by the Pharmacy and Therapeutics Committee and implementation.

Results: Based on the literature review, a fixed dose of three vials of 4F-PCC (1500 units) for reversal of VKAs (with the ability to give an additional 1 vial [500 units] based on clinical response) and four vials (2000 units) for reversal of factor Xa inhibitors was presented to the Emergency Department Committee and subsequently approved. Retrospective chart review yielded a total of 23 patients who received 4F-PCC, with the majority of patients administered 4F-PCC for the reversal of VKAs (n=18, 78%). Five patients were administered 4F-PCC for the reversal of factor Xa inhibitors (two for rivaroxaban and three for apixaban). There were no reported incidences of thrombotic events post 4F-PCC administration. The average pretreatment International Normalized Ratio (INR) was 2.63 and a total of two (9%) patients presented with INRs less than 2. The cost analysis yielded an estimated $16,000 drug acquisition cost savings to the organization per year should the new 4F-PCC dosing regimen be officially approved.

Conclusion: A 4F-PCC fixed dosing regimen can effectively be implemented in a rural hospital setting. Not only does it offer an opportunity to simplify medication ordering and administration, but also eliminates potential wait time for INR results and yields substantial drug cost savings to the organization.

Evaluation of Adherence to DOAC Periprocedural Management in the Inpatient Setting

Stephanie Cailor, PharmD, Jeremiah Barnes, PharmD, BCPS

Background: Direct oral anticoagulants (DOACs) have increased in use as they are now favored over warfarin in appropriate patients for venous thromboembolism treatment and stroke prevention in non-valvular atrial fibrillation. Society guidelines consistently recommend these medications be held prior to procedures to prevent bleeding complications. The recommended duration of time off of anticoagulation varies depending on the bleed risk of the procedure, pharmacokinetics of the agent, and thromboembolism risk and renal function of the patient. Advanced knowledge of an upcoming procedure and coordination by the healthcare team is essential to ensuring DOACs are stopped for an appropriate amount of time peri-procedurally to help prevent adverse events related to excess bleeding. Due to the complexity of this coordination for hospitalized patients, the objectives of this evaluation conducted at one VA facility were to evaluate adherence to current guidelines regarding DOAC periprocedural management in the inpatient setting, determine if inappropriate management of DOACs perioperatively led to bleeding events, and determine methods that can be implemented to improve periprocedural management of DOACs in the inpatient setting.

Methods: A retrospective chart review was conducted on patients hospitalized between 7/1/2018 and 7/1/2019 who had an inpatient order placed for apixaban, rivaroxaban, or dabigatran. Patients were included in the evaluation if they received a dose of the DOAC in the hospital prior to an unplanned procedure (i.e. a procedure for which a planned anticoagulation hold was not initiated as an outpatient prior to admission). Data were collected regarding the indication for the DOAC, the patient's renal function, the procedure type and bleed risk, details regarding the timing of the DOAC hold if completed, and if any excess bleeding was noted post-procedure. Data will be analyzed using descriptive statistics. Quality improvement recommendations will be generated for the facility based upon evaluation findings.

Evaluation of Additional Corticosteroid Use in Infusion Reaction Prophylaxis for Obinutuzumab in Chronic Lymphoid Leukemia Patients

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Background: Obinutuzumab is a monoclonal antibody that is FDA approved to treat chronic lymphoid leukemia (CLL) or small lymphocytic lymphoma (SLL). It targets the CD20 antigen on B cells to cause directed cell death. Obinutuzumab has the potential to cause non-allergic infusion reactions triggered by cytokine release, which can increase patient morbidity and mortality and limit treatment. Current manufacturer recommended prophylaxis to prevent these infusion reactions includes dexamethasone or methylprednisolone, acetaminophen, and diphenhydramine prior to the start of the obinutuzumab infusion. Currently, a number of patients at Froedtert and the Medical College of Wisconsin receive additional prednisone prophylaxis the day before the infusion and the night following the infusion. The purpose of our study is to determine the impact of prednisone prophylaxis on the incidence of obinutuzumab infusion reactions.

Methods: A retrospective analysis was conducted of 100 patient charts for patients receiving obinutuzumab for dates between November 1, 2013 and July 1, 2019. Patients were eligible for evaluation if they were 18 years or older, had a diagnosis of CLL or SLL, received at least one dose of obinutuzumab, and were treated within the Froedtert Cancer Network. Patients were excluded if they were treated in a clinical trial or if they had an allergy to any of the recommended pre-medications or prednisone. Patient information was collected along with data on pre-medications, infusion reaction presence/severity, reaction resolution, and baseline characteristics and labs.

Measuring the Impact of Inpatient Pharmacists Dosing Warfarin and Time in Therapeutic Range for Inpatients During Their Stay

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Background: Warfarin (Coumadin®) is a vitamin K antagonist used as an anticoagulant in a variety of conditions.

Monitoring required for patients on warfarin may consist of daily, weekly, or monthly lab draws, including international normalized ratios (INRs), which help to guide the dosing of warfarin. Pharmacists are often utilized to dose and monitor warfarin for inpatients, due its complexity and many drug-drug interactions.

Many patients admitted to Ascension St. Joseph Hospital are already on or will be started on warfarin because of its generic availability and low cost, if an anticoagulant is needed. Warfarin is dosed and monitored daily by pharmacists, according to a P&T-approved protocol.

This project will assess time-in-therapeutic range (TTR) for the current pharmacist-driven dosing protocol, as well as after the implementation of a statewide warfarin protocol in early 2020.

Methods: Patients admitted to Ascension St. Joseph Hospital will be reviewed retrospectively for inclusion, specifically patients receiving warfarin for at least 3 days while inpatient, via the electronic medical record. Once a patient has met inclusion criteria, the following data will be collected: age, sex, weight, indication for therapy, target INR range, daily INRs, INR on admission, daily warfarin dose, total days of therapy, and new start warfarin vs. continued therapy from home. Average warfarin dose, median warfarin dose, % of INRs below target range, % INRs above target range, total number of critical INRs (INR > 5) and overall time in therapeutic range will be calculated based on the collected data. The time in therapeutic range will be calculated using the Rosendaal Method. The data collected will be categorized as data pre- and post-implementation of the standardized protocol and compared accordingly. The target sample size is ~250 patients, 125 patients reviewed using site-specific protocol and 125 patients reviewed after statewide protocol has been implemented. The statewide protocol has been approved but not yet implemented; data collection for these patients will begin shortly after implementation. In addition, for patients newly started on warfarin while inpatient, the first dose will be assessed for appropriateness and compliance with the approved protocol.

Ticagrelor Use for Acute Coronary Syndrome Before and After an Institutional Imitative to Increase Appropriate Use

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Background: According to the 2016 ACC/AHA guideline focused update on the duration of dual antiplatelet therapy in patients with coronary artery disease, ticagrelor and prasugrel are preferred over clopidogrel for patients receiving dual antiplatelet therapy (DAPT) following percutaneous coronary intervention (PCI) for acute coronary syndrome (ACS) and for those receiving medical management of ACS. In January 2019, the Cardiology Provider Group and Hospital Cardiovascular Committee at UnityPoint – Meriter Hospital in Madison, Wisconsin issued a clinical recommendation to use ticagrelor in preference to clopidogrel for these patients. However, barriers to implementation have limited its use. The purpose of this study is to investigate change in the rate of ticagrelor prescribing at UnityPoint Meriter Hospital and identify specific patient populations that would benefit increased use of ticagrelor.

Methods: Data from the Chest Pain – MI Registry® and the CathPCI® Registry® were extracted to identify patients who received care at UnityPoint Meriter Hospital and were candidates for DAPT following ACS or PCI. Data from June 1st, 2018 to August 31st, 2018 were compared to data from June 1st, 2019 to August 31st, 2019 – following the new institutional recommendation. Chart review was performed to determine pre-hospitalization antiplatelet regimens, concurrent anticoagulant use, DAPT indication and discharge antiplatelet regimens. Patients who were appropriate candidates for ticagrelor were identified based upon the 2016 ACC/AHA recommendations. The primary outcome was the number of patients who were eligible for ticagrelor who were discharged on this medication.

Results: 289 and 283 patients were identified from the registries in 2018 and 2019 respectively. Following exclusion of patients who were not candidates for DAPT, patients who were transferred for care at another hospital, discharged against medical advice, died before hospital discharge and patients for whom ticagrelor was contraindicated or a non-preferred P2Y12 inhibitor, 34 patients remained in the 2018 cohort, and 34 patients in the 2019 cohort. Of the 34 patients who were appropriate candidates for ticagrelor in 2018, one patient was prescribed ticagrelor at discharge. Following implementation of new recommendations regarding P2Y12 inhibitor use, ticagrelor use increased by 20.6% in patients for whom this therapy is preferred – with 8 of 34 eligible patients receiving ticagrelor at discharge.

Conclusion: Institutional use of ticagrelor increased following the institutional initiative; however, prescribing rates still remain suboptimal. Appropriate patients receiving ticagrelor in preference to clopidogrel for ACS suffer fewer ischemic complications with no increased risk of bleeding. However, high cost to patients, provider hesitance and confusion regarding appropriate P2Y12 inhibitor use often prevent prescribing of ticagrelor at discharge. In addition to an updated institutional recommendation, provider re-education and development of a process to determine affordability may further increase use.

Optimization of Granulocyte Colony Stimulating Factor Use Within a Large Health Care System

Anna Suwala, PharmD, Peter Stuessy, PharmD, BCPS, BCOP, Cara Boticki, PharmD, BCOP

Background: Granulocyte colony stimulating factors are high-cost drugs used to prevent neutropenic complications in patients receiving highly myelosuppressive chemotherapy regimens. However, in patients with metastatic solid malignancy, use of granulocyte colony stimulating factors to maintain dose density has not been shown to improve overall survival or progression-free survival. Both American Society of Clinical Oncology and National Comprehensive Cancer Network guidelines support utilization of chemotherapy dose reductions in lieu of granulocyte colony stimulating factors in this patient population. The objectives of the project are to evaluate current use of granulocyte colony stimulating factors in patients with metastatic solid malignancies within outpatient cancer clinics at our institution and align future use with guideline recommendations.

Methods: Electronic Health Record dispense reports for January 2019 were utilized to identify patients with metastatic solid malignancy, who received granulocyte colony stimulating factors. Patients receiving chemotherapy regimens with ≥ 20 % risk of febrile neutropenia were excluded. Data on malignancy, chemotherapy regimen, provider, patient comorbidities, and absolute neutrophil count was collected. Second set of data will be collected after implementation of provider, pharmacist, and nursing education is complete.

Results: A total of 60 patients with metastatic solid malignancy received granulocyte colony stimulating factor in the pre-implementation period. Two patients were excluded from the analysis due to receiving a chemotherapy regimen with ≥ 20% febrile neutropenia risk. Only 19/58 (33%) of patients received a reduced chemotherapy dose prior to initiation of granulocyte colony stimulating factor. Majority of patients did not have significant comorbidities or end organ dysfunction.

Conclusion: Despite guideline recommendations for utilizing chemotherapy dose reductions over granulocyte colony stimulating factors in patients with metastatic solid malignancy, such utilization persists within our institution. Provider, pharmacist, and nursing education followed by direct pharmacist intervention may prove to be an effective strategy at shifting practice away from granulocyte colony stimulating factors in this setting.

Provider Acceptance of Palliative Care Pharmacist Recommendations after a Comprehensive Hospice Medication Review

Alexandra Edinger 2021 PharmD Candidate, Allison Riendeau PharmD, Amanda Margolis PharmD, MS

Background: At the William S Middleton Memorial Veteran's Hospital, medication reconciliations are completed by the palliative care pharmacy specialist for each Veteran after hospice admission. Medication reconciliation includes discontinuing active prescriptions the patient is no longer taking, documenting new medications started by hospice, and determining medication payer source depending on the patient's primary hospice diagnosis. The pharmacist makes additional medication recommendations, a majority related to deprescribing, to decrease a patient's medication burden during their end of life care. Recommendations are compiled into a medication reconciliation note, placed into the chart, and forwarded to the patient's primary care team for consideration. The primary objective of this evaluation was to determine the proportion of medication recommendations accepted by providers as part of the pharmacist hospice medication reconciliation process.

Methods: A retrospective chart review was performed on hospice medication reconciliation notes for patients at the Madison VA. Approximately 100 notes from April 2019 to September 2019 were reviewed. The primary outcome was the percentage of medication recommendations accepted. Secondary outcomes included the actual cost savings from the accepted recommendations and the potential costs savings of recommendations not accepted or addressed.

Development and Implementation of a Collaborative Physician-pharmacist Care Model for Medication Assisted Treatment with Buprenorphine/Naloxone

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Background: A marked increase in synthetic opioid-related deaths occurred, with a 21.4% increase from 2015 to 2016 and a 12% increase from 2016 to 2017. Medication-assisted treatment (MAT) programs utilizing buprenorphine/naloxone for opioid use disorder decrease all-cause mortality. However, patient access to services is limited due to underutilization of services by clinicians. Reasons for underutilization include complexity of monitoring, medication safety concerns, and lack of supportive services, time, and expertise. Collaborative care physician-pharmacist care models decrease barriers and increase access to treatment but are not routine in practice. The objective of this quality improvement initiative was to develop and implement a collaborative physician-pharmacist care model for management of patients on MAT with buprenorphine/naloxone to minimize provider burden, expand access to treatment, and optimize patient care.

Methods: A physician-pharmacist collaborative practice model for management of patients on MAT with buprenorphine/naloxone was piloted at the Clement J. Zablocki Veterans Affairs Medical Center outpatient substance use disorder clinic. One-half day of clinic time per week was dedicated to physician-pharmacist shared medical appointments for a five-month trial period. Patients were included if currently prescribed buprenorphine/naloxone under the care of the addiction psychiatrist with appointments scheduled during the allotted joint clinic time. During the shared appointment, the pharmacist met with the patient first and then staffed the case with the physician. Pharmacist responsibilities included review of urine drug screens and state prescription drug monitoring reports, assessment of stability on current buprenorphine/naloxone treatment, naloxone prescribing and education, general medication review, and assessment and management of comorbid conditions. The physician was responsible for reviewing information collected by the pharmacist during the appointment and prescribing buprenorphine/naloxone. Descriptive data was collected including the number of patients seen, physician-time saved, medication interventions, and referral for other supportive services.

Evaluation of Positive *Pseudomonas Aeruginosa* Cultures for Population-based Empiric Therapy Considerations

Seungyong Yang, 2020 PharmD Candidate, Austin Stolze, 2020 PharmD Candidate, Susanne Barnett, PharmD, BCPS, Prakash Balasubramanian, MD, Paul Lata, PharmD, BCPS

Background: *Pseudomonas aeruginosa* (PSA) has been categorized as a serious public health threat, and can cause a wide array of infections including pneumonia (PNA), bloodstream infection (BSI), urinary tract infections, and skin and soft tissue infections. Often these infections are hospital-associated and categorized as multidrug-resistant (MDR), resulting in overuse of broad-spectrum antibiotics and double coverage. The current evaluation was conducted to characterize patients with positive PSA cultures in the fiscal year 2018 (FY18) to inform institution-specific population-based empiric gram-negative therapy for various disease states.

Methods: Microbiology provided a list of patients with a positive PSA culture in FY18. A retrospective review was conducted at William S. Middleton Veterans Administration Hospital. Metrics collected included: whether the PSA isolated was treated with antibiotics or was dismissed as non-pathogenic, illness severity, 6 MDR risk factors, laboratory-reported susceptibilities, and source of culture. Patients were categorized into four groups based on illness severity (critically ill vs. not critically ill) and if the PSA was treated or not. PSA was categorized as MDR per CDC definition and patient groups were evaluated for risk factors for MDR. Patients were further categorized by the site of infection.

Results: A total of 89 cases involving 78 patients were identified; 46 (52%) cases received PSA treatment while 43 (48%) were dismissed as non-pathogenic. Of these 46 cases, 17 (37%) involved critically ill patients vs. 29 (63%) not critically ill. Prevalence of 6 MDR risk factors among the patients receiving PSA treatments were as followed (% cases critically ill vs. % cases not critically ill): admission from nursing home/assisted living (18% vs. 3%), history of PSA culture in last 12 months (18% vs. 14%), immunosuppressant use in last 30 days (24% vs. 14%), history of transplant (6% vs. 7%), hospitalization in last 90 days (65% vs. 45%), antibiotic use in last 90 days (76% vs. 55%). Of critically ill, treated, PSA infections (n=17), 2 isolates were resistant to piperacillin/tazobactam, and 1 to cefepime; no MDR PSA isolates were identified. In total, 17 of 89 cases (19%) had positive blood, sputum, or a BAL culture, with no MDR PSA isolates; 12 (71%) of these cases received treatment (10 cases of lung infection (9 sputum, 1 BAL), 2 BSI).

Conclusion: Positive PSA cultures in FY18 were uncommon, with 46 cases treated as infection. In general, MDR risk factors were more prevalent in critically ill patients. PSA infections resistant to common gram-negative agents were rare in critically ill patients, suggesting empiric PSA double-coverage may not be necessary for these patients. Results will be considered in context of total FY18 cultures to determine need for empiric PSA monotherapy in non-critically ill patients. The current evaluation will inform a revision of decision support tools for various disease states such as PNA as a local, population-based approach.

Assessing the Utility of Layered Learning in Practical Pharmacy Education

Alexander W Gidal PharmD, Jeremiah Barnes PharmD, BCPS

Background: The layered learning model has shown positive results in reducing precepting demands on clinical pharmacists and extending pharmacy services. There is a lack of literature, however, examining the benefit to student and resident learning. At the end of the 2018-2019 academic year, a layered learning model was implemented at the Clement J. Zablocki VA Medical Center (ZVAMC) for the internal medicine advanced pharmacy practice experience (APPE) and resident rotations. This project aims to assess the educational value and institutional impact of the layered learning model at ZVAMC.

Methods: Pharmacy students from the University of Wisconsin Madison, Concordia University, Midwestern University, and The Medical College of Wisconsin Schools of Pharmacy participating in a 6 week internal medicine APPE at ZVAMC, as well as PGY1 pharmacy residents completing the same rotation were included in the analysis. During each rotation block 2 students were on rotation concurrently. Students were paired with a resident preceptor and participated in layered learning when resident rotation schedules overlapped with students, and were precepted traditionally by a shared clinical pharmacist otherwise.

Students and residents responded to questions about their perception of learning on retrospective pre/post surveys with 10-point Likert scale and subjective essay response questions. Resident surveys also included questions on teaching skills and confidence as a preceptor. In addition, students completed a pre/post assessment of pharmacotherapeutics knowledge on their first and last days of rotation. Quantification of student interventions was completed after rotation conclusion through retrospective chart review.

Results: At present, 6 students and 2 residents have completed the internal medicine rotation at ZVAMC. Of the students, 4 (67%) completed the rotation with a resident preceptor while 2 (33%) shared a clinical pharmacist as a preceptor. Average improvement in perceived learning across all assessment questions was 4.2 points in layered learning students and 1.6 in traditionally precepted students.

Data for this project are still being collected and analyzed. Other outcome measures will explore resident perception of learning and development as a preceptor, changes in student knowledge, quantification of student interventions, and qualitative student assessments of the layered learning model. An in-depth analysis of subjective and objective assessments will be presented.

Conclusion: Preliminary data demonstrates a potential benefit to learning with the layered learning model for pharmacy students. Adoption of the layered learning model for APPE rotations may improve student perception of learning while reducing precepting demands and potentially expanding pharmacy services.

Clinical Outcomes of Oral Cefuroxime and Cefpodoxime with Concomitant Acid Suppressive Therapy

Michael Fantl, PharmD, Melissa Forbes, PharmD, BCPS

Background: The second and third generation cephalosporins, cefuroxime and cefpodoxime, respectively, are routinely utilized for the management of respiratory and urinary tract infections (UTI). Both are administered as oral prodrugs that support their time-dependent, bactericidal pharmacodynamic profiles through improved bioavailability. Current literature contains illustrations of decreased oral absorption of cefuroxime and cefpodoxime when used in conjunction with histamine 2 receptor antagonists or antacids, and a similar effect is theorized with concomitant use of proton pump inhibitors. The clinical impact of this decreased absorption, however, is unknown. This investigation sought to determine whether the concomitant use of acid suppressive therapy mitigates the clinical effectiveness of oral cefuroxime or cefpodoxime therapy.

Methods: This investigation was a retrospective assessment of patients receiving oral cefuroxime or cefpodoxime for treatment of pneumonia or UTI between June 2017 and June 2019. Demographic, clinical, and outcomes data were extracted from a report generated from the electronic health record (EHR) and independent EHR review. Patients were allocated into two groups based on the presence or absence of concomitant acid suppressive therapy. The primary efficacy endpoints were rate of recurrent pneumonia requiring hospitalization within 30 days and rate of recurrent UTI within 180 days.

Results: Preliminary analysis of 340 patients demonstrated no significant impact of concomitant use of acid suppressive medications with oral cefuroxime or cefpodoxime. The incidence of recurrent pneumonia at 30 days was comparable between patients that received acid suppressive therapy and patients that did not (11.34% vs 6.03%, $p>0.05$). The incidence of recurrent UTI at 180 days was also similar between patients who received acid suppressive therapy and patients that did not (8.51% vs 10.05%, $p>0.05$).

Conclusion: Therapeutic efficacy of oral cefuroxime and cefpodoxime is not influenced by theoretical reductions in serum concentration due to concomitant use of acid suppressive therapy, as evidenced by comparable rates of recurrence of pneumonia and UTI.

Implementation of a Formal Pharmacy Technician Certification Preparatory Program in a Multistate, Integrated Health System

Kari Ford, PharmD, Angie Knutson, PharmD, BCPS

Background: Advocate Aurora Health (AAH) seeks to help people live well. To support achieving this goal, pharmacy technicians are required to become certified pharmacy technicians within one year of becoming a pharmacy technician. On January 1, 2020, the Pharmacy Technician Certification Board (PTCB) updated the requirements for certification. All candidates for certification are now required to 1. Complete a PTCB-recognized education/training program or 2. Complete equivalent work experience as a pharmacy technician (min. 500 hours). For pharmacy technicians to achieve certification, they are required to pass the Pharmacy Technician Certification Examination (PTCE) alongside the previously mentioned requirement. A formal pharmacy technician certification preparatory program is needed at AAH in order to prepare technicians for the upcoming changes and standardize technician certification preparation across the system.

Methods: Pharmacy technician certification preparation best practices were initially investigated to determine an adequate and cost-effective method to prepare technicians to pass the PTCE. Metrics on PTCE passing rates and the utilization of current materials endorsed by the system were gathered to assess the need for a formal preparatory program across the system. Online PTCB-recognized programs were formally evaluated. Two programs were reviewed for the following: content, PTCE pass rates, functionality, and end-user experience. Once this research was complete, a cost-benefit analysis was conducted to asses implementation of an online programs versus the potential costs associated with developing an internal PTCE preparatory program.

Results: It was determined that an online program would best serve the needs of AAH to prepare pharmacy technicians to pass the PTCE. Four pharmacy technicians (2 outpatient and 2 inpatient) trialed the selected program for 4 weeks before implementation across the system. During the trial, each technician had limited access to the online program, was responsible for completing 12 hours of program content, and progress was tracked by program administrators. Feedback from the trial showed that an online technician certification preparatory program is an easy-to-use program and simplifies PTCE content. Difficulties using the program on devices other than desktop computers was noted as a barrier to using the program. Overall the online program was highly recommended for other technicians to utilize for PTCE preparation. PTCE passing rates post- and PTCB certification rates pre/post program implementation were not assessed in this project at this time.

Second Victim Support for Pharmacy Caregivers

Shannon Stoeckmann, PharmD, Kyle Sabol, PharmD, BCPS

Background: Second victims in health care are providers involved in an unforeseen adverse patient event, medication error, and/or patient related injury. These caregivers become victimized in the sense that they experience a sense of personal responsibility for the patient outcome, feel as if they have failed the patient, and second-guess their clinical knowledge base. Advocate Aurora Health (AAH) offers an employee assistance program (EAP) to all caregivers at no cost. However, the AAH inpatient pharmacy department currently has no formal procedure in place to identify at-risk care givers immediately after a potentially traumatic event (PTE), or direct the caregiver to an appropriate support system. The purpose of this project is to develop a comprehensive procedure which promotes the early identification of caregivers involved in a PTE, direct involvement of pharmacy leadership, individualized intradepartmental support, and incorporation of AAH's mission and spiritual care (M&SC) and EAP.

Methods: A literature search was conducted to establish baseline needs of those suffering from second victim syndrome, as well as previous practices that have been implemented within other institutions. A four – component system of second victim support was developed to identify and support caregivers who have been victimized by an adverse patient event. This four-component system is comprised of self-identification by the caregiver, identification by pharmacy leadership, individualized peer support, and connection with M&SC and EAP.

Preliminary Results from a Longitudinal Mixed Methods Study of Medication Adherence in Blacks with Type II Diabetes

Bailey Stevenson, Deepika Rao, BPharm, MS, Jiaying Zhang, Olayinka Shiyanbola, PhD, BPharm

Background: Despite new interventions for medication adherence, Black patients continue to have lower rates of adherence than whites. Medication adherence is a dynamic process that changes as the social and environmental context of the individuals change and must be evaluated over time. The purpose of this study is to examine the role of key psychosocial and interpersonal factors in Black patients' medication adherence changes and explore patients' views regarding these changes.

Methods: An explanatory sequential mixed methods design is being used for a survey at baseline and follow-up at 6 months, followed by an interview. We applied the Integrated Theory of Health Behavior Change, theorizing that patients are adherent if they embrace beliefs consistent with their adherence behavior, develop self-regulation abilities to change their adherence behavior (psychosocial), and experience social support encouraging their adherence (interpersonal). The questionnaire included self-reported measures of medication adherence (Adherence to Refills and Medication Scale-Diabetes), psychosocial constructs – illness and medication beliefs (Brief Illness Perception and Belief about Medicines Scales), self-efficacy (Self-efficacy for Appropriate Medication Use Scale), health literacy (three item literacy screener), and depressive symptoms (Patient Health Questionnaire-9). Interpersonal constructs – social support (Diabetes Care Profile Social Support), and patient-provider communication (Patient Perceived Involvement in Care Scale), as well as sociodemographic and clinical factors were also assessed.

Convenience sampling was used to recruit English-speaking adults with type II diabetes who self-identified as African American/Black through an independent community pharmacy in Milwaukee. Surveys were mailed or administered over the phone to eligible participants (n=232) and responders received follow-up surveys. Semi-structured 60-minute interviews will be conducted with respondents of both surveys who had a change in adherence. Descriptive, mean differential, and bivariate correlational analyses were conducted on initial baseline survey data.

Results: Currently, 34 responses have been received. On average, participants were about 61 years old (SD = 8.54), took two oral medications and had three chronic illnesses. Twenty-seven (79.4%) participants were female, 21 (61.8%) had a high school education or less, and 17 (50%) had poor or fair self-reported health status. Overall, the sample reported good adherence (Mean=15.44, SD=3.86) and low health literacy (Mean=6.72, SD=3.34). Negative perceptions of diabetes were significantly correlated with lower necessity beliefs regarding diabetes medications ($r=-.405$, $p<0.05$), lower self-efficacy ($r=-.534$, $p<0.01$), lower health literacy ($r=.447$, $p<0.05$), and higher depression ($r=.644$, $p<0.01$). Lower adherence was significantly correlated with higher depression ($r= .472$, $p< 0.05$).

Conclusion: Preliminary results show negative perceptions of diabetes was an important psychosocial factor for Blacks with diabetes in this study. Significant relationships were found between necessity beliefs in medicines, self-efficacy, health literacy, and depression. There was also a significant relationship between adherence and depressive symptoms. Patient perceptions of these constructs will be further studied through interviews. The results of this study may be used to design medication adherence interventions, tailored to important psychosocial and interpersonal factors among Blacks with diabetes.

Standardization of Inpatient Pharmacy Technician Orientation within a Multihospital, Multistate, Integrated Health System

Tyler Twardoski, PharmD, Angie Knutson, PharmD, BCPS, Nick Ladell, PharmD, BCPS

Background: Having a formalized orientation/training program can help promote employee retention, boost staff morale, lead to efficient practice, promote competency, and lead to higher patient satisfaction. Through a formal orientation program, inpatient technicians can be onboarded in an environment that fosters positivity, commitment, and motivation. The purpose of this project is to develop and implement a standardized technician orientation plan for all inpatient technicians across a multihospital, multistate, integrated health system.

Methods: A literature review and external resource evaluation were conducted to determine best practices for inpatient pharmacy technician orientation. After completion of the literature review, an inpatient pharmacy technician orientation committee was formed and orientation materials from all inpatient sites were collected. The committee began meeting bi-weekly with the goal of working collaboratively to effectively develop a standardized orientation plan consisting of a system orientation manual and educational competency checklist.

Impact of Implementing Barcode Validation of Barcode of Intravenous Antibiotics Prior to Dispensing

Nicollette McMann, PharmD, Jessica Benjamin, PharmD, Joshua Rekoske, PharmD

Background: Barcode scanning in the central pharmacy reduces the occurrence of incorrect medication or dose selection errors by validating the product barcode and alerting the dispensing technician of any mismatch against the medication order. This functionality can capture discontinued medication orders that would be identified prior to leaving the pharmacy, thus reducing waste. The objective of this project is to implement EPIC's barcode scanning module, Dispense Preparation, in a community hospital to decrease error rates in dispensing intravenous (IV) antibiotics.

Methods: IV antibiotic products supplied in the central pharmacy will be cataloged and inventoried and will either have a manufacturer-supplied barcode or a custom barcode applied to the product. An operational process and educational training will be developed for all pharmacy staff. The barcode scanning functionality will be activated after barcode testing and personnel training is completed. Post-implementation IV antibiotic dispensing error rates will be compared to pre-implementation error rates to determine if there is a reduction in error rates due to utilization of dispense preparation functionality.

Standardizing Utilization of Smart Pump Data Across a Multi-hospital, Multi-state Health System

Ann Vo, PharmD, Kyle Sabol, PharmD

Background: Smart pumps were developed to decrease the risk of potentially serious medication errors associated with IV medication administration, by placing safeguards to ensure that the correct dose of a drug is given. These safeguards are enforced by the development and maintenance of a drug library. There are currently two main sources of smart pump data within our health system, and it is unclear how each of these sources of data should be used to guide drug library management. The purpose of this project is to develop and implement a standard process for utilizing smart pump metrics to evaluate changes in medication management.

Methods: A literature review was first conducted to determine how institutions are maximizing smart pumps functionality to improve medication safety. Smart pump library managers and experts within the health system were consulted to review how smart pump data has been used historically and to determine the ideal components of a standard process in the future. Based on these discussions, three focus areas were identified for analysis in quarterly smart pump reviews—compliance, safety, and optimization. Subsequently, reports that would help evaluate previous changes and potential opportunities for improvement were identified within the smart pump database and internal event reporting system. A process connecting the focus areas and reports was developed and initially implemented using data from quarter 3 and quarter 4 of 2019.

Facilitating Compliance with United States Pharmacopeia (USP) Regulatory Requirements Through Implementation of an Electronic Data Management Tool

Eric Hesselbach, PharmD, Landon Kortman, PharmD, Michael Metz, RPh

Background: Quality assurance is necessary to ensure that sterile products are compounded under optimal conditions as defined by the United States Pharmacopeia (USP) and health system standards. In addition, medications must be stored per manufacturer recommendations and documentation of this data must be retained to demonstrate safe practices. Historically, this has been accomplished via paper logs and binders, requiring hand-written evidence of USP compliance. A number of challenges arose from this method however as the logs may be misplaced upon storage, could not be cleaned and enter the sterile products area for documentation, and were difficult to manually analyze when creating reports. It is for these reasons that the decision was made to migrate USP compliance documentation to an electronic data management tool. The new interface offers a variety of advantages including activity reporting from any internet-capable device, unlimited storage within an online database, and the ability to instantly generate reports on task completion rates. Therefore, the purpose of this project is to implement and optimize a cloud-based system and to ensure sustainability and ongoing successful utilization of this product.

Methodology: Current paper-based workflows and personnel responsibilities were assessed for shortcomings and proficiencies prior to creation of the new online product. Once understood, time was taken to fully learn and recognize the functionalities of the electronic data tool. This was followed by a draft of the preliminary software configuration and subsequently reviewed by end-users for feedback that would be incorporated into the final product. Prior to operation, staff was trained on proper use of the system through in-person demonstrations, conference calls, and written instruction. Ultimately, implementation was facilitated, and the electronic tool was utilized throughout pharmacy department areas as feedback was gathered in real time and adjustments were made to the product as necessary. The data collected from this tool was eventually used to generate reports of USP compliance for managerial and regulatory needs.

Using a Data Mining Approach to Improve Anticoagulation Management at the Milwaukee VAMC - Opportunities, Challenges, and Success

Bradley Endres, PharmD, PhD, Megan Vranes, PharmD, BCPS, Jeremiah Barnes, PharmD, BCPS, Jennifer Koch, PharmD, BCPS, BCGP, Kimberly Bell, PharmD, BCPS

Background: While oral anticoagulants such as warfarin, apixaban, rivaroxaban, edoxaban, and dabigatran are routinely used in clinical practice for a variety of indications including reducing risk of stroke and systemic embolism with atrial fibrillation, treatment of deep vein thrombosis or pulmonary embolism, or prophylaxis of a thromboembolic event, they are also associated with an increased risk of bleeding and other adverse effects warranting a need for close monitoring. This has primarily been pharmacist driven in most hospital settings. Currently at the Milwaukee VA Medical Center (VAMC), all patients on oral anticoagulation are identified manually by pharmacy and compiled within a centralized database that is updated daily. In order to improve the Milwaukee VAMC means of managing patients receiving an anticoagulant, we sought to implement a data mining system (MedMined™) with the goal of reducing time spent on manually maintaining an anticoagulation database, minimizing medication errors, and improving overall user satisfaction.

Methods: MedMined™ was acquired and is currently active within the Milwaukee VA Medical Center (VAMC). MedMined™ uses data integration, mapping, continuous monitoring, and normalization to track any patient receiving an oral anticoagulant in the hospital. Daily reports have been run with MedMined™ consisting of any patient that has an active order for an oral anticoagulant. A manually curated database consisting of these anticoagulated patients has been updated daily as a means of comparing to the MedMined™ reports. Lists were compared daily, discrepancies between lists were recorded, and time spent obtaining the lists were also recorded.

Results: On average, there were 39 (±4) patients in the hospital that were receiving an oral anticoagulant daily with apixaban and rivaroxaban being the most commonly prescribed medications. It was identified that MedMined™ was capturing 88% of patients that were truly on an anticoagulant at the hospital. We identified three major causes of discrepancy: 1) patients were being missed within a specific floor, 2) patients with more than one active order for a medication were not being captured (auto-discontinuation logic), and 3) there was an error involving future admissions into the hospital. It was found that not every patient floors' data was being sent to MedMined™, which was changed after identifying this problem. The auto-discontinuation logic was removed from MedMined™ and quickly resolved the issue of patients not having their active orders captured. However, the future admission date error involved patients who transferred from the long-term care floor of the facility to a different floor. This error is still requiring further assessment. Despite the discrepancies in lists, time spent obtaining the list from MedMined™ was significantly less than preparing the list manually.

Conclusion: While data mining and automation can significantly improve productivity, it requires gradual implementation and careful evaluation. While the anticoagulation workflow at the Milwaukee VAMC has not yet changed, we are significantly closer to implementing MedMined™ for anticoagulation monitoring.

Streamlining Pharmacy Department Documents Using Sharepoint Drive

Nelson Milbach, PharmD Candidate, Jeffrey Waise, PharmD, MBA

Background: Pharmacy department files are dispersed throughout several folders on a local area network computer drive, accessible only on the hospital's server. The purpose of the project is to collect and analyze data regarding perceptions of document storage before and after implementation of document storage on SharePoint, a web-based collaborative platform.

Methods: A survey based on the perception of document storage was distributed to hospital pharmacy staff. Respondents ranked their agreement with 5 positive and 5 negative descriptive statements of usability from 1, strongly disagree, to 5, strongly agree, and a composite score was calculated on a scale of 1 to 100. Individual item and composite data were compared to an adjective rating scale developed using a seven-point adjective-anchored Likert Scale. The capability of the SharePoint platform was presented to a small group of pharmacy preceptors, and student documents and resources were transferred to SharePoint. A collection of 3 tutorials were constructed to instruct preceptors on how to upload documents and share them with students. The next step of our project will be to collect perceptions on this pilot of the SharePoint platform and incorporate our existing tutorials into a comprehensive tool kit for SharePoint usage. These findings will serve as a springboard to influence future decisions on pharmacy department document storage.

Results: A mean composite score of 44.4 (SD = 17.9) was obtained for the current storage model. Survey items regarding the confidence in use and availability of necessary documents were ranked highest, 6.7 (SD = 2.2) and 7 (SD = 2.5), respectively. Items concerning availability of most current document versions and consistency of document location were ranked lowest, 0.7 (SD = 1.3) and 1.3 (SD = 2.1), respectively. The mean composite score across the department corresponds to an adjective rating of "Poor" (35.7 to 50.9). Composite scores from individual respondents ranged from 14 to 80, corresponding to adjective ratings of "Worst Imaginable" to "Good."

Evaluation of Drug-disease Alerts for Relevance and Implementation into Electronic Health Record

Andrew Osterbauer, PharmD Candidate, Mike Lewandowski, PharmD, BCPS, Ryan Miller, PharmD, BCPS

Background: Modern electronic medical records provide multiple levels of decision support to help health care workers provide patient care. One common area of decision support used is notification alerts. These alerts provide real-time information regarding drug-drug and drug-disease interactions. Gundersen adopted its current electronic medical record in 2008 and opted to disable all drug-disease alerts and only enable drug-drug interactions. The rationale for this was based on the large volume of drug-disease interactions that, if enabled, would hinder workflow. Interaction content is typically overseen by third-party data vendors who often restrict individual alert customization without the purchase or additional software or services. With the increased awareness of alert fatigue, many institutions have begun allocating resources to these services so that they can better manage their systems and decrease the burden placed on their healthcare providers. In 2017, Gundersen re-evaluated the organizational benefits of this alert software and decided that purchasing it would be beneficial. Based on the success of a recent alert reduction project, which decreased drug-drug interaction alert burden by 40%, a systematic optimization of drug-disease interactions was chosen as the next area of focus. These interactions are not well known and thus easily over-looked which can result in unnecessary admissions, hospital spending, and patient harm. With over 18,000 possible drug-disease alerts in the third-party database identified, individual evaluation was required so that each alert added would provide medically necessary information without additional burden on providers.

Methods: The third-party alert list was filtered to only include the drug-disease interactions that were deemed to be the most likely to result in patient harm. Each interaction was reviewed using a clinical drug information site, such as Lexicomp, or the drug's package insert for relevance. If no supporting data was found, literary searches were conducted to provide case reports and research data. Interactions were then evaluated on the merit of disease state, severity of interaction outcome, and if disease was acute or chronic. All interactions deemed significant were presented to the hospital's medication management and safety committee for initial approval and then at the clinical decision support committee for implementation into the electronic medical system. Alerts were tracked for activation.

Results: The initial alert list, focusing on contraindications, yielded 1317 drug-disease alerts to evaluate. To date, 741 (56.3%) have been reviewed with 128 (17.3%) interactions being turned on. Through November and December, 66 alerts have fired with providers accepting the alerts 22 times (33.3% acceptance).

Conclusion: Gundersen's average acceptance of an alert is 10%, which makes our preliminary results of 33.3% acceptance a major improvement.

Creation of a Direct Oral Anticoagulant Dashboard in an Outpatient Anticoagulation Clinic at Froedtert & the Medical College of Wisconsin

Hannah Hecht, 2020 PharmD Candidate, Lei An, 2020 PharmD Candidate, Amanda Mauerman, PharmD, BCACP, Jennifer Hardman, PharmD, Kathryn Frowein, PharmD, BCACP

Background: As prescribing of direct oral anticoagulants (DOACs) increases, questions regarding the best outpatient monitoring strategy for this medication class continue to arise. Several health systems and individual institutions are shifting towards utilization of electronic DOAC monitoring tools. As patients' age and health condition change, these tools help ensure that the correct DOAC medications and dosage are received. Additionally, these tools can increase efficiency by decreasing the amount of time pharmacists spend monitoring patients on DOACs. The purpose of this study is to create an online monitoring dashboard in the electronic medical record (EMR) for DOACs that can be used by pharmacists and provider teams to improve the overall safety and efficacy of DOAC use for the prophylaxis and treatment of thromboembolic events.

Methods: Student-pharmacist co-investigators contacted pharmacy staff at other institutions throughout the United States in order to collect information regarding their DOAC monitoring practices. Information collected included: department and staff responsible for DOAC monitoring, the parameters routinely monitored for patients on DOACs, if alerts/flags are real-time or pulled from a report and frequency of reports, eligibility criteria for patients to be enrolled in the monitoring tool, and other comments staff found useful pertaining to feasibility and implementation of a monitoring tool. The students then reported data gathered from the collaborative effort to the study team and feasible monitoring parameters were agreed upon by group consensus. Additionally, a health informatics pharmacist was recruited to the study team after monitoring parameters were decided in order to determine a realistic Epic driven monitoring tool.

Results: To date, it was determined that the following parameters can be reasonably collected and should be included in the electronic DOAC monitoring dashboard: creatinine clearance <30 mL/min and <50 mL/min, serum creatinine <2.5 mg/dL and <1.5 mg/dL, date of last serum creatinine, hemoglobin <10 g/dL, date of last hemoglobin, platelet count <50,000 µL, date of last platelet count, aspartate aminotransferase (AST) <7 units/L, date of last AST, alanine aminotransferase (ALT) <10 units/L, date of last ALT, alkaline phosphatase (ALP) <40 units/L, date of last ALP, body mass index >40 kg/m2, weight in kilograms, active antiplatelet/non-steroidal anti-inflammatory drug prescriptions, end date of medication, and drug-interactions.

Conclusion: Through collaboration with other health institutions the study team was able to determine a standardized set of categories that should routinely be monitored for patients on DOACs. A DOAC episode will be created in the electronic monitoring record so the patient can be continuously followed remotely. The electronic DOAC monitoring tool is scheduled to be created in early 2020 by the health informatics pharmacy team and will be reviewed by the study team prior to implementation.

A Single Academic Medical Center's Experience with the Pharmacist Avoidance or Reductions in Medication Costs in Critically Ill Patients (PHARM-CRIT) Study

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Background: The PHARM-CRIT study was performed to determine the epidemiology of and cost avoidance from pharmacist interventions in the intensive care unit based on a validated framework. A subset of data from a single tertiary-care, academic medical center with five intensive care units totaling 107 beds was analyzed to characterize the types of interventions performed and associated cost avoidance.

Methods: All recommendations from pharmacists providing care for intensive care unit patients during a total of 36 ten-hour shifts worked between August and October 2018 were evaluated. Interventions were grouped into 38 pre-established categories from a validated systematic framework for cost avoidance interventions. Cost avoidance values from each intervention were determined using the same framework. Total cost avoidance in 2019 USD was calculated by summing the cost avoidance for each category.

Results: Three intensive care unit pharmacists performed 793 interventions on 506 patients in six categories: adverse drug event prevention (135; 17%), resource utilization (103; 13%), individualization of patient care (411; 51.8%), prophylaxis (16; 2%), hands-on care (39; 4.9%), and administrative/supportive (89; 11.2%). The most frequent interventions were dose adjustments (111; 14%), antimicrobial pharmacokinetic evaluation (77; 9.7%), total parenteral nutrition management (77; 9.7%), and drug information consultation (74; 9.3%).

Intensive care unit pharmacist-generated cost avoidance totaled $531,225 in six categories: adverse drug event prevention ($245,011; 46.1%), resource utilization ($51,323; 9.7%), individualization of patient care ($170,266; 32.1%), prophylaxis ($14,897; 2.8%), hands-on care ($35,572; 6.7%), and administrative/supportive ($14,156; 2.7%). The three areas of greatest cost avoidance were major adverse drug event prevention ($184,214; 34.7%), dose adjustment ($67,946; 12.8%), and antimicrobial therapy initiation and streamlining ($41,235; 7.8%). The average cost avoidance per intervention was $670 and $1050 per patient.

Conclusion: Intensive care unit pharmacists at an academic medical center perform interventions that reduce healthcare expenditures.

Latex Allergy Medication Preparation Protocol Revision

Lauren Kolb, 2020 PharmD Candidate, Brianne Bakken, PharmD, MHA, Megan Ose, PharmD, MHA, Heidi Zafra, MD

Background: Children's Wisconsin currently employs a standard latex avoidance protocol for patients who have been identified as having a latex allergy in Epic. This identification includes patients who have not had a true type I hypersensitivity reaction to latex and patients who have specific diagnoses that require a latex free environment (e.g. spina bifida). The current pharmacy protocol specifies that medications whose stopper latex content information is not available, the single-stick method must be used for all patients who are identified with a latex allergy in Epic. To prepare a "latex free" medication means to obtain a vial that has not been previously punctured, use aseptic technique with the single-stick method to draw the correct dose, and label the multi-dose vial with the correct expiration date per USP 797. If the patient requires another dose this process must be repeated. The current protocol increases the turn-around time of other medication orders and increases medication waste when the single-stick vial is not used before it expires.

Methods: Patients' electronic health records (EHR) from Children's Wisconsin (2014-2019) were analyzed to determine if the latex allergy listed in the profile is a true type I hypersensitivity or if a latex free environment is required due to diagnosis. Both Latex H. Brasiliensis and Latex IgE antibody allergen tests need to be positive to confirm the allergy.

Results: 3,296 EHRs were identified as having a latex allergy and 52 patients received the double latex allergen diagnostic test. Only one patient out of those 52 patients was deemed to have a true type 1 hypersensitivity based on their profile and testing results. When analyzing the results of the latex testing, a note for this patient stated that the test was performed due to a reaction from kiwi which may cause a cross allergic reaction to latex. The findings were listed as positive, but it is unsure if the result was due to kiwi or latex. The patient was advised to avoid all latex if possible. Three out of 52 patients tested require a latex free environment due to diagnoses. These patients did test negative to having a true allergy. All findings were brought to the allergy team who confirmed only one patient had tested positive.

Conclusion: It is unlikely that patients who are tested for latex have a positive result and a true type 1 hypersensitivity. The reactions reported were due to a history of latex containing devices, not to medications containing latex. The findings of this study and other literature suggest that the likelihood of having an anaphylactic reaction to medications containing latex is nearly non-existent. The single-stick method for medication preparation at this institution will be revised. By revising the protocol, patient medication turn-around time and medication waste are expected to decrease, which will improve patient care and reduce medication costs for the hospital.

Transitioning Rituximab Utilization from an Inpatient to Outpatient Setting

Lauren Farnsworth, 2020 PharmD Candidate, Maralena Taube, 2020 PharmD Candidate

Background: Rituximab, a monoclonal antibody used in hematologic malignancies, comes with a hefty price. The current institutional cost for rituximab in the outpatient setting is 22% lower than the inpatient cost. From a financial perspective, outpatient administration is preferred, and formulary restrictions have been implemented across the Froedtert Health Cancer Network. Currently, patients are eligible for inpatient rituximab administration if they meet one of the following criteria: (1) the patient is at high risk for tumor lysis syndrome, (2) the patient lives > 1 hour away from a network oncology infusion center, or (3) the patient has a diagnosis of Acute Lymphoblastic Leukemia receiving induction chemotherapy. Because of the financial disparity, administration of rituximab in the outpatient setting is favored. True financial impact to the patient, the institution, and insurers is unknown.

This cost analysis quantifies the financial impact to the institution in order to assess the impact of outpatient rituximab administration. The purpose for this project originated from the initiative to decrease costs associated with rituximab infusions.

Methods: This is a retrospective data analysis reviewing patients who received rituximab infusion from 04/01/19 until 10/31/19 and included a review of 14 patients. Inclusion criteria consisted of patients who received rituximab infusion within the Froedtert Health system between 04/01/19 and 10/31/19. Acquisition cost and reimbursement data for both inpatient and outpatient administration was retrieved from hospital records and analyzed, including quantity of drug administered and cost of each administration. This data was used to determine the financial impact to Froedtert Hospital.

Results: A total of 14 patients were included in the analysis. There were 5 inpatient administrations and 33 outpatient administrations. The cost of outpatient administered rituximab was 71% lower. The total institutional savings in medication cost was roughly $178,000 over the 1st 7 months of the project. The additional reimbursement incurred via outpatient administration was $255,707 for a net organizational gain of over $423,000 in this 7 month period.

Conclusion: Administering rituximab in the outpatient setting has saved Froedtert Hospital roughly $178,000.00 over a 7 month period. In addition to this savings, the additional reimbursement incurred via outpatient administration was $255,000. In total, administering rituximab in the outpatient setting allowed the institution a net positive of $423,000.00. Successful implementation of rituximab formulary restrictions led to both a savings in acquisition cost and added reimbursement for the institution.

Leveraging Business Intelligence to Develop a Standardized Metrics Dashboard in a Multi-site, Mutli-state Health System

Ryan Hannan, PharmD, MBA, Kim Spencer, PharmD, MHA, BCPS

Background: Develop a system dashboard of metrics for pharmacy leaders encompassing quality, finance, safety, efficiency, and human resources

Methods: Business intelligence software (Microsoft Power BI) was utilized to aggregate and publish data from systems containing information pertinent to pharmacy leaders. Examples of these systems are the electronic medical record (EMR), financials, and automated dispensing cabinets (ADC). The process to publish metrics included collaboration with the organization's information services team, cybersecurity, hospital information technology (HIT), and other teams who maintain data pertinent to pharmacy. A significant focus of the reporting design was sustainability, which was done through automation whenever possible.

Expansion and Optimization of the Pharmacy Technician-Based Medication History Program at Advocate Aurora Health

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Background: Currently, the Advocate Aurora Health Wisconsin sites utilizes pharmacy technicians to complete medication histories upon admission of patients. However, at the Illinois sites, medication histories are completed by pharmacists which has become a hinderance in the pharmacist workflow as they have transitioned a new electronic health record (EHR) and pharmacy practice model. As it stands, there are not enough pharmacy technicians at the Wisconsin sites to complete all medication histories. The Pharmacy Integrated Clinical Services (PICS) has technicians that will contact patients at certain hospitals to complete the medication histories remotely via telephone. However, the current process does not sufficiently cover the system hospitals' needs. The purpose of this project is to provide guidance to expand the pharmacy technician-based medication history program to Illinois sites and optimize the program throughout Advocate Aurora Health.

Methods: Admissions data was collected from Advocate Aurora Health. All outpatient units, labor and delivery, and neonatal ICU were excluded. Average time to complete medication histories was determined and compared to admissions data to determine full-time employee (FTE) requirements. A survey was sent to all pharmacy technicians who perform medication histories to evaluate areas for improvement of the current process at Wisconsin sites. Pharmacy directors were asked to provide current medication history FTE data to analyze opportunities for optimization of the remote medication history program. Data was analyzed to create recommendations for expansion of the pharmacy technician-based remote history program into Illinois sites and optimization of the remote pharmacy technician-based medication history program in Wisconsin.

Analysis of WAC Spend by Type and Identification of Mitigation Strategies

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Background: Minimize current wholesale accusation cost (WAC) account use and establish a workflow that encompasses targeted strategies to minimize WAC spending in the future by creating an ongoing monitoring strategy.

Methods: Drugs that were purchased through the WAC account during October 2018-19 above will be analyzed and stratified into subcategories. The cost of those items will be obtained via WAC purchase orders and compared to the cost of drugs through GPO. Cost saving strategies will be determined after comparison of drug prices through the various accounts.

Results: WAC spend during October 2018-19 was stratified into 6 categories including; normal WAC, shortage, unmapped, and before/partial accumulation. The shortage category was the most expensive category measuring at approximately 38% of the annual WAC spend. The second most expensive category, approximately 34%, was caused by the drug being purchased before it was able to accumulate. An example of this would be lack of accumulations due to a new NDC. The other categories accounted for approximately 5% of annual WAC spend.

Conclusions: WAC spend can negatively impact an organization's budget if used incorrectly. Therefore, it is important to analyze WAC spend and determine the appropriateness. Although the shortage category was the most expensive, WAC spend due to shortages cannot be avoided. However, there were other categories where action items were identified. One of these mitigation strategies included postponing drug purchasing, if able, to allow the drug to accumulate. Further research needs to be completed to assess the impact each mitigation strategy. However, creating a method to evaluate WAC spend on an ongoing basis moving forward would ultimately make a large impact and be beneficial for the organization.

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