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Poster & WPRC Platform Presentation Abstracts

Design and Implementation of Central Fill Pharmacy Services

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Background: One of the goals of retail pharmacies is to improve efficiency in order to allow pharmacy personnel to provide increased patient care services. One way to accomplish this goal is through centralization of the prescription filling process. Through centralization of the filling process, the pharmacy can shift duties of both pharmacists and pharmacy technicians to increase the focus on providing patient care activities such as immunizations or medication therapy management, increase staff productivity, and reduce costs. Pharmacists and pharmacy technicians can devote more face-to-face time with patients, in turn improving patient care.

Methods: The primary objective was to design and implement a central fill process at the 87th Street Pharmacy at F&MCW. The primary outcome measure was reduction in time spent filling prescriptions by pharmacy personnel. Secondary outcomes focused on the development and evaluation of the central fill operation, including staff training resources and percentage of prescriptions filled within the promise time. Prescriptions were included in the study if they were filled at the 87th Street Pharmacy between November 1, 2017 through April 30, 2018. Prescriptions were excluded from the study if they were controlled substances.

Glycohemoglobin Trajectory in Adults with Type II Diabetes Mellitus

Mickey J. Hart, PharmD, BCACP, Brandon M. Goetz, PharmD Candidate

Background: Glycohemoglobin (A1c) has been used both as a measure of glucose control and to diagnose diabetes mellitus; the A1c lab test measures the average level of glucose that was bound to hemoglobin in red blood cells over the previous two to three months. While Medicare quality reporting programs utilize an A1c of 9% or greater as a metric benchmark, this method of monitoring is reactive rather than proactive. The purpose of this study was to determine a trend in type II diabetes mellitus patients' A1c values in order to identify at-risk patients sooner for earlier pharmacist intervention.

Methods: The Froedtert & the Medical College of Wisconsin (F&MCW) Institutional Review Board approved this retrospective chart review as a quality improvement project. The primary outcome measure was percent of patients with an index A1c result of 8.0% through 8.9% who had a subsequent A1c ≥ 9% within one year. Secondary outcomes focused on other index A1c ranges over one and two years of follow-up. Patients were included if they were eighteen years of age or older, had a documented type II diabetes mellitus diagnosis, had an F&MCW primary care provider, and had an A1c result between August 1, 2016 and August 31, 2016 ("index A1c") with at least one additional A1c result between September 1, 2016 and July 31, 2017. Additional A1c results through July 31, 2018 were evaluated for secondary objectives. Patients were excluded if they were pregnant, using U-500 insulin, or receiving diabetes management from an endocrinology provider during the study period. Data analysis consisted of descriptive statistics.

Results: Patients with an index A1c between 8.0% and 8.9% had a 32.9% chance of having an A1c result ≥ 9% within one year, and a 45.7% chance of having an A1c result ≥ 9% within two years. Secondary outcomes showed patients with an index A1c <8% had a lower chance of developing an A1c of ≥ 9% within one and two years, while patients with an index A1c between 8.5% and 8.9% had an increased chance of developing an A1c of ≥ 9% within one and two years. However, all patients had an increased chance of developing an A1c of ≥ 9% within two years when compared to one year of follow-up.

Conclusion: As hypothesized, type II diabetes mellitus patients with a higher index A1c result had a greater likelihood of having an A1c result of 9% or greater within one year and two years. The clinical significance of these results must be further evaluated by analyzing specific patient factors such as demographic data and antidiabetes medication regimens. Future research should focus on evaluating the effect of earlier pharmacist intervention in patients with an index A1c below 9%, and determining the likelihood of those patients developing an A1c of 9% or greater in the next one to two years.

Impact of Text Refill Reminders and Prescription Ready Reminders at Outpatient Pharmacies at an Academic Medical Center

Kate, Schaafsma, PharmD, MS, MBA, BCPS and Maren VanMieghem, PharmD Candidate

Background: FroedtertRx is a web-based application that patients download to their phone. The new technology was implemented at Froedtert & the Medical College of Wisconsin (F&MCW) to optimize communication between patients and the pharmacy and to improve the efficiency of patients refilling and picking up outpatient, prescription medications. The application reminds patients when it is time to refill a prescription, gives them a notification when it is ready, and sends reminders when it is time to pick up the prescription. The purpose of this study is to determine the effectiveness of FroedtertRx at shortening pick up times, increasing patient adherence, and improving patient and staff satisfaction.

Methods: Eligible patients of this pre-post study were those that filled a prescription at any of the F&MCW Outpatient Pharmacies that had at least one refill. The primary outcome was to determine whether FroedtertRx increases or decreases time between when a patient requests a medication refill to when the prescription is picked up. Secondary outcomes were sign-up and retention rates of FroedtertRx, return to stock rates, adherence measured through proportion of days covered (PDC), and patient/employee satisfaction with using the tool. The data collected were analyzed by descriptive statistics and paired t test. To calculate percentage of days covered, medication names were captured in order to calculate PDC for their respective therapeutic classes. The pre-intervention data were derived from the Enterprise refill database between the months of June 2018 through August 2018. The initial post-intervention data were derived from the first 3 months after FroedtertRx was implemented. Patient and staff satisfaction were measured through satisfaction surveys distributed three months after FroedtertRx implementation.

Development of Collaborative Practice Agreements for Antiretroviral Therapy, Opportunistic Infection Prophylaxis, and Pre-exposure Prophylaxis Medication Refills to Promote Medication Adherence

Melissa M Durst, PharmD Candidate, Angela Katzfuss, PharmD, Kate Lewis, PharmD, Anne Daniels, PharmD

Background: Collaborative practice agreements (CPAs) are legal documents that summarize guidelines for collaboration between pharmacists and physicians and allow the delegation of specified patient care activities to pharmacists for the expansion of their role in the healthcare team. Froedtert & the Medical College of Wisconsin (MCW) Medication Management pharmacy utilizes multiple CPAs with Froedtert & the MCW physicians to provide medication refills to patients enrolled in the Medication Management Program. One significant benefit of this is decreasing time to refill for patients and ultimately decreasing risk for non-adherence. Currently, there are 210 patients enrolled in the Medication Management Program that are either patients living with human immunodeficiency virus (HIV) receiving antiretroviral therapy (ART) and/or opportunistic infection (OI) prophylaxis or HIV pre-exposure prophylaxis (PrEP) patients receiving ART. While ART has been shown to be extremely effective for the treatment and prevention of HIV, patient adherence greatly impacts its efficacy. Previously collected data shows that it takes on average 3.7 days for medication refill requests to be approved for patients receiving ART or OI prophylaxis enrolled in the Medication Management Program, which increases risk for patient non-adherence due to delay in therapy. The purpose of this project was to create CPAs that allow Froedtert & the MCW Medication Management pharmacists, in collaboration with and under the supervision of Froedtert & the MCW Infectious Disease physicians to renew, update, and process prescriptions to encourage patient adherence to medication regimens.

Methods: Existing CPAs between Froedtert & the MCW Infectious Disease physicians and non-prescribing providers in the Infectious Disease clinic regarding HIV and PrEP refills and lab orders were obtained to guide the development of the Medication Management CPAs. Once the CPAs were developed, they were reviewed and approved by both the HIV Medication Management and Infectious Disease clinic pharmacists. The CPAs will then be reviewed for approval by the infectious disease physicians at the Infectious Disease Clinic Leadership Meeting and finally by the Ambulatory Care Pharmacy and Therapeutics Committee. Once the CPAs receive their final approval, they will be implemented by Froedtert & MCW Medication Management pharmacists caring for HIV and PrEP patients both seen by the Froedtert & MCW infectious disease physicians included in the CPAs and enrolled in the Medication Management Program.

Creation of a Pharmacist-led Enteral Feeding Tube Medication Reconciliation Workflow

Brooke Foster, PharmD, Elizabeth Pieper, PharmD, Michelle Maynard, PharmD, BCPS

Background: Amyotrophic Lateral Sclerosis (ALS) is a disease that affects motor neurons in the spinal cord to cause progressive weakness and atrophy of muscles. Patients eventually have difficulty moving the tongue and swallowing properly as ALS progressively weakens muscles. Due to possible complications from dysphagia, ALS patients are often encouraged to have a percutaneous endoscopic gastrostomy (PEG) or percutaneous endoscopic jejunostomy (PEJ) feeding tube placed to minimize malnutrition and aspiration risks. Patients may begin to use the enteral tube for feeding and/or medication administration, when clinically necessary. Given the tube deposits directly in the stomach or jejunum, it is important to screen all patients' medications to avoid malabsorption, drug interactions with enteral formulas, tube incompatibility and occlusion, altered drug pharmacokinetics, and other adverse effects.

At Froedtert & the Medical College of Wisconsin (F&MCW), the Multidisciplinary ALS Clinic within Neurology Clinic providers often consult F&MCW Gastroenterology Clinic providers for enteral tube placements. Currently, there is no established workflow for the evaluation of a patient's medication list to ensure tube compatibility and medication absorption upon discharge since patients may not use their tube for weeks to months after placement. When the opportunity of a collaboration between the two clinics presented itself, the pharmacists in F&MCW Gastroenterology and Neurology clinics developed a workflow to complete medication reconciliation and provide therapeutic interchange for ALS patients who use enteral feeding tubes for medication administration.

The goal of this project is to create, implement, and assess a workflow that outlines pharmacist involvement in optimizing safety and efficacy of medications administered via enteral feeding tubes. Comprehensive medication reviews will occur as a collaboration between the clinical pharmacists in both Gastroenterology and Neurology Clinics to ensure proper medication administration use for patients primarily managed by Neurology and consulted by Gastroenterology for enteral tube placements.

Methods: Eligible patients include any patient referred from F&MCW Neurology Clinic providers to F&MCW Gastroenterology Clinic for placement of an enteral feeding tube.

A workflow will be implemented to involve both gastroenterology and neurology clinic pharmacists to provide initial education and recommendations regarding therapeutic interchanges to the patient and staff prior to enteral tube placement. Recommendations will be sent to the neurology provider, pharmacist, and dietician to be implemented when the patient decides to start using the tube for nutrition and medications. Any additional therapy modifications and education regarding tube use will be coordinated by the neurology clinic staff and discussed with the patient.

After implementation of collaborative workflow, the impact of the new process will be evaluated for optimization. Monitored outcomes include the number of medication change recommendations, including recommendations for therapeutic interchange and de-prescribing, made by pharmacist(s), number of occluded enteral feeding tubes pre versus post-implementation, and increased patient awareness of safe medication use via enteral feeding tube.

Use of Advanced Analytics by Rural Hospital-Based Pharmacists to Impact Guideline-Directed Prescribing by Ambulatory Medical Providers

Caleb Chitwood, PharmD

Background: Research, design and implement a workflow for hospital-based centralized pharmacists to prospectively review ambulatory patient's electronic charts in an effort to optimize medication therapy.

Methods: An initial population based retrospective analysis of adherence to level I and II recommendation from the 2018 ACC/AHA Multisociety Guideline on the Management of Blood Cholesterol in diabetic patients was conducted using a cloud-based registry system. Findings of the analysis identified statin intensity as a potential target to improve patient outcomes which would be reflective of pharmacist work efforts. Scheduled future primary care appointments and the cloud-based registry system were used to generate a patient list for pharmacist review and intervention. The pharmacist focus: diabetic patients between the ages of 40 and 75 years old, without orders for the guideline-based statin therapy. After patient identification, the electronic medical record was evaluated to create pharmacist-based medication optimization recommendations. Recommendations were sent to the primary care provider at least two days prior to the patient's appointment. A reminder system was utilized to ensure pharmacist follow up and assess intervention adoption by the provider. The primary outcome of the study was change in proportion of diabetic patients receiving guideline-recommended statin therapy before and after implementation of the pharmacist-based chart evaluation and intervention. Operational outcomes collected include: time spent reviewing patient, number of chronic conditions, intervention type, condition targeted by intervention, time spent in documentation, and resulting action by the primary care provider.

Results: Initial data of a single primary care clinic identified 462 diabetic patients. Of those patients, 94 (20.3%) did not have active statin orders in accordance with level I and II recommendations of the 2018 ACC/AHA Multisociety Guideline on the Management of Blood Cholesterol for diabetic patients. Primary and operational outcomes stated in above methodology will be presented at the 2019 Wisconsin Pharmacy Residency Conference.

Conclusion: Regarding patient outcomes and return on investment, the value of ambulatory care pharmacists is well documented in the literature. The initial cost of dedicating a full-time pharmacist position to primary care clinics may provide a barrier in rural health care settings. Results of this study demonstrate proof of concept—strategic use data analysis and existing pharmacist positions provides an FTE neutral avenue to impact physician prescribing and downstream patient outcomes.

The Impact of a Pharmacist Driven Intervention on Appropriate Statin Prescribing in Patients Living with HIV: A Population Health Perspective

Kelsey K Phipps, PharmD

Background: Within the AIDS Resource Center of Wisconsin (ARCW), a patient-centered medical home, the pharmacy team manages several medical conditions for patients via collaborative practice agreements. Literature from other established ambulatory settings demonstrates successful implementation of pharmacist-driven interventions in the management of a variety of chronic conditions, including hypertension, diabetes, anticoagulation, and smoking cessation. One study, in a community pharmacy setting, targeted statin prescribing in patients diagnosed with diabetes. The aim of our study is to evaluate the impact of a pharmacist-driven statin management protocol in patients living with HIV. It is hypothesized that a higher proportion of patients will be prescribed appropriate statin therapy after pharmacist intervention.

Methods: This study will evaluate a pharmacist-driven statin management protocol over a five-month period between January 2019 and June 2019 across ARCW's four Wisconsin based medical clinics. Eligible patients will be over 21 years of age, living with HIV, and eligible for statin therapy based on 2013 ACC/AHA guidelines. In phase one, researchers will utilize a data collection tool, constructed to identify eligible patients and format pertinent data, in conjunction with the electronic medical record to perform a chart review and determine appropriateness of current statin prescribing. In phase two, a pharmacist-driven intervention will target gaps in statin prescribing. In the last phase, a final chart review will be performed, utilizing the data collection tool, to assess for the impact of a pharmacist-driven intervention on appropriate statin prescribing.

Results: Of the 1600 patients considered, 554 individuals were identified as candidates for inclusion in this study. Only 66% of patients eligible for statin therapy were prescribed a statin at baseline (349 patients on statin / 554 patients eligible for therapy). Twenty seven of the patients receiving statin therapy were flagged for recommendation of a dose adjustment (27/349; 7.7%). Phase two of the study is currently underway, targeting patients eligible for statin therapy who are not currently treated and/or receiving suboptimal therapy.

Conclusion: Improvement in rates of appropriate statin prescribing in patients living with HIV may be possible via a pharmacist-driven statin management protocol. If this impact is demonstrated, the results of this study could be utilized to support pharmacists in other ambulatory and population health settings in increasing their utility and promoting collaborative care at their practice by demonstrating improvement in outcomes with pharmacist intervention.

Use of Intravenous Verapamil in the Setting of a Diltiazem Shortage

Landon Neese, PharmD

Background: To evaluate the incidence of hypotension associated with intravenous verapamil, compared to intravenous diltiazem, in the setting of an intravenous diltiazem shortage at a community hospital.

Methods: All intravenous verapamil and intravenous diltiazem administrations for emergency department visits or admissions to a community hospital were obtained from Epic for the year of 2018. Retrospective chart review collected information on the initial dose received, initial blood pressure and heart rate (prior to administration of study medications), the lowest blood pressure and heart rate (while on an infusion or up to one hour after administration of a bolus), conversion to normal sinus rhythm and weight

Pharmacist Managed Warfarin Dosing Using Chromogenic Factor X Assay During Direct Thrombin Inhibitor Overlap Therapy

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Background: Direct thrombin inhibitors (DTIs), such as argatroban and bivalirudin interact with the prothrombin assay resulting in a falsely elevated INR creating a challenging situation for clinicians managing patients transitioning from DTIs to warfarin. This is particularly important for patients with heparin-induced thrombocytopenia (HIT) due to the increased risk of thrombosis. The chromogenic factor X (CFX) assay is an alternative way of monitoring warfarin therapy in these patients, which is not affected by this lab interaction. The CFX assay specifically measures the percentage of factor X activity which can be correlated to equivalent INR values and is used to determine the appropriate time to discontinue the DTI infusion.

The purpose of this project is to retrospectively evaluate the transition from direct thrombin inhibitor (DTI) to warfarin using INR values. Then after implementation of a pharmacist managed protocol to monitor the transition from DTI to warfarin with CFX, the prospective results will be evaluated and compared to the retrospective results.

Methods: This project was reviewed and approved the Aurora Health Care Institutional Review Board. All patients who received argatroban or bivalirudin at our institution between June 1, 2017 and June 30, 2018 were screened for inclusion through retrospective data available in the electronic health record (Epic). Patients were included if they had overlapping therapy with argatroban or bivalirudin and warfarin.

Prospective patients were identified from October 1, 2018 through present using the same inclusion and exclusion criteria and managed by the pharmacist managed protocol established and monitored with CFX levels in combination with the clinical judgement of the healthcare team.

The primary objectives of this project was to retrospectively review the transition of DTI to warfarin, implement a pharmacist managed protocol for warfarin dosing using CFX in patients transitioning from DTI to warfarin and compare the difference in percentage of therapeutic confirmatory INRs between the retrospective and prospective groups.

Results: Of 212 patients screened, 18 unique patients and 20 courses of overlap therapy (19 argatroban, 1 bivalirudin) had data that met inclusion criteria. The primary outcome of a therapeutic confirmatory INR (based on individual patient INR goal) after discontinuation of DTI infusion was achieved in 40% (8/20) of patients in the retrospective INR group. The median time of DTI and warfarin overlap in the retrospective INR group was 6.0 (3-17) days.

Characterizing the Impact of Shortages on Antibiotic Utilization and Clinical Outcomes

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Background: Following the destruction of intravenous (IV) fluid manufacturers in Puerto Rico due to Hurricane Maria in September 2017, hospitals around the country were forced to quickly find resolutions in response to fluid shortages. One way to preserve fluids is to limit IV medication use to only when absolutely clinically necessary and to use oral (PO) alternatives instead. At Froedtert Hospital, this was attempted by creating alternative alerts. These alerts prompt the ordering provider to consider using the PO alternative when an order for an IV medication is entered. Alternative alerts were placed for metronidazole and linezolid, and ciprofloxacin was also evaluated as the control. The purpose of this project is to characterize the use of IV medications in relation to the shortage and describe clinical outcomes for impacted patients.

Methods: This project was a pre-post quasi-experimental retrospective analysis. Patients were eligible if they were > 18 years old and began IV antibiotics within the Froedtert Hospital system. Pertinent data was collected, including the antibiotic name, IV antibiotic duration, type of infection, date of switch to PO if oral initiated, and date and time the patient was able to tolerate PO medications. Data collected also included the number of times an alternative alert was accepted and the number of times the prescriber continued with the original order. The primary outcome was duration of IV antibiotic therapy. Key secondary outcomes included 30-day all-cause mortality, 30-day hospital readmission, and time receiving IV antibiotics while tolerating other PO medications.

Results: In the interim analysis, data has been collected for 15 patients for each antibiotic in the pre-intervention group. Patients received IV metronidazole for an average of 87.54 hours, IV linezolid for 89.72 hours, and IV ciprofloxacin for 92.65 hours. Death within 30 days occurred in 2 (13.33%), 4 (26.67%), and 0 (0%) patients in the metronidazole, linezolid, and ciprofloxacin groups, respectively. A total of 5 patients were readmitted within 30 days, with 2 (13.33%), 1 (6.67%), and 2 (13.33%) patients receiving metronidazole, linezolid, and ciprofloxacin, respectively.

Economic Impact of Daptomycin Dosing Protocol Utilizing a Closed-system Drug Transfer Device in Combination with Dose Rounding to Minimize Waste

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Background: Health care spending accounts for trillions of dollars each year in the United States. With evolving payer reimbursement policies and an increased focus to become more efficient with health care dollars, initiatives to minimize costs have become a focus for many health care systems across the country. As medication costs continue to rise, reducing drug waste is a simple and effective way to reduce spending. Daptomycin is a costly IV antibiotic used to treat gram-positive infections. The dose of daptomycin is weight-based and often requires a partial vial for each dose. Patients can be treated with daptomycin for weeks at a time, and the use of partial vials over this extended time creates a significant amount of waste. Closed-system transfer devices (CSTD) have been shown to prolong the expiration dates of compounded IV medication vials. The purpose of this study was to evaluate the potential cost savings associated with reduced daptomycin waste when a prolonged expiration date is applied after a CSTD is utilized in combination with a dose rounding protocol.

Methods: A retrospective chart review was performed on all doses of daptomycin given at Gundersen Lutheran Health System between January 1, 2017 – March 3, 2018. The following data was collected for each dose of daptomycin: indication, dose, and phase of care where daptomycin was administered. The cost for a 500 mg vial of daptomycin was assumed to be $534.59 (average wholesale price). Two scenarios were analyzed to assess cost. Scenario A assessed total cost without the application of a CSTD: doses were not rounded and partial vials were discarded. Scenario B assessed total cost with the utilization of a CSTD: doses were rounded to the nearest 0.25 vial and the remaining partial vial would be preserved with a CSTD and available for use in the next 48 hours; if a dose was not needed in the next 48 hours, the partial vial would be discarded.

Results: 415 doses of daptomycin were dispensed at Gundersen Lutheran Health System during the study period. 262 doses were dispensed in the hospital. The average dose of daptomycin dispensed was 504 mg. The most common indications for use were bacteremia, osteomyelitis, and skin and soft tissue infection. Scenario A (without CSTD) utilized 519 vials and cost $277,452.21. Scenario B (with CSTD) utilized 427 vials and cost $228,269.93. A potential cost-savings of 17.7% of total daptomycin cost was discovered by using the CSTD and dose rounding.

Conclusion: Many health systems are looking for opportunities to reduce health care spending. The application of a daptomycin dosing protocol utilizing a CSTD and dose rounding presents such an opportunity for reducing drug waste and subsequently reducing drug spending.

Evaluation of the Clinical Impact of Prospective Pharmacist Order Review in the Emergency Department

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Background: Prospective pharmacist order review (PPOR) ensures that medications are selected appropriately for patients based on dose, route and frequency while avoiding drug interactions. The use of PPOR in the Emergency Department varies across the country. A survey of hospital emergency departments around the United States found that 28.3% of hospitals use auto verification for all medications, 39.8% have targeted order review and 31.9% have no medications undergoing auto verification. Current practice at Froedtert Health System emergency departments is the use of targeted PPOR for high-risk medications, weight-based orders and centrally distributed medications.

The primary objective is to increase the amount of medications that undergo PPOR in emergency departments throughout the Froedtert Health System. The secondary objectives are to evaluate the clinical impact of the PPOR through the number of pharmacist interventions, medication administration timeliness and pharmacist job satisfaction.

Methods: This is a pre and post implementation study that uses a scoring system based on data from literature review, best practice standards and expert opinion, to select medications to undergo PPOR. The primacy outcome will be measured by evaluating the percentage of emergency department medications undergoing PPOR pre and post intervention. The secondary outcome of pharmacist intervention will be measured by a combination of in order edits and order rejections for medications that are removed from auto verification. Processing times will be assessed for pre and post implementation to measure the total amount of time from provider order entry to medication administration. Pharmacist satisfaction will be assessed through pre and post satisfaction survey utilizing a 5 point Likert scale.

Results: Pre-implementation data identified 33 unique medications that have been removed from auto verification for PPOR. Based on historical order volumes from a retrospective analysis of one month, we anticipate a 3.2% increase in PPOR.

A Retrospective Review of the Use of Phenobarbital in Acute Alcohol Withdrawal in Critically Ill Surgical Patients

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Background: Acute alcohol withdrawal can be a debilitating and potentially life-threatening condition by placing patients at risk for a variety of side effects, ranging from headaches and nausea/vomiting to tremors and seizures. Therefore, it is important to provide patients with quick and effective pharmacologic therapies to prevent or cease their withdrawal symptoms without further complication of their clinical picture. Currently, benzodiazepines (i.e. Lorazepam, Midazolam) are frequently used medications for acute alcohol withdrawal; however, they too have a number of undesirable side effects. We aimed to determine the efficacy and safety of the use of phenobarbital for the cessation of acute alcohol withdrawal.

Methods: A total of 37 patients were screened and were included in this study if they were >18 years old, were admitted to the Surgical Intensive Care Unit (SICU) at Froedtert Hospital and for whom phenobarbital therapy was initiated for acute alcohol withdrawal from January 2016 to December 2018. After applying the previously mentioned inclusion and exclusion criteria, 23 patients were included to be studied. In this study, data collection was attained through retrospective review of the patient's electronic medical record (EMR), recording patients' demographic information, indication, and doses of phenobarbital given (in both mg and mg/kg).

Results: After analysis of the twenty-three patients' demographic information, the mean age was 55 years old (ranging from 26-83 years old) with 87% of patients being male. The mean cumulative load of phenobarbital given was 640mg (9mg/kg) followed by an average of 48mg phenobarbital for the starting dose of the taper. The number of days that the phenobarbital taper was utilized for varied between patients, ranging from 0 – 7 days after initiating therapy (mean duration of phenobarbital taper is 3 days). The two most common reasons for discontinuation of the phenobarbital taper included the presence of side effects (22%) and a patient transfer to the floor (7%).

Conclusion: From our results, phenobarbital appears to be effective at reducing a patient's acute alcohol withdrawal. However, similar to benzodiazepines, phenobarbital has its own array of side effects (i.e. delirium/altered mental status, hypotension, somnolence) that must be considered when choosing an agent for acute alcohol withdrawal.

Guideline Development for Tissue Plasminogen Activator (tPA) and Deoxyribonuclease (DNase) Per Chest Tube Procedure

Carla Karczewski, PharmD, Karissa Fritsch, PharmD Candidate

Background: Currently Froedtert Hospital does not have a guideline for tissue plasminogen activator (tPA) and Deoxyribonuclease (DNase) administration via chest tube or for necessary monitoring once administration is complete. As tPA is a high-risk medication carrying serious bleeding side effects, the monitoring of its use is necessary for medication safety. This project will attempt to rectify this situation by developing a practical and appropriate guideline to be utilized when this procedure is performed.

Methods: This project was performed in a multi-step approach. Initially, current practice regarding administering tPA and DNase per chest tube was assessed through chart review of patients who had received this treatment from July 1 2017 through July 1 2018. Then a thorough literature search was completed to determine optimal dose, administration technique, and monitoring parameters. Information gained through the literature search was utilized during guideline development to ensure evidence-based practice. Finally, the guideline was implemented into practice and its usefulness was assessed by a survey of key stakeholders involved in this treatment. The primary outcome of this project is the final draft of the guideline. Secondary outcomes include an assessment of current practice by data collection accompanied by descriptive statistics, as well as a short survey administered to applicable nursing and medical staff to evaluate the guideline as a reference to their practice.

Results: The chart review has identified 64 patients who have received at least one dose of tPA via chest tube between July 1 2017 and July 1 2018. Of these patients, 11 (17.2%) received both tPA and DNase, while the other 53 (82.3%) patients received only tPA. Out of the 64 patients reviewed, 38 (59.4%) required more than one dose of tPA and one patient required 13 doses.

A Multi-site Retrospective Review of Continuous Ketamine Use in Critically Ill Patients

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Background: The 2013 Pain, Agitation, and Delirium guidelines from the Society of Critical Care Medicine recommend the use of propofol or dexmedetomidine for sedation in mechanically ventilated patients. However, both propofol and dexmedetomidine have been associated with significant hypotension, rendering them unsuitable for use in patients with underlying hemodynamic stability. The sympathetic stimulant properties of ketamine, a rapid acting anesthetic agent, make it a good candidate for use in patients with underlying hemodynamic and cardiovascular instabilities that limit the use of propofol or dexmedetomidine. The primary objective of this study is to characterize the use of continuous ketamine infusions in intensive care units (ICUs) in terms of indication, dose, and duration of therapy.

Methods: This multi-site study was derived as part of a national multi-center study. Institutional Review Board (IRB) approval was obtained from the Medical College of Wisconsin. Data was pulled from the electronic health record (EHR). The patient name & medical record number, ordering service, intended order start and order end times, and hospital admission & discharge information was collected for patients receiving continuous ketamine infusions. Retrospective chart review was performed on patients to assess ketamine indication, duration of use, pain and sedation scores, and the incidence of adverse events. The number of completed chart reviews was limited by a chart review process that approximated 4 hours per patient.

Results: 418 unique patients were identified that had active orders for continuous ketamine infusions from 2014 through 2017. 324 patients were deemed appropriate for inclusion in the study. Of all patients meeting inclusion criteria, 47 patients screened had active orders for ketamine at the community hospital site and 277 had active orders for it at the academic medical center. At the academic medical center 50 patients received ketamine in the cardiovascular ICU, 16 in the medical ICU, 21 in the neurological ICU, 181 in the trauma/surgical ICU, and 9 in the transplant ICU. For all ketamine infusions, 31% were ordered by trauma surgery, 24% by cardiology-based teams, 13% by a neurology service, 8% by a hospitalist, 8% by orthopedic services, 7% by other surgical teams, 5% by internal medicine, and 4% by oncology. More detailed chart review data is forthcoming.

Conclusions: Based on ordering service data and ICU utilization, continuous ketamine infusions tend to be used most often in surgical/trauma patients or patients with cardiovascular complications. Further conclusions regarding specific indication are forthcoming upon detailed chart review statistics.

Clinical Effectiveness of Using Multimodal Pain Management Strategies In Surgical Patients

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Background: Opioid therapy has long been the cornerstone of acute pain management. While opioids offer improved pain management, they are also associated with a host of adverse effects, ranging in severity from mild constipation to death. Multimodal pain strategies emphasize the use of non-pharmacologic and non-opioid pharmacologic treatments and specifically, in the post-operative setting, numerous studies have shown multimodal therapy to be associated with superior pain relief and decreased opioid consumption compared with a single medication administered through one technique. (5,6) While reduced opioid consumption is generally a desirable attribute, the amount of reduced opioid consumption that confers a clinical benefit, as measured by reduced adverse effects, has yet to be elucidated. Therefore, this protocol strives to describe the relationship between opioid reduction and reduction in opioid-related adverse effects to better define what a clinically-relevant reduction in opioid therapy is as part of a multimodal pain strategy.

Methods: Eligible participants are those >18-year-old emergency surgical or isolated traumatic abdominal injury patients admitted to Froedtert Hospital who had a laparotomy and were inpatient for at least 72 hours. A retrospective evaluation of 300 emergency general surgery patients who underwent an open laparotomy before January of 2018 was performed. We will identify the 300 patients needed to meet sample size through the I2B2 software.

Analyzing the Impact of Diuretic Therapy on Heart Failure Readmissions

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Background: To determine if the length of oral diuretic therapy prior to discharge affects heart failure readmission rates. Secondary objectives were to assess if patients' diuretic dosage was being converted equivalently from intravenous (IV) to oral (PO), and the change in diuretic dose from admission to discharge.

Methods: Included patients are those who had an inpatient admission coded to heart failure at Ascension All Saints Hospital and were discharged between January 2018 and June 2018. Data was collected through retrospective chart review. Excluded were those that were never converted from IV to PO diuretic therapy, transferred to another hospital, passed away within 30 days of initial discharge, left against medical advice, converted to spironolactone, or had no encounters documented in Epic post admission.

Results: 178 patients were included in the IRB-waived study and 146 patients were included in analysis. Twenty-eight patients (19%) were readmitted for heart failure within 30 days of discharge and 13 (46%) of those patients received zero days of oral diuretic therapy prior to discharge. Length of PO therapy prior to discharge was not statistically significant ($p = 0.178$) for all cause nor heart failure readmission; however, total length of diuretic therapy was statistically significant ($p = 0.023$) in relation to all cause readmission. Overall, 127 patients (87%) were not equivalently converted from IV to PO diuretic therapy. Focusing on those that were readmitted for heart failure, only 4 patients were equivalently converted from IV to PO diuretic therapy. When analyzing change in dose from admission to discharge, those that didn't have a dosage change had a 1 in 4 chance of being readmitted for heart failure ($p = 0.006$).

Conclusion: We observed a considerable number of diuretic dosages not being equivalently converted. While not a predictor of readmission, it is an opportunity for pharmacists to intervene and ensure a proper oral dose is being initiated. Additionally, it is important for pharmacists to carefully review discharge orders and if diuretic dose has not changed, verify a documented reason or check with the physician. Patients that were on diuretic therapy for ≥ 5 days should have closer follow-up post discharge in hopes of preventing readmission.

Pharmacist Interventions After Completion of Discharge Planning in Rural Hospitals

Matt J. Huppert, PharmD Candidate, Bryant Schobert, PharmD, Michelle A. Chui, PharmD, PhD

Background: Thirty-day readmissions are a major concern for rural hospitals as even a few patients returning can produce a high readmission rate. Focusing on the transition of care from hospital to home is one factor our healthcare system can focus on to reduce medication-related adverse events and help prevent hospitalizations. One valuable variable, pharmacist time, was recorded in order to evaluate resources used within the transitions of care process. The primary objective of this project is to describe pharmacists' interventions that occur after discharge planning is completed by the healthcare team.

Methods: Seven pharmacists at three different rural hospitals documented each transition of care intervention, defined as any intervention that occurred after discharge planning was completed over 16 weeks. The pharmacists were to document five aspects of the situation: (1) What was the situation? (2) Who mentioned the situation? (3) What was the approach to resolve the situation? (4) Who is to follow-up with the patient? (5) How much pharmacist time was spent resolving the situation? The primary author sent out weekly emails for data collection.

Results: Seventeen interventions have been recorded to date. Preliminary results show that correction in medication dosing (N=7; 41%) was the most common intervention after discharge planning is completed. Hospital pharmacists averaged 16.4 ± 6.4 minutes to correct the medication dose for the patient by contacting the provider, nursing staff and/or a community pharmacy. Antibiotics (N=6; 35%) were the most common class of medications in which interventions took place after discharge planning was completed.

Conclusion: This pilot study on pharmacists' effectiveness post-discharge planning indicates that pharmacists focus on dosing of medications and appropriate use of antibiotics after discharge planning occurs. In an effort to combat extra time and resources spent on fixing errors, a checklist to standardize the transition to home during the discharge process will be created for rural health practitioners. This checklist will be driven by interventions that have taken place within rural hospitals. Future efforts will focus on implementing and evaluating this checklist within rural hospital settings.

Assessment of Perioperative Vancomycin Use in Orthopedic Patients with a History of Penicillin Allergy: A Retrospective Review of Penicillin Skin Testing

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Background: To assess if implementation of a penicillin skin testing algorithm reduces orthopedic perioperative vancomycin use in patients with a documented penicillin allergy at Marshfield Clinic Health System.

Methods: This retrospective quality improvement project included adult patients who received elective total joint replacement surgery. Patients with a documented penicillin allergy who were scheduled to receive a total joint replacement surgery between January 1, 2018 – January 1, 2019 were analyzed utilizing a penicillin skin testing algorithm. In this group, patients were identified by their medical history number if they had a history of penicillin allergy, were referred to the allergy clinic for penicillin skin testing and by a positive or negative penicillin skin test. A cohort of total joint replacement surgery patients prior to implementation of the penicillin skin testing algorithm served as a control. This study has four aims and will assess 1) how many patients have a history of penicillin allergy recorded in their electronic medical record and the documented reaction, 2) how many patients with a documented penicillin allergy went on to receive penicillin skin testing and what proportion of tests resulted in a positive penicillin skin test, 3) whether penicillin skin testing decreased perioperative vancomycin use in total joint replacement orthopedic surgical patients and 4) if the documented penicillin allergy was removed from the electronic medical record in patients who resulted a negative penicillin skin test.

Results: In Marshfield Clinic Health System patients, 13.6% had a history of penicillin allergy documented in their electronic medical record. The most common reported reactions to penicillin was rash (40%) and hives (29%). Between January 1, 2018 – January 1, 2019, 15 (31.9%) patients with a documented penicillin allergy were referred to the allergy clinic for penicillin skin testing before undergoing a total joint replacement procedure. Three patients (20%) had a positive penicillin skin test. Twelve patients (80%) had a negative penicillin skin test. After implementation of the penicillin skin testing algorithm between January 1, 2018 – January 1, 2019, preoperative vancomycin use decreased compared to the control (4.1% vs 9.5%). In patients who had a negative penicillin skin test, 80% of documented penicillin allergies were removed from the electronic medical record.

Conclusion: The incidence of documented penicillin allergies within our health system is similar to the national average of 10-20%. Implementation of a penicillin skin testing algorithm reduced vancomycin use in total joint orthopedic procedures. Future efforts will include evaluating the feasibility of extending penicillin skin testing to all patients scheduled to receive other surgeries requiring preoperative antibiotics.

Assessment of Apixaban Dosing in Chronic Hemodialysis

Michael Palmer, PharmD Candidate

Background: Apixaban is a direct oral anticoagulant that inhibits factor Xa. The FDA-approved dosing for prevention of thromboembolic events in patients with nonvalvular atrial fibrillation is 5 mg twice daily. Dose reduction to 2.5 mg twice daily is recommended for patients who have two or more of the following characteristics: age greater than or equal to 80 years, weight less than or equal to 60 kg, and serum creatinine greater than or equal to 1.5 mg/dL. However, it is unclear how these dosing recommendations are followed in patients on chronic, intermittent hemodialysis. This drug use evaluation examines apixaban dosing patterns at Gundersen Health System for patients on dialysis.

Methods: A raw data report containing all patients with apixaban listed on their electronic health record medication list at least once and a hemodialysis encounter at Gundersen Health System between the dates 10/1/2017 to 9/30/2018 was produced. For each patient, a chart review was completed to determine the patient's weight, age, and current medication list at the time of the dialysis encounter or when apixaban was discontinued. Prescribed apixaban doses and patient-specific factors were compared to the manufacturer recommendations.

Results: A total of 46 patients on apixaban had a dialysis encounter between the dates of 10/1/2017 and 09/30/2018. Of the 46 patients, 38 were prescribed apixaban for prevention of thromboembolic events in nonvalvular atrial fibrillation. Inappropriate dose reductions, per the manufacturer's recommendations, occurred in 5 of the 38 cases (5/38, 13.2%). Additionally, two patients were prescribed the full apixaban dose when a dose reduction was indicated based on age and renal function (2/38, 5.3%).

Conclusion: The manufacturer's dosing recommendations are not followed in all identified patients on dialysis and taking apixaban for atrial fibrillation. Gundersen Health System has an opportunity to optimize apixaban dosing for their patients on hemodialysis.

Impact of an Institutional Guideline for Standardized Tacrolimus Dosing

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Background: Although most commonly used for immunosuppression after solid-organ transplant, tacrolimus (FK-506) plays an important role in prevention of graft-versus-host disease in allogeneic hematopoietic stem cell transplantation (HSCT). Tacrolimus has a narrow therapeutic window necessitating close monitoring through whole blood concentration levels to ensure achievement of an adequate level of immunosuppression as well as to prevent the development of adverse effects. In December 2017, HSCT physicians at Froedtert Hospital anecdotally reported they felt many of their patients, especially those with a body mass index (BMI) > 30 kg/m2, were experiencing severe tacrolimus-related adverse effects, such as nephrotoxicity. Clinical analysis demonstrated the majority of patients with BMI > 30 kg/m2 had a therapeutic first level and rarely had kidney injury. The analysis, however, also demonstrated tacrolimus levels and dose modifications were variable depending on the attending physician and clinical team caring for the patient. At that time, there were no consensus recommendations or guidelines available describing optimal tacrolimus management in blood and marrow transplant recipients within Froedtert Health. As a result, practices varied among providers and there was no standard expectation for review of tacrolimus levels and adjustment of dosing. Therefore, a tacrolimus dosing and monitoring guideline was created and approved. Overall, the purpose of this study is to evaluate patient outcomes following the implementation of the Froedtert guideline.

Methods: A retrospective, single-center chart review was completed. The chart review assessed provider compliance with the Froedtert guideline, initial FK-506 levels, maximum FK-506 levels within the first 30 days of therapy, side effects attributed to tacrolimus including nephrotoxicity and neurotoxicity, and the number of hospitalizations due to toxicities of tacrolimus. Eligible patients were those > 18 years old who underwent allogeneic HSCT between March 2018 and August 2018 and who received tacrolimus therapy for at least 30 days post-transplant. Patients were excluded if they were < 18 years old or were in clinical trials with protocol-specified tacrolimus dosing.

Evaluating the Appropriateness of the Frequency of Low Molecular Weight Heparin Levels Ordered

Sabrina M. Schneider, PharmD Candidate, Sara Hubbard, PharmD, MSHS

Background: Low Molecular Weight Heparin (LMWH), namely enoxaparin, is frequently used for the treatment and prevention of serious clotting events. Traditionally, anticoagulation with LMWH does not require monitoring, unlike its unfractionated heparin counterpart. Most data do not support routine monitoring of anticoagulant response in patients, since the anti-Xa level is not usually predictive of bleeding risk in general patient populations. Froedtert-specific guidelines suggest that anti-Xa levels should be monitored in specific patient populations, including pregnant women, significantly underweight or overweight patients, or those with creatinine clearance (CrCL) less than 30 mL/min. These patient-specific recommendations stem from recent studies investigating the dosing variability and pharmacodynamic properties of LMWH. In investigations comparing dosing in obese and non-obese patients, anti-Xa levels were not found to predict thrombotic or hemorrhagic events, though they may be useful in guiding treatment for patients with altered clearance or unexpected pharmacokinetic response to the medication. Ultimately, the clinical use of anti-Xa levels with LMWH is not well understood.

The purpose of this analysis is to determine whether the increased number of anti-Xa levels ordered are appropriately indicated by Froedtert's guidelines, and whether these results are being used to make therapeutic interventions to avoid adverse outcomes for our patients. If not clinically indicated or useful, these lab draws could be an unnecessary cost for our patients and the Froedtert organization.

Methods: Eligible patients are persons 18 years or older who received enoxaparin and had at least one anti-Xa level drawn during their admission. Once eligible patients are identified, their demographic, biometric, and laboratory values will be collected from the electronic medical record. Documented indications for LMWH monitoring will be compared to current protocol-recommended indications to assess for appropriateness. Levels will also be assessed for utility in guiding LMWH dosing, as well as therapeutic efficacy based on therapeutic ranges within the protocol. The results will be compiled into percentage of appropriate draws and percentage of levels that led to dosing changes. Finally, patients will also be assessed for adverse events due to supra or subtherapeutic levels of LMWH.

Impact of a Pharmacist-driven Discharge Medication Reconciliation Process at a Community Teaching Hospital

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Background: The World Health Organization identifies that approximately half of all hospital medication errors occur during transitions of care. To prevent such errors, the American Pharmacists Association and American Society of Health-System Pharmacists recognize medication reconciliation as a way of ensuring safe and effective pharmacotherapy. Pharmacists can play a vital role in recognizing and resolving clinical discrepancies to optimize pharmacotherapy via discharge medication reconciliation (DMR). The purpose of this study is to evaluate the impact of a pharmacist-driven DMR process.

Methods: A dedicated workgroup was created to expand clinical services via formalization of a DMR process. A literature review of best practices was performed, and a pharmacist survey of baseline DMR practices was completed. A standardized pharmacist-driven DMR workflow was established, and a pre- and post-implementation study was conducted to evaluate the impact of the process. DMR activities completed by a defined group of clinical pharmacists were evaluated during the pre- and post-implementation periods of October 2017 and October 2018, respectively. Data collected included the number of patient discharges for whom reconciliation was completed, the number and type of clinical interventions performed, and pharmacist time invested in DMR.

Results: The baseline survey was completed by 90% of the hospital pharmacists. Results demonstrated a baseline focus on warfarin management, antimicrobial therapy, and completion of pending clinical interventions. Identified areas of opportunity included formalization of a prescription re-routing process and establishment of DMR documentation expectations. Medication reconciliation was completed for 2 discharges during the pre-implementation period and 127 discharges during the post-implementation period. Of the 127 discharges reviewed during the post-implementation period, 33 (26%) involved intervention resulting in a clinical change.

A total of 71 changes were documented which included several instances of a pharmacist review resulting in multiple clinical changes (average 2.15 changes/DMR requiring clinical intervention). The most common types of clinical changes recommended by pharmacists were anticoagulation adjustments (n=32) and antimicrobial stewardship interventions (n=11). Other changes involved avoidance of therapeutic duplications, dose optimization, and increased access to acutely indicated medications at hospital discharge. The average pharmacist time invested in DMR was 14 minutes per discharge when pharmacist review resulted in a clinical change and 7 minutes when no change was indicated. Implementation of the DMR process did not require adjustment to pharmacist staffing during the study period.

Conclusion: This study showed that a pharmacist-driven DMR process resulted in optimization of pharmacotherapy across multiple therapeutic classes of medications and increased access to medications at transitions of care. Furthermore, pharmacist engagement in DMR was feasible within the existing staffing model. Based on the results of this study, the pharmacist-driven DMR process was implemented on a hospital-wide basis. Impacts on clinical pharmacist workload and patient outcomes continue to be evaluated.

Implementing a Workflow Protocol in the Emergency Department to Reduce Hospital Admissions in Patients with Autonomic Dysreflexia

Brian Domack, PharmD, Youqi Zhang, PharmD Candidate

Background: At Froedtert Memorial Lutheran Hospital (FMLH), patients who present to the emergency department (ED) with autonomic dysreflexia (AD) are often directly admitted to the hospital. These symptoms often resolve after the initiation of the inpatient AD protocol shortly after hospital admission. Currently, there is no protocol in place at FMLH ED that pertains to the triage or treatment of AD. The purpose of this study is to evaluate the autonomic dysreflexia workflow at FMLH and determine how many potential hospital admissions could be prevented if the existing inpatient AD workflow was implemented in the ED.

Methods: This was a retrospective chart review conducted in the ED of Froedtert Memorial Lutheran Hospital from 01/01/2017 – 07/15/2018. Two-hundred and thirty-four charts were screened and reviewed. Data collected include the following:

Inclusion/ Exclusion provided as lists:

i. Inclusion Criteria
   a. Adult patients 18 years of age or older with spinal cord injury
   b. Patients with a formal diagnosis of autonomic dysreflexia at FMLH
   c. Patients with AD who were started on a bowel regimen at FMLH ED or the observation unit
   d. Patients with AD who were started on a bowel regimen in an inpatient unit at FMLH
   e. Patients with AD who were admitted inpatient from Froedtert ED whose total length of inpatient stay was less than 48 hours

ii. Exclusion Criteria
   a. Pediatric patients under the age of 18
   b. Patients who were admitted with AD diagnoses whose hospital stay was longer than 48 hours

Results: Two-hundred and twenty-three patients were screened and eight patients met the inclusion criteria and were included in the study. Out of the eight patients, six patients presented to the ED with concurrent AD and complicated urinary-tract infection (UTI), four of which were admitted inpatient and two were directly discharged from the ED. Two patients had AD related to catheter malfunction and were discharged from ED after catheter replacement. Patients who were admitted for UTI and AD had an average hospital-stay of 2 days.

Conclusion: Our current data suggests that patients with AD who presented to Froedtert ED were triaged properly based on the severity of their symptoms and conditions. A workflow protocol implementation is not necessary at this moment.

Evaluation of the Medication Possession Ratios of Patients with Multiple Sclerosis (MS) Participating in F&MCW Medication Management Home Delivery Service

Timothy Hinkley, PharmD, Robert Cress, PharmD Candidate

Background: Multiple sclerosis (MS) is an immune-mediated process where the body's immune system starts to attack the central nervous system. When MS is untreated it leads to progressive degeneration and symptomatic progression. MS is a progressive disease that can be modified by using immune-modulators. If patients are not adherent to their medications, they will continue to have disease progression. Adherence to these medications is critical to preventing downstream complications. This research originated as a follow up to prior investigation assessing medication adherence with other chronic health conditions and a desire to evaluate the impact of FMCW's medication management pharmacy program. The services provided include performing monthly medication reviews assessing medication changes and determining refill needs to help minimize gaps in therapy without simply automating medication refills. The goal of this project is to demonstrate the impact of the F8MCW medication management pharmacy on patient adherence and compare it with published literature.

Objectives:

1. Determine the medication possession ratios for patients with multiple sclerosis who are receiving their medication(s) from a F&MCW dispensing retail pharmacy.
2. Assess the impact on medication possession ratios for patients' utilizing the F&MCW medication management home delivery service.
3. Compare F&MCW medication possession ratios with available literature medication possession ratio information within MS.

Methods: This study is a retrospective, single-centered, cross-sectional review/study meant to determine the medication possession ratios for patients with MS receiving their specialty medication(s) from a F&MCW dispensing retail pharmacy during fiscal Year 2018 (June 30, 2017 through July 1, 2018)

Results: Among (68) patients, (79.4%) of patients were considered to be medically adherent to their medications among our medication management population. Compared to an average of (56.3%) based on three other studies evaluating medication adherence rates for patients with MS, our medication management program's adherence rate was higher than the literature reviewed.

Conclusion: Monthly medication reviews with patients along with assessing medication changes by reviewing medical charts, along with assessing patient needs for medication refills may help improve medication adherence.

Evaluation of *The Journal of the Pharmacy Society of Wisconsin* Peer Review Mentoring Program

Hannah Hecht, PharmD Candidate, Amanda Margolis, PharmD, MS, BCACP

Background: In 2018, the Journal of the Pharmacy Society of Wisconsin (JPSW) implemented a peer review mentoring program in an effort to improve the quality of peer reviews and to support new peer reviewers. The JPSW mentoring program matches new practitioner mentees with experienced peer reviewer mentors to complete peer reviews for JPSW. The mentors are tasked with guiding the mentees in the peer review process in an effort to increase their confidence as a reviewer and to provide constructive feedback to enhance the quality of the peer review. The objective of this evaluation was to assess the peer review mentoring program, specifically: the usefulness of the program, if the mentees increased confidence in completing peer reviews, and how JPSW can improve the program.

Methods: An electronic, email link survey was sent to mentees and mentors that participated in the first 10 mentored peer reviews. Mentors and mentees were both asked: the primary mode of communication used to complete the review, the time commitment to the review process, how the program could be improved, and any additional thoughts about their experience. Subsequent questions for the mentees included rating their level of confidence on a scale of 1-5 (1 being not at all confident; 5 being completely confident) prior to and after completing the mentored peer review. Further questions for the mentors included rating on a scale of 1-5 (1 being not at all, 5 being very likely) their likelihood to participate in the program in the future.

Results: There were 5 survey responses from mentees (56%) and 6 from mentors (100%). The primary modes of communication for the review were email (63.6%) and telephone (27.3%). Completion of a mentored review took an average of 3 hours and 4.9 hours for mentors and mentees, respectively. The average confidence level of mentees in completing an independent peer review prior to the mentoring program was 1.8 compared to 4 after completing the program. An average rating of 4.8 was obtained for the likelihood of mentors to serve as a mentor again. 100% of mentees indicated with a score of 5 that they would recommend the program to an interested colleague. Suggestions for improving the program included setting formal expectations for the mentor/mentee partnership, having PSW editorial staff provide feedback on the quality of the review conducted, and requiring that the initial mentor/mentee communication be in-person or via telephone.

Conclusion: Feedback from program participants indicates that the program was beneficial for mentees and a positive experience with minimal time commitment for mentors. However, further feedback and program structure may further improve peer review quality.

One Small Event, One Large Leap in Supporting Womankind

Heather R. Dalton, PharmD Candidate, Stefanie A. George, PharmD, BCPS

Background: Gender disparities continue to be a topic of conversation in the United States. Women often report feeling undervalued or disrespected in the workplace. This year, an organization titled Pharmacist Moms, put together the first annual Women Pharmacist Day to celebrate the achievements and daily contributions made by women in the field of pharmacy. To commemorate this day, the Medical College of Wisconsin (MCW) School of Pharmacy held a Women Pharmacist Day luncheon. The purpose of this project is to measure the outcomes of the first Women Pharmacist Day event held at the Milwaukee Regional Medical Center.

Methods: A one-hour luncheon was held at the MCW campus where participants were invited to discuss women's issues in a small group setting. Each group received 3 question prompts to discuss in length their individual and shared experiences. To conclude the event, a large group discussion was held to highlight common themes of conversation. A 15-question survey was administered 10 days later to assess the overall impact and quality of the event. Each question was assessed based on a 5-point scale with 5 indicating strongly agree, and 1 indicating strongly disagree. Quality improvement data was analyzed to review the effect of an unscripted, one-hour Women Pharmacist Day luncheon.

Results: Of the 40 participants who attended, 16 completed the post-event survey. The sample size consisted of both male and female students, faculty, staff, and pharmacists from Froedtert Hospital. Respondents indicated that the event provided a stronger sense of support for women in pharmacy (mean of 4.9), a new perspective on the societal factors that can impact women (mean of 4.7), and motivation to learn more about how women can be successful in pharmacy (mean of 4.7). All respondents reported discussing the topics from the event with colleagues, family, or friends. On average, each person talked with five new people about the things they learned, with 67% posting related topics on social media. Based on the results, a Women's Advocacy Group was created at MCW, in which 75 individuals joined.

Conclusion: This program required minimal preparation and was relatively inexpensive however, it made a large difference in the community at MCW. Participants walked away feeling empowered to continue discussing important topics for women in pharmacy. As a result, a standing committee was created to work on gender disparities and the celebration of achievements made by women.

Utilization of Learners and the Institute for Safe Medication Practices Quarterly Action Agendas to Drive Medication Safety Improvements in a Health-system

Jennifer M. Fleege, PharmD Candidate, Jordan F. Dow, PharmD, MS, FACHE

Background: The Institute for Safe Medication Practices (ISMP) publishes Quarterly Action Agendas in order to facilitate discussion about and help organizations in reducing medication errors. The Mayo Clinic Northwest Wisconsin (NWWI) pharmacy team has begun leveraging these action agendas to conduct medication safety assessments throughout the region. This descriptive project is an effort to describe the methods employed and value gained from engaging learners in this effort.

Methods: The ISMP Quarterly Action Agenda is reviewed in detail between a pharmacist preceptor and a pharmacy student or resident learner. The learner is charged with understanding the medication safety problems that are described, completing follow-up with the preceptor or other site contacts to learn whether the issues apply to each of the sites within NWWI, and creating recommendations for risk reduction. The learner summarizes their follow-up within the ISMP action agenda tool and uses it as a platform for presenting their findings. The findings are presented at the NWWI Pharmacy Quality and Safety Committee (comprised of pharmacists and technicians) and the NWWI Medication Oversight Group (comprised of pharmacists, providers, and nurses).

Results: The process was initiated in October 2018 with the 3rd Quarter Action Agenda. The learner helped pharmacy preceptors complete each of the 12 organizational assessments and closed each identified action step. The process identified one item that prompted a complete update of the organizational high alert medication list and prevention strategies, one item that required an update to maximize safety of compounding practices, five items that prompted communication with other disciplines as safety reminders, and five items that did not require any further action. The process facilitated substantial self-directed learning for the learner and was efficient for the pharmacy preceptor.

Conclusion: Utilization of learners to complete ISMP Quarterly Action Agenda follow-up can be an efficient mechanism for organizations to identify opportunities to improve medication safety processes and provide a valuable, self-directed learning opportunity for learners.

JPSW Online: An Assessment of Open-access Journal Content Implementation

Nicholas J Friedlander, PharmD Candidate, Amanda R Margolis PharmD, MS, BCACP

Background: To assess the perspectives pertaining to open-access content implementation from The Journal's readership.

Methods: An electronic survey was developed that targeted readers of The Journal to assess their perspectives towards online content migration. Questions aimed primarily at identifying online content utilization and preferences for online content delivery. Additional questions included current journal utilization and preferences for physical content delivery; three of these questions were previously utilized in a 2016 survey and serve as a point of comparison. The survey contained 15 questions, three open-ended questions and 12 multiple choice questions. The survey was presented to The Journal Editorial Advisory Board for feedback and necessary modifications were incorporated prior to formal survey administration to The Journal readership. A link to the survey was included in Fast Facts emails to PSW members and was administered through Qualtrics Survey Software®.

Improving Pharmacy Student's Understanding of Complexities of Medication Adherence Through Use of Social Media in Geriatrics Pharmacy Elective

Renee R. Johnson, PharmD Candidate, Travis W. Suss, PharmD, BCGP, Rochelle M. Wolfram PharmD, Taylor Poulson, PharmD

Background: At Concordia University Wisconsin School of Pharmacy, an assignment was created as part of a geriatric pharmacy elective course to exhibit the hardship of complying to complex medication regimens. Geriatric patients often face safety challenges as a result of increased complexity of chronic care, leading to poor adherence to medication regimens. Pharmacy students may not yet have a full appreciation for these difficulties as they likely have never experienced firsthand the challenges in adhering to a complex medication regimen. This assignment aims to improve pharmacy students' understanding by utilizing the social media platform, Snapchat, in which students send "snaps" of themselves taking their medications to a non-personal facilitator Snapchat account for accountability. All pharmacy students have access to social media, which is an underutilized tool in the academic setting that supports a creative and fun learning environment within a rigorous curriculum. The objective of this activity will be for pharmacy learners to gain empathy for the difficulties elderly patients face in adhering to a complex medication regimen, to develop strategies to help with daily medication reminders, and to evaluate the use of social media in the classroom.

Methods: After the pharmacy students are given a lecture on geriatric pharmacy medication challenges, they will put what they learned into practice for 5 consecutive days. Pharmacy students will adhere to a complex 10 medication regimen of a geriatric woman with the health conditions of a fibrillation, diabetes mellitus, hypertension, hypothyroid, osteoporosis, and arthritis. Each dose must be documented via Snapchat along with a time stamp and a short explanation of how the dose was administered. The students will be graded on adherence, and must have 60% adherence to receive a passing grade. Each day the students are required to self-reflect on what went well and what was difficult. At the end of the activity, the facilitator will collaborate the data of adherence through the picture collection of time stamped Snapchat pictures, as well as gather reflection themes of the activity to share with the class to discuss what was learned.

Formative Versus Summative Evaluation in a Pharmacy Skills-Based Course

Robert G Hetue, PharmD Candidate, Casey E Gallimore, PharmD, MS

Background: The four-semester Integrated Pharmacotherapy Skills course sequence at the UW-Madison School of Pharmacy is designed to prepare student pharmacists for advanced pharmacy practice experiences (APPEs). Between the academic years of 2015-2016 and 2016-2017, the framework of courses within this sequence was redesigned to offer additional low-stakes formative performance-based assessments in preparation for the end of semester summative examination. This project focuses on evaluating changes made to the second course in the sequence (Integrated Pharmacotherapy Skills II), held in the Spring of 2016 and 2017. In this course, the number of low-stakes, formative assessments increased from two totaling 20% of the final course grade in 2016, to seven totaling 27.5% of the final course grade in 2017. In contrast, the percent contribution of high-stakes summative assessments towards the final course grade decreased from 45% in 2016 to 40% in 2017. In the context of a change to the Integrated Pharmacotherapy Skills II course, this project aims to determine how formative and summative assessments should be weighted within a skills-based lab course to optimize the student learning experience and resource allocation, while still ensuring grade allocation is reflective of actual student performance in the course.

Methods: Final course grades for the Spring 2016 and 2017 semesters were analyzed by comparing aggregate student performance scores on the final summative examination and final course grades. In addition, four Likert scale items from course evaluations pertinent to informing the project were selected for comparison between the Spring 2016 and 2017 semesters [the course: 1) contributed to learning, 2) had a manageable workload, 3) improved understanding of concepts and principles, and 4) accurately assessed learning]. Data was analyzed by calculating and comparing averaged Likert scale responses indicating agreement on the four items. A qualitative analysis was conducted to identify themes within open-answer questions from course evaluations, asking students to identify strengths and areas from improvement within the Integrated Pharmacotherapy Skills II course.

Results: The distribution of performance on the final summative examination and final course grades did not change appreciably between the Spring 2016 and 2017 semesters. Student agreement on Likert-scale course evaluation items were marginally higher in 2017. Four recurring themes were identified on open-ended course evaluation responses; in 2017 fewer students voiced that more opportunities for practice were needed, assessment results did not reflect true competency, and the summative examination weight was too high. In contrast there were more students who voiced that course workload was too high in 2017 compared to 2016.

Conclusion: While Increasing the availability of formative performance-based assessments in a pharmacotherapy skills-based course does not appear to impact overall student performance, student satisfaction with the course's availability of practice opportunities and perception of accuracy and fairness of assessments may improve.

Development of an Interprofessional Military Academic Enrichment Elective

Michael W. Nagy, PharmD, Sean Blaeser, PharmD Candidate, Megan Grochowski, PharmD Candidate, Isabelle Sviatoslavsky, PharmD Candidate

Background: Approximately 7% of the United States population are veterans and military service members who live alongside their families.1 Only around 38% of veterans receive their health care within the Veterans Health Administration (VHA). Therefore, it is imperative that civilian sector health care professionals be competent in caring for this vulnerable and unique population.2 Adept training can assist health care professionals to navigate the communication barriers that affect post-deployment health.

The 2012 Joining Forces initiative is supported by the Association of the American Medical Colleges (AAMC) and the American Association of Colleges of Nursing (AACN).3,4 The initiative aims to engage the community to provide support to military and their families including access to wellness to "reduce the tolls that the stress of war, multiple deployments, and frequent moves can take."5

The purpose of this project is to collaborate on the development of a Military Academic Enrichment Elective (MAEE) course, to create a pre and post self-assessment and objective examination, and to lay the framework for an interprofessional elective designed for trainees to attain key knowledge, skills, and attitudes (KSAs) for military and veteran care.

Methods: The MAEE course for up to 30 medical students will occur in the Winter of 2019. The course will adapt materials from Terregino et al and provide framework to expand into an interprofessional elective course in the Winter of 2020.6 Instructional methods will minimize the use of lecture by leveraging participation from military members and veterans in the community. The traditional lecture format will be augmented by incorporation of role-play, case-based instruction, discussion (large and small group), simulation and independent learning activities.

Measures: A pre and post examination will consist of 5-10 questions from each topic written by the instructor. The exams will be reviewed by military members and veterans and data will be used to develop associated KSAs for interprofessional health care trainees. Additionally, a self-assessment before and after the MAEE will provide insight on perceived trainee confidence for interacting with this population. The pre and post self-assessment will be based on a 7-point Likert scale.

Statistical Analysis: We will compare individual's responses before and after they participate to determine the effectiveness of the program. For all continuous outcomes, we will use an independent t-test or a paired t-test when there is a before and after comparison. For all Likert based measures, we will use a Wilcoxon rank sum test.

Identification and Implementation of Strategies to Increase Pharmacy Technician Retention in a Multi-state, Multi-hospital Health System

Christina C. Andros, PharmD, MBA, Arlene Iglar, RPh, MS, FASHP

Background: Pharmacy technicians are critical to providing safe and efficient pharmacy and patient care services. The 2017 pharmacy technician turnover rate at Aurora Health Care was 25%, which exceeded our organization's overall goal of 14.1%. The purpose of this project is to identify and implement strategies to increase pharmacy technician retention.

Methods: A comprehensive literature review revealed that inadequate compensation, lack of career development opportunities, and lack of employee engagement were primary factors contributing to employee turnover. Our organization's 2017 team member engagement survey results were analyzed to assess overall engagement along with department strengths and opportunities for engagement. Focus groups were conducted with pharmacy technicians to gain further insight into factors affecting engagement and retention. Feedback from greater than fifty pharmacy technicians reveled perceptions of inconsistent and insufficient training, lack of onboarding, excessive workload, burnout, short staffing, and inadequate compensation. In addition, a focus group of ten pharmacy department leaders was held to gain insight into the department's career ladder and potential barriers to its use. Feedback from the leaders reinforced the value the career ladder provides while also exposing a general lack of awareness of the promotion tool for pharmacy technicians.

Results: Three toolkits were built for leaders: a Career Ladder, Onboarding and Engagement, and Certified Trainer toolkit. Career ladder promotion rates (pharmacy technician I to pharmacy technician II) increased from 67% to 93% in Q2 2018 compared to Q3. Feedback from site supervisors on the toolkits emphasized the importance of dedication to the toolkits' use. Noted benefits included useful organization of resources, positive facilitation of relationship between supervisors and newly hired pharmacy technicians, and clear alignment of expectations.

Conclusion: Pharmacy technician turnover has the potential to be combatted by focusing efforts on training and onboarding, opportunities for promotion, and career development.

Urinalysis Decision Support Tools and Provider Education in Long-term Care Units to Reduce Antibiotic Use for Asymptomatic Bacteriuria

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Background: Asymptomatic bacteriuria (ASB) is a common occurrence in patients residing in long-term care facilities and especially in patients with indwelling catheters. Despite the presence of bacteria, most of these patients do not require antibiotic treatment, yet antibiotics are often prescribed inappropriately for these patients. The purpose of this project was to implement decision support tools and educate providers on the appropriate ordering of urinalyses with reflex urine cultures to reduce the treatment of ASB in the long-term care units (approximately 100 beds total) of a Veterans Affairs Medical Center.

Methods: Decision support tools were created and implemented to guide nursing home prescribers in appropriately ordering urinalyses (UAs) with reflex urine cultures and subsequent antibiotics when necessary. Education to providers about the tools and ASB was completed prior to tool implementation. Chart review of patients who had a urinalysis obtained while in the long-term care units was conducted pre- and post-implementation of the decision support tools. The primary outcome was the frequency of inappropriately prescribed antibiotics for ASB with secondary outcomes including the frequency of Clostridioides difficile (formerly *Clostridium difficile*) infection, frequency of urinalyses ordered in the absence of urinary tract symptoms, and frequency of altered mental status as the sole symptom leading to initiation of antibiotics.

Results: Prior to implementation of the decision support tools and provider education, 15.1% of patients had UAs associated with antibiotics prescribed for ASB; 72.7% of urinalyses were ordered in the absence of urinary tract infection (UTI) symptoms; 0.0% of patients developed *Clostridioides difficile*; and 3.0% of antibiotics were initiated based on altered mental status being the sole symptom.

Development and Implementation of a Comprehensive Fluoroquinolone Restriction Protocol

Hans Scheerenberger, PharmD, Claire Dysart, PharmD, BCIDP

Background: Fluoroquinolones are one of the most frequently used classes of antibiotics for a variety of infections. A recent medication use evaluation (MUE) performed at the Clement J Zablocki VA Medical Center (ZVAMC) reviewing fluoroquinolone prescribing for uncomplicated infections (e.g. acute bacterial sinusitis, bronchitis, and uncomplicated urinary tract infection) showed that as much as 81% were inappropriately prescribed. Fluoroquinolones are associated with many adverse effects including tendinitis, tendon rupture, peripheral neuropathy, seizures, QT prolongation, *Clostridium difficile* infection (CDI), hypoglycemic coma, central nervous system effects (e.g. disturbance in attention, memory impairment, delirium, nervousness, agitation, disorientation), and most recently, aortic dissection. Multiple studies implementing fluoroquinolone prescribing restrictions have shown reductions in overall fluoroquinolone usage, improved antimicrobial susceptibilities of various pathogens, and reduced incidence of CDI. The purpose of this project was to implement a comprehensive fluoroquinolone prescribing restriction procedure, with accompanying antimicrobial prescribing support, to improve antimicrobial stewardship practices and patient care within the ZVAMC.

Method: A literature search was conducted to identify and review publications for recommended antimicrobial stewardship practices regarding fluoroquinolone prescribing. An antimicrobial usage report was generated to review current fluoroquinolone prescribing practices within the ZVAMC (days of therapy per 1000 patient days for inpatient use and number of outpatient prescriptions). A multifaceted strategy, including electronic antimicrobial decision support, was designed and developed to align fluoroquinolone utilization with best-practice recommendations. A plan was developed to facilitate implementation with post-implementation data collection and analysis to follow.

Pharmacist-managed Antibiotic Prophylaxis in Surgical Populations

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Background: The United States Centers for Disease Control and Prevention (CDC) estimates approximately up to 500,000 surgical site infections (SSIs) occur each year in the United States with over half of them being preventable. A SSI is defined as an infection related to an operative procedure that occurs at or near the surgical incision within 30 days of the procedure or within 90 days if prosthetic material is implanted at surgery. SSIs are the most common and costly form of hospital acquired infections (HAIs) resulting in more than $3 billion in attributable cost per year in acute care hospitals, and up to an estimated additional 11 days of hospitalization. Studies found without pharmacist-managed antimicrobial prophylaxis, there is only about 50% adherence to surgical prophylaxis regimens. The role of clinical pharmacists to manage antibiotics for surgical antibiotic prophylaxis may provide an opportunity in reducing the burden of SSIs.

Purpose: The objective of this study is to measure the impact on the rate of surgical site infections and adherence to surgical antibiotic prophylaxis guidelines with pharmacist-managed surgical antibiotic prophylaxis

Methods: This was a pre-/post-intervention study conducted at Aurora BayCare Medical Center, in Green Bay, Wisconsin and included patients greater than 18 years of age requiring surgical antibiotic prophylaxis for general/vascular/neurologic surgical procedures. Interventions included developing a collaborative practice agreement allowing pharmacists to independently and preemptively manage pre-surgical antibiotics in the respective surgical populations. The primary outcome was the difference in rate of surgical site infections between the pre-/post-intervention periods. The secondary outcome evaluated the appropriateness of pre-/post-intervention antibiotic orders using the antibiotic surgical prophylaxis guidelines established by the site. The amount of time pharmacists needed to review preoperative antibiotic orders and complete interventions was also evaluated.

Development and Implementation of Prescribing Algorithms for Antibiotics on Discharge from the Emergency Department

Kristin M. Stoll, PharmD, Erik Feltz, PharmD, BCPS

Background: Antimicrobial stewardship efforts have demonstrated reductions in treatment failure and adverse events due to antibiotics. In the emergency department (ED), rapid decision-making, frequent distractions, and limited availability of diagnostic data are often challenges to implementing effective antimicrobial stewardship. The purpose of this project is to improve guideline adherence and promote optimal use of outpatient antibiotic therapy for community-acquired infections.

Methods: Prescribing algorithms were developed to integrate clinical practice guideline recommendations with emergency department-specific antibiogram data. Algorithms for treating community-acquired pneumonia (CAP), skin and soft tissue infections (SSTI), and urinary tract infections (UTI) were made available throughout the ED. Providers received education regarding appropriate use of the algorithms, as well as routine performance evaluations of guideline adherence. Outcomes were evaluated through chart review of patients prescribed outpatient antibiotics for CAP, SSTI, or UTI by ED providers. Patients were excluded if they were < 18 years old, pregnant, or taking antibiotics prior to arrival. The primary outcome was rate of adherence to clinical practice guidelines, defined as the selection of an appropriate antibiotic agent, dose, and duration of therapy for each patient discharged. Secondary outcomes included the rate of fluoroquinolone use, as well as all-cause 30-day returns to the ED or urgent care.

Results: When compared to patients discharged from the ED prior to algorithm implementation (N = 325), the post-implementation group (N = 172) received more antibiotic prescriptions that were completely guideline adherent (57.0% vs. 11.7%, $p < 0.01$). Post-implementation discharge orders demonstrated improvement in the selection of an appropriate agent (86.6% vs. 45.5%, $p < 0.01$), dose (89.0% vs. 77.2%, $p < 0.01$), and duration of therapy (63.4% vs. 39.1%, $p < 0.01$). Additionally, fluoroquinolone prescribing rates in this population were reduced (2.9% vs. 12.3%, $p < 0.01$). In the post-implementation patients who presented at least 30 days prior to analysis (N = 124), a reduction in all-cause 30-day returns to the ED or urgent care was observed (12.9% vs. 21.5%, $p < 0.05$).

Conclusion: Pharmacist-driven implementation of antibiotic prescribing algorithms improved guideline adherence in the outpatient treatment of CAP, SSTI, and UTI. By developing prescribing algorithms, pharmacists have the opportunity to promote the appropriate use of antibiotic therapy, reduce unnecessary use of broad-spectrum agents such as fluoroquinolones, and prevent patient returns to the emergency department.

Assessment of the Rate of Second-dose Piperacillin-tazobactam Delay in Patients that are Admitted to the Floor After Receiving an Initial Dose in the Emergency Room

Alex B Wontor, PharmD Candidate, JJ Singer PharmD, BCCCP

Background: A 2017 trial found that significant delays in administering the second dose of an antibiotic had a significant association with mortality and the need for mechanical ventilation. The purpose of this project is to determine whether there are significant delays in second-dose piperacillin-tazobactam administration at Gundersen Lutheran Health System once patients have been admitted to the floor from the emergency department.

Methods: Patients were evaluated if they received an initial dose of piperacillin-tazobactam in the emergency department and were then admitted to the floor. The rate of major delay was defined as > 25% of the recommended dosing interval. Of patients that received a second dose of antibiotic, data was compiled and the timeliness of each unit's second-dose antibiotic administration was assessed.

Results: Patient data was used from 7/2/16 - 6/30/18 and involved 600 patients, of whom 444 received a second dose of antibiotic once admitted to the floor. The rate of major delay was much lower in the every six-hour interval group at Gundersen compared to the findings from the 2017 trial (28.7% vs 72% respectively). Among units that had at least 20 second-doses of an antibiotic administered, the medical and oncology unit had the best adherence (22.7%, n=88) while the intensive care unit had the lowest rate of adherence (35.1% n=94).

Conclusion: The rate of major delay of second-dose piperacillin-tazobactam administration at Gundersen Lutheran Health System was much lower than the reported rate from a 2017 trial concerning every 6-hour antibiotic dosing (28.7% vs 72% respectively). While the intensive care unit had the highest rate of major delay (35.1%), this is likely due to more urgent procedures, potential line placements, and more time required to initially stabilize the patient, compared to other units. At this time, the rate of delay is not substantial enough to consider the need to utilize longer dosing interval antibiotics such as cefepime as the original trial suggested.

Characterizing the Use of Ketamine for Acute Severe Asthma in the Critical Care Setting

Alexander Gidal, PharmD Candidate, Carla Karczewski, PharmD

Background: Acute severe asthma is a medical emergency involving bronchoconstriction unresponsive to conventional asthma treatment with bronchodilators.1 This condition can lead to severe respiratory distress, and ultimately be life threatening. Because conventional treatments are often ineffective, physicians may resort to more unconventional treatments.

Within the Froedtert Hospital (FH) medical intensive care unit (MICU) ketamine is occasionally used to treat refractory acute severe asthma. Due to limited clinical literature, MICU physicians rely on clinical experience to administer ketamine for this disease state. Presently, no procedure exists for this use of Ketamine at FH, creating difficulties for pharmacists when verifying these medication orders. To resolve this problem, an institutional guideline for ketamine use in acute severe asthma reflecting the prescribing preferences of providers at FH could be created, and the first step in this project requires an examination of the trends of ketamine utilization. The primary objective of this project will be to determine the usual Ketamine dosing strategy used at FH in the setting of acute severe asthma. A secondary objective will be to compare historical dosing strategies from the literature for ketamine in acute severe asthma to current practices at FH.

Methods: Patients will be included if they were over the age of 18 years, and received ketamine while admitted to the MICU with a diagnosis of acute severe asthma, respiratory failure, or asthma exacerbation, between July 31 of 2013 and August 31 of 2018.

Historical chart review will be conducted for included patients. Medical record number, date of birth, weight, sex, and entries to the medication administration record will be recorded. Patient care notes will be examined to distinguish patients who received ketamine for the purpose of sedation in preparation for, or during intubation, and these patients will be excluded. All entries for ketamine into the medication administration record will be recorded and outcome measures will be calculated. Finally, a literature search will be performed on the use of ketamine for acute severe asthma. Descriptive statistics will be used for data analysis.

Results: Data for this project is still being analyzed. Currently, 57 patients have been identified and historical chart review is underway. A literature search has revealed 6 systematic reviews, 2 randomized controlled trials, 1 observational study, and 6 case reports.

Outcome measures will explore average ketamine dose, average ketamine infusion rate, and the average duration of ketamine therapy, and compare these results to previously published data.

Conclusion: This project will characterize the current use of Ketamine for the treatment of acute severe asthma within the MICU at FH. Identifying these prescribing practices will facilitate the creation of an institutional guideline to facilitate safe medication use.

Assessing Pharmacist Documentation of Patient Monitoring: Post-implementation of Electronic Monitoring Tool

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Background: Collect and analyze pre- and post-implementation data of a new electronic inpatient clinical pharmacy monitoring tool to assess pharmacist transcription errors at UW Health.

Methods: Eligible units included nine medicine, surgery, neurology, or cardiology units in the hospital. The number of characters of electronic documentation that were determined to be "transcription" versus "assessment/plan" that pharmacists noted while monitoring patients on these units was assessed. Errors were analyzed in a retrospective review of documentation of medications, labs, transcription of chart information, and history of present illness. Transcription errors that were identified were further categorized into four service areas: anticoagulation, infectious disease, cardiology, and renal monitoring. Data collection was standardized across the three data collectors. Data were evaluated before and after implementing the monitoring tool in order to compare transcription characters with assessment/plan characters and the number of errors in each service area.

Results: Across units, pharmacist documentation within the new patient monitoring template was categorized as 38% assessment/plan and 62% transcription. From the post-implementation data collected, the anticoagulation section was composed of 52% assessment/plan and 48% transcription documentation, the infectious disease section included 62% assessment/plan and 38% transcription, cardiology included 69% assessment/plan and 31% transcription, and renal included 32% assessment/plan and 68% transcription. Among patient charts with at least one documentation error in the post-implementation analysis of the new monitoring template, 7% included a history of present illness error, 12% included a transcription error, 19% included a medication documentation error, and 19% included a lab update delay error.

Conclusion: Following implementation of the monitoring tool at UW Health, there was an overall decrease in the percent of transcription in the patient chart and a subsequent increase in assessment/plan documentation by pharmacists.

Timeliness of Wisconsin Immunization Registry (WIR) Data Entry by Wisconsin Pharmacies

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Background: Community pharmacies have experienced issues interfacing with state immunization information systems. These issues have led to problems with IIS participation and data entry by pharmacies. The large pharmacy immunization volume and noted IIS interface issues warrant an examination of current Wisconsin pharmacy timeliness in Wisconsin Immunization Registry (WIR) data entry and consideration of current pharmacy best practices.

Methods: Data for immunizations administered by pharmacies in Wisconsin between 2011 and 2017 were collected from WIR and analyzed. Multiple variables, including submission method, year of immunization administration, immunization type, and recipient age were analyzed through multivariate logistic regression to determine if they had any significant relationship to pharmacy timeliness. Following analysis and identification of pharmacy barriers, pharmacies were surveyed on immunization data entry practices and challenges.

Results: Influenza vaccinations are significantly less likely to be timely than non-influenza vaccinations (OR 0.685, 95% CI 0.678-0.691). When examining the impact of recipient age on timeliness, immunizations administered to individuals over 18 years old are significantly less timely than immunizations administered to individuals 18 years old and under. The magnitude shows a slight difference in timeliness, but the result is statistically significant (OR 0.974, 95% CI 0.957-0.990). For submission method, flat file submission is less likely to be timely than manual entry of immunization data (OR 0.388, 95% CI 0.383-0.392). HL7 submission, however, is much more likely to be timely than manual entry (OR 2.073, 95% CI 2.055-2.091). With each successive year, starting from 2011 and going up through 2017, immunizations were entered in a more timely manner (OR 1.032, 95% CI 1.030-1.034).

Conclusions: From this study we learned that pharmacy timeliness of WIR data entry depended on entry method, age of the immunized individual, immunization type, and year of vaccine administration. With these findings and upcoming pharmacy survey data we hope to identify ways to help pharmacies improve entry of immunization data into the WIR and facilitate more timely communication of immunization information among providers.

Optimization of Cartfill at Aurora St. Luke's Medical Center (ASLMC)

Shannon Stoeckmann, PharmD Candidate, Ellen Revak, PharmD, MBA, BCPS, Jennifer Lester, PharmD

Background: The purpose of this evaluation is to determine the medications that are frequently dispensed from the central pharmacy, through cartfill, but are not being administered to the patient. The end goal of this project is to transition the infrequently administered medications into a medication cabinet on the patient care unit, so the care team may access them as needed and pharmacy time and resources may be reallocated.

Methods: A dispense report was generated for the months of January, March and April 2018 detailing the medications dispensed from pharmacy through cartfill. A charge report was also generated for the same time periods, detailing the medications that were charged to the patient, indicating that the medications were administered. These reports were then compared to determine the medications that were frequently dispensed and infrequently administered. All inpatient units of the medical center were included in this retrospective study. All outpatient care areas including emergency department and same day surgery, and operating room were excluded.

Evaluation of Pharmacist Medication Recommendations from a Community-Based Comprehensive Medication Review Targeting At-Risk Patients

Colin G Pearson, PharmD Candidate, Emily H Jaeger, PharmD Candidate, Kari Trapskin, PharmD, Helene McDowell, MS, Hayley Chesnik, MS, Amanda Margolis, MS PharmD, BCACP

Background: United Way of Dane County (UWDC) is devoted to serving vulnerable, underserved populations. This includes patients who have difficulty managing the complexity of their medications. These patients often have extensive medication lists which may include interactions, and adverse drug reactions (ADEs) including falls. In 2011, to help reduce local fall rates, UWDC partnered with the Pharmacy Society of Wisconsin (PSW) and Wisconsin Pharmacy Quality Collaborative (WPQC)-certified pharmacists to launch an initiative to provide older adults with Comprehensive Medication Reviews (CMRs) in convenient community settings.

These "medication reviews" are dispersed throughout Dane County where pharmacists travel to local, community locations. High-risk patients meet one-on-one with pharmacists and pharmacy students to review their medications and address other primary concerns. Each medication is evaluated for safety and efficacy. This information, accompanied by any recommendations, is communicated to the patient's primary care provider by the pharmacist.

Objective: To determine the frequency and types of recommendations made and accepted by patients and primary care providers from pharmacist-led CMRs.

Methods: A prospective evaluation was conducted over the course of one cycle of UWDC community-based CMRs. Patients typically were 60 years of age or older, live in Dane County, had an income less than $47,080, and were identified to be at an increased risk of falls based off of a standardized falls risk assessment survey. Following the CMR, pharmacy interns received copies of the pharmacist recommendations for patients who consented to the evaluation. Using this information, pharmacy interns conducted three scheduled phone calls to patients over the course of 90-days to determine acceptance of recommendations. Recommendations made and accepted were assessed using descriptive statistics.

Results and Conclusions: To date, 158 CMRs were provided to patients by 15 pharmacists and 22 pharmacy students at 13 community sites. Data collection is currently ongoing and results with final conclusions are pending.

Patient Perspectives on a Pharmacist-Delivered Community-Based Comprehensive Medication Review Targeting At-Risk Patients

Emily H Jaeger, PharmD Candidate, Colin G Pearson, PharmD Candidate, Kari Trapskin, PharmD, Helene McDowell, MS, Hayley Chesnik, MS, Amanda Margolis, MS PharmD, BCACP

Background: To help reduce local fall rates, United Way of Dane County (UWDC) partnered with the Pharmacy Society of Wisconsin (PSW) and Wisconsin Pharmacy Quality Collaborative (WPQC)-certified pharmacists to offer Comprehensive Medication Reviews (CMRs) to underserved patients with complex medication regimens. The CMRs are offered by the pharmacist who travels to a convenient community setting such as a senior center. The CMR events are planned by the program coordinator and a liaison at the community setting. This evaluation is to determine patient satisfaction of the events as one aspect of program quality and to identify opportunities for improvement.

Objective: To determine the patient satisfaction from pharmacist-led CMRs.

Methods: Satisfaction surveys were conducted by the program coordinator immediately following the one-on-one CMR appointment with the pharmacist. Patients were asked seven questions related to the satisfaction of their interaction with the pharmacist performing the CMR. Six questions were answered using a five point scale (Poor, Fair, Good, Very Good, or Excellent), and two free-response question allowed patients to provide personal examples of their satisfaction with the program and any additional comments about their experience. PSW pharmacy interns conducted three scheduled phone calls to patients over the course of 90-days where additional testimonials were collected. Descriptive statistics were calculated for quantitative questions and themes were considered for qualitative data.

Results and Conclusions: To date, 158 CMRs were provided to patients by 15 pharmacists and 22 pharmacy students at 13 community sites. Data collection is currently ongoing and results with final conclusions are pending.

Creation of Drug Shortage Management Policy and Standard Operating Procedure in a Rural, Independent Hospital

MacKenzie L Eliszewski, PharmD Candidate, Tahmeena Siddiqui, PharmD

Background: Design a policy and standard operating procedure for managing drug shortages in a rural, independent hospital.

Methods: A literature search was performed to assess potential drug shortage management strategies. These recommendations were then applied to a rural, independent hospital. In order to implement the management strategies, a policy and standard operating procedure were drafted to present to the Pharmacy and Therapeutics (P & T) Committee and training modules were prepared for involved hospital staff.

Results: A drug shortage management policy was created and consisted of a standard operating procedure document to present to the P & T Committee at Fort Memorial Hospital, education modules aimed at pharmacy staff, and documentation forms in order to appropriately execute the management procedure. The shortage management strategy includes implementing a management shortage team, including the roles of each team member, workflow diagrams for the pharmacy team to follow, and modes of communication amongst the health care team. The shortage management policy and standard operating procedure were approved by the P & T Committee at Fort Memorial Hospital and have been implemented into the daily workflow.

Conclusion: Implementation of the drug shortage management strategy at Fort Memorial Hospital will likely lead to improved consistency among the health care team, decrease patient risk, improve clinical outcomes, and decrease overall costs for the health care system. The concepts of this policy and standard operating procedure can be applied to other rural hospitals in light of the ever-persistent drug shortage management obstacle.

Implementation and Evaluation of Depression Screening in Patients with Recently Diagnosed Coronary Artery Disease

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Background: There is a bidirectional relationship between coronary artery disease (CAD) and depression. Patients with CAD and depression have increased all-cause mortality and worse cardiac outcomes compared to those without depression. The American Heart Association recommends routine depression screening in patients with CAD, including during inpatient hospital admissions, but this is not often done in practice. The patient health questionnaire-9 (PHQ-9) is easy to use and highly specific for identifying depressive disorders. The Clement J. Zablocki Veterans Affairs Medical Center (ZVAMC) has an established inpatient cardiology service and numerous mental health resources, including a Primary Care Mental Health Integration (PCHMI) clinic, but no protocol for depression screening in patients with CAD. The purpose of this project was to implement and evaluate a protocol for screening patients with a recent diagnosis of CAD for depression using the PHQ-9 during inpatient hospital admissions.

Methods: Patients with a recent CAD diagnosis who were admitted to the ZVAMC between October 1, 2018 and January 18, 2019 were included for analysis. Patients were excluded if they were actively being treated for a mental health disorder or were non-decisional. Patients were identified via ongoing chart review and were screened for depression using the PHQ-9 during their inpatient admission. Patients with a positive screen for depression were offered referral to the PCMHI clinic. Patients with both positive and negative screens were rescreened using the PHQ-9 after 4 weeks and 8 weeks. Outcome measures included the amount of patients with positive screens for depression, the amount of patients who accepted PCMHI referral and continued with treatment/follow-up, reasons for declining PCMHI services, and changes in PHQ-9 scores from baseline, 4-week follow-up, and 8-week follow-up.

Evaluation of an Interprofessional Training Program Using Dissemination Science

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Background: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death world-wide and affects over 24 million Americans. At the William S. Middleton Memorial Veterans Affairs Hospital, COPD is the second leading cause of hospital readmissions within 30-days post-discharge, a with a 30-day readmission rate of 27.3% in 2017.

In effort to improve patient outcomes, the COPD CARE service was designed as an interprofessional service model for COPD care transitions and was recognized as one of eleven Veterans Affairs Gold Status Practices nationally in the 2018 Diffusion of Excellence Shark Tank competition. This evaluation assesses a novel approach to expanding the COPD CARE service across the country using dissemination and implementation science. The Replicating Effective Programs (REP) Model, a dissemination and implementation science framework, was employed to design, implement, and evaluate an interprofessional training program for health care practitioners, with assessment of fidelity measures to evaluate training effectiveness.

Methods: An interprofessional online training package was designed in November of 2017 with the intent of training pharmacists, nurses, and primary care practitioners on how to adopt the COPD CARE service into their practice model. Training was piloted and refined over a six-month period using an iterative approach to incorporating feedback from interprofessional trainees (pharmacists, nurse care managers, and primary care providers) at the Madison VA. The current evaluation involves implementation and evaluation of the most up-to-date training package, which has been piloted from October 2018-March 2019 on 71 interprofessional learners across the country in two VA Medical Centers located in Fayetteville AR and Madison, WI.

The current online training package has been disseminated to 45 Patient Aligned Care Teams (PACT) and includes 12 audio-visual tutorials with 18 associated toolkit resources. Training was divided into the following four content areas: (1) Service overview (2) Patient Action Plan Review (3) Disease State Management and (4) Service Logistics and was delivered over a five-week period using a staggered implementation plan. Interprofessional learners completed each content area over 1 hour per week with 30-minute weekly telephone conference calls to debrief on training content. This approach, which combined online training with conference call debriefs, was intentionally designed to most efficiently disseminate COPD CARE service training content to a large number of learners nationally.

Training evaluation included assessment of learners' attitudes and self-efficacy managing COPD patients before and after training completion using validated questionnaires. Content understanding of learners was also assessed using weekly quizzes, and fidelity of training content will be evaluated using transcribed audio-recordings of clinic visits obtained in February 2019.

Improving the use of Diagnostic Labs and Pharmacological Treatment for Suspected Heparin-induced Thrombocytopenia

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Background: While incidence is rare, heparin-induced thrombocytopenia (HIT) can be associated with potentially severe complications. Since heparin is a widely used anticoagulant, HIT is often a differential diagnosis when thrombocytopenia develops in patients. Appropriate use of clinical criteria and laboratory testing can prevent unnecessary blood draws, expensive lab resources and costly medication usage. The 2018 American Society of Hematology (ASH) Guidelines for Management of Venous Thromboembolism: Heparin-Induced Thrombocytopenia outlines a pathway for the clinical and laboratory assessment of suspected HIT. First a "4T score" is used to assess the clinical probability of HIT followed by subsequent laboratory testing. Studies have demonstrated that the negative predictive value of a low probability 4T score is 99.8% and hence it is a useful tool for ruling out HIT without laboratory testing. If warranted, a number of laboratory tests are available to support a HIT diagnosis. With the high sensitivity, lower cost and faster time to results, the ASH guidelines recommend that the commonly used anti-PF4 enzyme-linked immunosorbent assay (PF4 ELISA) be utilized prior to the serotonin release assay (SRA).

If there is true suspicion of HIT, all heparin products should be discontinued, including flushes. Additionally, an alternative non-heparin anticoagulant should be initiated to prevent thrombosis which paradoxically occurs despite the thrombocytopenia due to activation of the platelets in addition to their destruction and clearance. Non-heparin anticoagulant options for use in HIT that are available in the United States include argatroban, bivalrudin, fondaparinux and direct-acting oral anticoagulants (DOACs). Confirmed diagnosis of HIT can establish an indication for continued non-heparin anticoagulation while a prompt negative result can aid in the discontinuation of costly non-heparin anticoagulation therapy.

This study was initiated to assess the current practice of HIT diagnostic lab ordering, including both immunoassays and functional assays, at one facility and evaluate the need for interventions.

Methods: In this retrospective chart review, patients with any HIT diagnostic laboratory testing will be analyzed for the appropriateness of test ordering. Inclusion criteria are any patient at the Clement J. Zablocki VA Medical Center with a PF4 ELISA or SRA test ordered during the 3 year time period of 7/1/15 to 7/1/18. Exclusion criteria is any patient receiving a chemotherapy agent within 4 weeks prior to the date the lab was ordered. Primary outcomes to be evaluated are percentage of appropriately ordered PF4 ELISA labs based on the investigator-calculated 4T score and percentage of appropriately ordered SRA labs based on the results of the PF4 ELISA labs. PF4 ELISA labs are defined as inappropriate if the investigator-calculated 4T score was 3 or less. SRA labs are defined as inappropriate if 1) no PF4 ELISA labs were ordered 2) the SRA was ordered before the PF4 ELISA resulted or 3) the SRA was ordered despite a negative PF4 ELISA result. Secondary outcomes to be evaluated include safety outcomes (incidence of venous thromboembolism or major bleeding) and a cost analysis of both laboratory and non-heparin anticoagulation medication expenses.

Pharmacist Led Opioid Analgesic Reduction Service

Alyssa M Owens, PharmD, Jacob J Keeffe, PharmD

Background: The United States is in the midst of an opioid epidemic calling upon health care providers to reassess how they navigate the difficult task of treating chronic pain. Although there is no established ceiling dose of opioid medications, guidelines suggest doses above 90 MME should be avoided as the risks often outweigh potential benefits from the medication. Additionally, existing research has indicated that strategic dose reductions in opioid analgesics did not significantly impact pain scores or worsen patient outcomes. As medication experts, pharmacists are uniquely prepared to devise analgesic dose reductions and monitor patient progress, thus allowing them to address patient needs.

The purpose of this project is to utilize pharmacotherapists at Monroe Clinic working under a collaborative practice agreement with physicians to safely reduce patient harm and exposure to opioid analgesics. Our focus is to identify patients with chronic, non-cancer pain who are prescribed high doses of opioid analgesics and taper the dose to less than 90 morphine milligram equivalents (MME) in collaboration with their providers.

Methods: Prospective patients at Monroe Clinic above 200 MME or otherwise deemed candidates for the service by their physician as of 9/6/2018 will be identified using patient reports that track quarterly MME data. The reports will then be shared with their providers to encourage scheduling patients for the service. Patients prescribed high-risk doses of opioid analgesics, with chronic, non-cancer pain defined by pain that has lasted over three months, an absence of opioid use disorder, and willingness to participate in the program will be included. Patients under the age of eighteen and those with a cancer diagnosis will be excluded. Following an appointment with rheumatology or their primary care provider, patients deemed appropriate will be referred to meet with a pharmacotherapist within the Monroe Clinic Adult Medicine department. Once enrolled, patients will complete pain management appointments to have their opioid analgesics slowly tapered, starting with 5% each week during the first two weeks and then up to 10% weekly as tolerated. The primary objective is to decrease an individual's daily MME to less than 90 milligrams per day without significantly increasing pain as measured by PEG pain scores at each visit. Total MME reduction, individual pain goals, opioid related hospitalizations, and DIRE scores will also be tracked.

Implementation of a Pharmacist-managed Transitions of Care Process for Patients with Ambulatory Care Sensitive Conditions

Emily M. Fox, PharmD, Jeremiah L. Barnes, PharmD, BCPS, Angela S. Green, PharmD, BCPS, Daisy Peterson, PharmD, BCPS

Background: Hospital readmission rates have become an increasingly prominent topic within healthcare. Currently at the Zablocki Veterans Affairs Medical Center (VAMC), there is no pharmacist-driven procedure to identify, assess, and manage patients who may be at high risk for readmission. Recent literature suggests that pharmacists can play an important role in transitions of care to reduce hospital readmissions and improve access to primary care. The purpose of this quality assurance project was to develop a standardized process for triage of high risk patients with ambulatory care sensitive conditions being discharged from the inpatient setting by acute care pharmacists to patient-aligned care team (PACT) pharmacists for post-discharge follow-up and disease state management.

Methods: A prospective electronic chart review was completed for patients discharged from the Zablocki VAMC between February 1, 2019 and April 30, 2019 with a primary diagnosis of chronic obstructive pulmonary disease (COPD). Patients identified as having high risk of readmission based on complexity of inhaler regimen and past admission histories were provided standardized disease state and inhaler administration counseling by the inpatient clinical pharmacy specialist (CPS) and referred via electronic consult to receive post-discharge pharmacist follow-up within 14 days. The PACT clinical pharmacy specialist then reviewed the standardized disease state and inhaler administration counseling during the outpatient follow-up visit, as well as assessed the patient's smoking and immunization history for potential intervention. A retrospective electronic chart review was completed for patients discharged from the Zablocki VAMC between February 1, 2018 and April 30, 2018 with a primary diagnosis of COPD to compare rates of 30-day readmission pre- and post-implementation of the transitions of care process. The following baseline data was collected for both groups: patient demographics, smoking status, vaccine compliance, number of admissions related to COPD within the past 12 months, and COPD-related medications prior to admission and upon discharge.

Expanding Pharmacy Proficiency in Transgender Care

Hazel R. Thompson, PharmD, Angela Colella, PharmD BCPS

Background: Chicago is the largest lesbian, gay, bisexual, transgender, queer/questioning community in Illinois, and Milwaukee is the second largest in Wisconsin. This patient population has many unique risk factors. For example, forty-one percent of transgender patients report attempting suicide, and transgender women are four times more likely to contract HIV. Transgender patients are on numerous unique therapies including hormone replacement therapy and anti-androgens. Hormonal therapy increases risk for elevated liver function tests, venous thromboembolism, osteoporosis, elevated lipids, diabetes, and numerous other acute and chronic diseases. The number of transgender patients treated within the Advocate Aurora Health System continues to increase. However, there are no internal resources or focused education available for pharmacists. Pharmacy practice would first benefit from cultural awareness and sensitivity training to improve interactions with this diverse patient population. Second, pharmacists need to be educated on transgender drug therapies, associated risk factors and monitoring to best serve this patient population.

Methods: This study first assessed the current literature available on providing compassionate patient interactions, terminology, treatment of gender dysphoria, and preventative care opportunities in the transgender patient population. Next, an analysis of the electronic medical record monitoring capability was performed. Transgender patients with previous admissions were reviewed to assess documentation of gender preference and indications for admissions. Then, inpatient, retail and ambulatory pharmacists were individually contacted to discuss the educational and clinical resource needs across multiple pharmacy practices. Next, treatment options, risk factors and monitoring associated with hormonal and anti-androgen therapy were established based on literature review findings. Clinical pharmacy resources were then developed and published on the internal health system website. A baseline knowledge assessment, as well as an online training module was created for all pharmacists. Additional outreach activities were coordinated including onsite, offsite and poster presentations. Finally, pharmacists completed an identical knowledge assessment after completion of the online learning module, access to clinical resources, and outreach opportunities.

Results: There were gaps identified in the sensitivity training and internal literature available to pharmacy caregivers. Additionally, areas of familiarity and need were identified between inpatient, retail and ambulatory pharmacists. Internal outreach activities have been completed. Baseline and completion knowledge assessments are pending.

Comprehensive Monitoring in a Community-Based Pharmacy: An Anti-psychotic Medication Based Pilot Program

Kimberly M. Mellenthin, PharmD

Background: The aim of this study is to follow the initiatives and objectives of the Wisconsin Pharmacy Quality Collaborative (WPQC) model as set forth through the Pharmacy Society of Wisconsin (PSW) regarding completion of Comprehensive Medication Reviews (CMRs) for patients of Evergreen Pharmacy who take chronic anti-psychotic medication and are Wisconsin Medicaid (WIM) beneficiaries. The results of this study will enable Evergreen Pharmacy to establish a procedure for conducting CMRs, evaluate the feasibility of incorporating a CMR service with respect to sustainability and impact on pharmacy workflow, increase the efficiency of monitoring and reporting anti-psychotic side effects, and determine the efficacy of incorporating a patient-completed SMARTS (Systematic Monitoring of Adverse events Related to Treatments) checklist into CMR visits to systematically screen for potential antipsychotic side effects. This study may also benefit other community pharmacists by serving as an example of how to implement a direct patient care medication monitoring service. Systematic assessment of anti-psychotic medication side effects is recommended as a standard of care but is uncommon in practice, and patients may not always report side effects. The SMARTS checklist can form the focus for a more detailed clinical discussion about side effects, either used alone or as part of a CMR.

Methods: The proposed research will take place at Evergreen Pharmacy for a period of 6 months (December 1, 2018 to June 1, 2019). The study will utilize chart review as the primary data collection method, not requiring active participant involvement. Enrolled patients will be provided an opportunity to voluntarily complete the SMARTS checklist either prior to, or during their CMR visit. The target population is patients over 18 years of age who take ≥ 1 anti-psychotic medication for ≥ 3 months, are WIM beneficiaries (eligible for a CMR per WPQC & WIM requirements), and patients of Evergreen Pharmacy who are willing and able to attend ≥ 1 face-to-face meeting with a pharmacist at Evergreen Pharmacy. Types of data collected will include subjective information provided by patients (attitudes, beliefs, concerns, desires, complaints, SMARTS Checklist), objective information observed by employees or affiliates of Evergreen Pharmacy (laboratory values, vital/clinical measurements), assessments (clinical recommendations made by employees or affiliates of Evergreen Pharmacy), and plans (future monitoring, upcoming appointments, clinical forecasting, patient education).

The Development of a Shared Adult Intravenous Medication Administration Resource for Advocate Aurora Health

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Background: In 2018 Aurora Health Care and Advocate Health Care announced their merger, which led to the creation of the 10th largest health care organization in the United States. With this, there have been many steps to merging resources. Both organizations historically maintained their own resources that frontline caregivers would use to promote safe and consistent administration of IV medications. With the combined health system, there needed to be one consolidated document of agreed upon content for adult IV medication administration.

Methods: There are several phases involved. First, we assembled a project steering committee to identify current resources, determine principles and plan for consolidating content. Then the content in each organizations' resources was compared and workgroups were created to consolidate it. This allowed us to then vet recommendations for shared content though applicable stakeholder groups. Lastly, we facilitated the development of necessary education and communication for the implementation of the resource.

Development of a Medication Optimization Protocol for Geriatric Patients Discharged from the Emergency Department Following a Fall

Rebecca Do, PharmD, Jeffrey Zimmerman, PharmD, BCPS, Matthew Carleton, PharmD, BCPS, Laura Beres, PharmD

Background: Falls are the leading cause of preventable morbidity and mortality in patients aged 65 years and older. There is currently a gap in care for this vulnerable patient population, as patients discharged from the ED have inaccurate medication histories and changes are rarely made to their medications unless they are admitted. With an aging population and shifts in reimbursement to shared savings programs, there is a growing need for health systems to better identify geriatric patients at high risk for future falls and to intervene to prevent them. The purpose of this pilot program was to develop a protocol to reduce the use of high fall risk medications in geriatric patients discharged from the ED after a fall.

Methods: This pilot utilized a convenience sampling of geriatric patients (≥ 65 years of age) discharged from the emergency departments at two sites following triage for a fall. A new workflow was established to obtain medication histories for these patients, if able, prior to their discharge from the ED. Chart review was then performed by a pharmacist using an evidence-based protocol that was developed from Beers Criteria and resources from the CDC's STEADI Program. Medication recommendations were then sent to primary care providers via EPIC in-basket functionality.

Implementation of Pharmacy Services Within an Allergy and Asthma Clinic by a Specialty Community Pharmacist

Rochelle M. Wolfram, PharmD, Angelo M. Jones, PharmD, BCPS

Background: Pharmacists are a valuable resource equipped with the training to educate on proper administration and monitoring of inhalation devices, oral medications, and injectable therapies in collaboration with other health care providers. The implementation of pharmacist-led services within an allergy and asthma clinic could increase efficiency and productivity of other clinic-based ambulatory care services by prioritizing patients who will benefit most from disease education, comprehensive medication review, and adherence monitoring to improve patient outcomes and reduce overall cost to the healthcare system. The primary objective of this project is to develop a practice model that integrates a specialty community pharmacist within an established allergy and asthma clinic. The secondary objectives are to measure the impact of a pharmacist led service on improving patient outcomes with severe asthma including monitoring for changes in asthma control assessed by the asthma control test (ACT), number of asthma related hospitalizations, and nitric oxide levels as compared to baseline.

Methods: The specialty pharmacy team approached the allergy and asthma clinic to promote an interdisciplinary team approach for caring for the clinic's severe asthma patients that included pharmacist-led services. The patients identified by the provider have been diagnosed with asthma and are 4 years of age or older. The specialty pharmacist will be at the Milwaukee and Greenfield clinics each one day per week. During the patient visit, the pharmacist will review a patients' medication regimen and identify factors contributing to suboptimal therapy. This could include product formulation, medication nonadherence, adverse effects, comorbidities, smoking habits or exposure, access to medication, and/or affordability. Treatment plans and follow up will be developed and implemented as outlined by the collaborative practice agreement. The principal investigator will have access to the electronic health record of the clinic and the clinic staff will schedule coordination of office visits. With the consent of the patient, all asthma medications will be filled at the specialty pharmacy to ensure proper medication possession ratios for all appropriate therapies and minimize barriers to nonadherence. The specialty pharmacy will attempt to mitigate all insurance barriers, will provide complete medication education, and ensure that each patient is receiving medication with monthly refill calls. For secondary outcomes, the study will utilize chart review, ACT, number of asthma related hospitalizations, and nitric oxide levels at baseline and at every follow-up visit, with the addition of evaluating rescue and maintenance medication refills

Evaluation of the Effectiveness of Different Marketing Approaches on the Acceptance of a New Onsite Flu Shot Program by Local Businesses in a Small Rural Community

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Background: To evaluate the effectiveness of marketing materials on the acceptance of a new onsite flu shot program by local businesses in a small rural community. A secondary objective will be to evaluate the effectiveness of the flu shot clinic program for improving immunization rates in the community.

The immunization rate of Manitowoc county residents aged 19-64 years old was only 19.8% in 2016. The onsite flu clinic program is intended to improve immunization rates, reduce community-level influenza rates, generate value and boost productivity among local businesses, and promote the larger importance of immunizations to the public. Evaluation of the marketing methods will provide insight as to the most effective use of marketing resources for future flu shot clinics.

Methods: This will be a quality review project evaluating the effectiveness of marketing materials for an onsite flu shot program to local businesses in Two Rivers, WI. Targeted businesses will be within 10 miles of The Medicine Shoppe Pharmacy in Two Rivers, WI and will have five or more employees. Marketing approaches will include utilization of the Manitowoc Chamber of Commerce network email, The Medicine Shoppe website, The Medicine Shoppe Facebook page, prescription bag leaflets, direct emails to businesses, direct phone calls to businesses, flyers posted on town message boards, and face-to-face contact. Marketing approaches will be tracked when contacting local businesses to arrange an onsite flu shot program. The primary outcome will be the business owners' acceptance or not acceptance of an onsite flu shot program and which marketing material(s) made a difference in their decision to accept the flu shot program. The secondary objective will be evaluated by totaling the number of people immunized via the onsite flu shot programs and checking the Wisconsin Immunization Registry to determine how many received a flu shot in the previous year.

Implementation of a Tool to Manage Patients at Risk for Hospitalization due to an Ambulatory Care Sensitive Condition

Catherine M. Kuecker, PharmD, Anita Kashyap, PharmD, BCACP, Ellina Seckel, PharmD, BCACP, DPLA

Background: The Strategic Analytics for Improvement and Learning (SAIL) Value Model is used within the Veterans Health Administration as an indicator of access and quality of primary care. One SAIL quality measure is hospitalizations due to ambulatory care sensitive conditions (ACSC). Focusing on low to moderate hospitalization risk patients identifies hospital admissions that are likely preventable and avoidable with timely and appropriate ambulatory care services. The ACSCs identified by SAIL are diabetes, chronic obstructive pulmonary disease (COPD), hypertension, heart failure, urinary tract infections, asthma, dehydration, bacterial pneumonia, angina without an in-hospital procedure, and perforated appendix. The objective is to evaluate the feasibility of offering further referrals and care for patients at risk for hospitalization from an ACSC.

Methods: All patients identified to have low risk for hospitalization from an ACSC per the SAIL report from July through September 2018 were included. Patients receiving hospice care or no longer receiving primary care through the facility were excluded. Chart reviews were completed to identify potential interventions the patient may benefit from and discussed at primary care interdisciplinary meetings to determine which services or referrals to offer A primary care team member reached out to the patient via telephone to offer services. A final chart review will be completed three months post-intervention to evaluate feasibility measured by the proportion of patients who initially agreed to and completed the referrals offered. Additionally, time to complete chart review and contact patients via telephone were documented.

Results: To date, 66 chart reviews have been completed. Baseline characteristics were 95% male, 97% Caucasian, and average age of 66 years. The most prevalent ACSCs were hypertension (65%), COPD (44%), and diabetes (30%). There were a total 77 hospitalizations and 32 ED visits for all 66 patients within the year prior. Time to complete chart reviews took an average 13.5 minutes. For those that additional referrals were identified and patient contacted via telephone to date (n=36), 72% have accepted at least one referral with the telephone call lasting an average of 7.8 minutes.

Conclusion: Preliminary data suggests that identifying and offering additional referrals or services to patients at low to moderate risk of hospitalization from an ACSC is feasible and could serve as a population health management tool for future use.

Development and Evaluation of DOAC Laboratory Monitoring Guidelines

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Background: Laboratory assessment of direct oral anticoagulants (DOACs) may be of value for patients with confounding characteristics (e.g. obesity, renal dysfunction, drug interactions) or in situations where confirming the absence of anticoagulant effect is warranted. Based on CHEST and ISTH recommendations, the William S. Middleton Memorial Veterans Hospital has implemented institution-specific DOAC laboratory monitoring guidelines that recommend thrombin time and drug-specific calibrated anti-Xa testing as first-line coagulation parameters for dabigatran and factor Xa inhibitors rivaroxaban and apixaban, respectively. This study aimed to evaluate the utilization and appropriateness of DOAC laboratory monitoring, as well as its impact on clinical decisions for patients receiving therapy.

Methods: This IRB-exempt retrospective study evaluated patients at the William S. Middleton Memorial Veterans Hospital with an active DOAC prescription, for whom a thrombin time or anti-Xa level was drawn between January 1, 2015 and January 1, 2019. Data collection included baseline patient demographics and characteristics (including renal function, BMI, and concomitant P-gp/CYP3A4-interacting medications), indications for anticoagulation, anticoagulant dosing, indications for anti-Xa monitoring, types of anti-Xa assay if applicable (heparin, rivaroxaban, or apixaban-calibrated), timing of levels respective to last DOAC dose (peak, trough, or random), laboratory turnaround times, laboratory results, and characterization of the clinical decisions made in response to results. Heparin-calibrated or LMWH-calibrated anti-Xa levels which were ordered for the purposes of heparin infusion or LMWH monitoring were excluded.

Results: Eleven anti-Xa levels were evaluated for rivaroxaban (33%) and apixaban (67%); analysis of thrombin time measurements for dabigatran is ongoing. In these patients, laboratory testing was deemed indicated in the setting of unstable renal function (50%), concomitant use of a major P-gp/CYP3A4 inhibitor (16.7%), extreme body weight (16.7%), and breakthrough thrombosis (i.e., evaluating treatment failure vs. medication non-adherence) (16.7%). Several heparin-calibrated anti-Xa levels (45%) were ordered for both rivaroxaban and apixaban-treated patients. Most clinicians (73%) ordered anti-Xa levels based on estimated peak and trough time. Several anti-Xa levels (18%) were drawn less than 48 hours after initiation of DOAC therapy, and were therefore not truly steady-state levels. While the majority of anti-Xa levels (82%) were considered "on-therapy" per the hospital laboratory's reference ranges, several DOAC concentrations were deemed unacceptably high (9%) or unacceptably low (9%) by the patients' care teams, with both cases resulting in DOAC discontinuation and initiation of an alternative anticoagulation agent.

Conclusion: In a small subset of patients in complex clinical situations while on DOAC therapy, anti-Xa measurement has been shown to be a practical monitoring tool that may guide treatment changes and optimize DOAC efficacy and safety. To reduce inappropriate anticoagulant usage and facilitate test result interpretation and clinical decision-making, providers may benefit from further elucidation on how to appropriately time drug-calibrated anti-Xa levels. Future directions for research may include evaluation of how to best adjust therapy or dosing in response to results.

Implementation of Pharmacist Medication Administration Across an Academic Health System

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Background: In 2016, the American Pharmacist Association released a resolution in support of pharmacists administering injectable medications in all types of care settings. In the same year, Wisconsin law was changed to support pharmacist medication administration. Pharmacists in Wisconsin are now able to administer non-vaccine injectable medications after completing a required board-certified training course. Data suggest pharmacists can make an impact in the community by administering non-vaccine injectables such as long-acting antipsychotics, addiction treatment medications, and many others. In the inpatient realm, a recently published survey reported approximately 25% of Emergency Medicine pharmacists are involved in medication administration. The objective of this project is to identify, develop, and implement the necessary training, workflows, policies, and procedures across UW Health to allow pharmacists to administer non-vaccine medications and expand pharmacist provided services.

Methods: To implement this project, we conducted a gap analysis to identify the steps needed to allow pharmacist medication administration of non-vaccine medications for both inpatient and outpatient pharmacists. Surveys of inpatient and outpatient pharmacists will used to identify current practice, potential medication targets, pilot areas, attitudes, and potential future opportunities. Survey data will be used to identify an inpatient pharmacist pilot group for medication administration. Additionally, outpatient clinic volume data for target medications will be evaluated and used in conjunction with survey results to identify an initial outpatient pilot group. An additional survey of inpatient pilot unit nurses and providers will assess potential barriers, concerns, and opportunities. Implementation of medication administration services will occur after creation and completion of all training and education.

Results: Results of the gap analysis identified needs for a certified medication administration training course, allocation of funding, development of a training workflow, competency assessment, bar code medication administration training, and medication administration record (MAR) access. Post implementation metric will include number of pharmacists trained, number of doses administered, safety, costs of training, and workload shift. Workload shift will be addressed by pharmacist time required and clinic time saved. Potential revenue shift from clinic to outpatient pharmacies will be assessed.

Evaluation of Different Community Pharmacy Adherence Services and Adherence in Hmong Patients with Diabetes

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Purpose: To evaluate the impact of a community pharmacy's adherence services on adherence and disease outcomes among Hmong patients who have diabetes.

Background: Diabetes is a prevalent health condition found in many Hmong patients. Hmong patients and elders in the U.S. are part of an underserved population because they experience low health literacy due to language barriers. Many Hmong patients have difficulty understanding diabetes and the purpose of their medications which results in poor adherence. The pharmacy currently offers various adherence services and comprehensive medication reviews for patients of many different languages. It is anticipated that the results of this project can help better understand which adherence services offered at this community pharmacy can be effective for improving medication adherence and disease outcomes for Hmong patients with diabetes.

Methods: This quality-improvement project will be evaluating different adherence services provided by an independent community pharmacy. Patients identified to receive the services for this project include adult Hmong patients, 18 years and older, with diabetes, who fill their antidiabetic medication prescriptions with the community pharmacy.

The intervention will start with a pharmacist performing a comprehensive medication review (CMR) with the identified patients. The pharmacist will work with patients to implement an appropriate adherence service offered by the pharmacy. Current adherence services offered by the pharmacy include the following: a CMR, simply-my-meds (SMM) program (medication synchronization), bubble packaging of medications, text message or phone call refill reminders, diabetes self-management education (DSME) series, or a combination of any of the above.

The primary outcome of this study will be change in adherence of antidiabetic medications, following the CMR and implementation of adherence service(s). Adherence will be measured by proportion of days covered (PDC), which will be calculated from accessing patients' refill histories in the pharmacy's electronic dispensing system. Pre-CMR PDCs will be calculated and obtained for a 90-day period before the CMR service for each patient. Post-CMR PDCs will be calculated for a 90-day period, starting with the fill after implementation of the adherence service(s).

Secondary outcomes will include changes in diabetes-related biomarkers. These biomarkers include A1c, glucose levels, blood pressure, height and weight. Biomarkers pre-CMR will be obtained by the pharmacist during the initial CMR and also from the patients' primary care providers. Biomarkers post-CMR will be obtained by the pharmacist at a three-month follow-up visit.

Data collection for this project will begin in the fall of 2018 and will end three months after the last completed CMR. All data gathered will be coded, de-identified and stored in an Excel Spreadsheet, on a secure, electronic database. Data analysis will include descriptive statistics of pre- and post-data. This project is considered a quality-improvement project and is exempt from UW-Madison Institutional Review Board approval.

Evaluation of a Single Post-First Dose Vancomycin Level to Achieve a Goal Vancomycin AUC Range

Evan R Hurley, PharmD, Steve C. Ebert, PharmD, BCIDP, FCCP, FIDSA

Background: The ratio of 24-hour area under the concentration-time curve (AUC24/MIC) to minimum inhibitory concentration is the most consistent parameter to predict the effectiveness and toxicity of vancomycin. To achieve this parameter, vancomycin serum concentrations are typically measured when vancomycin is at steady state concentration. This requires serum concentration to be measured only after several vancomycin doses have been administered, potentially delaying the detection of supratherapeutic or subtherapeutic doses. Evidence now suggests that measuring serum concentrations prior to achieving steady state leads to faster obtainment of therapeutic serum concentrations with less nephrotoxicity and reduced laboratory costs. Our institution has enabled pharmacists to obtain post-first dose vancomycin levels and make earlier dose adjustments. A single vancomycin serum concentration is measured after the first dose and prior to subsequent doses. Based on the post-first dose concentration and population pharmacokinetic models, the 24-hour area under the concentration-time curve (AUC24) is calculated. Further dose adjustments may be made if an alternative AUC24 is desired to minimize toxicity or increase efficacy. The aim of this project is to monitor the outcomes of patients who have received post-first dose vancomycin levels and subsequent dose adjustments.

Methods: Single-center cohort study via electronic chart review of patients who have received post-first dose vancomycin levels and subsequent dose adjustments. Primary outcomes include percentage achievement of AUC24 of at least 400 mg x h/L at steady state and percentage of supratherapeutic AUC24 at steady state defined as an AUC24 greater than 700 mg x h/L.

Patient and Provider Perceptions and Attitudes About a Vivitrol Medication Assisted Treatment (MAT) Program in a Community Pharmacy

Goody Cacal PharmD, John Lemke PharmD, Jeff Kirschner RPh, Nicole Schreiner PharmD, David Mott PhD FAPhA

Background: Data from the National Survey on Drug and Health showed that 2 million individuals who use prescription opioids meet the criteria for opioid use disorder (OUD), with approximately 822,000 of these individuals receiving treatment for OUD. In Wisconsin, the rate of OUD has increased over the past 13 years, and in 2016, 20,590 individuals suffered from OUD. As of 2017, there were 18 opioid treatment programs in Wisconsin serving a total of 10,626 patients. The medications of choice for treatment in these programs include buprenorphine and methadone. The use of Vivitrol to treat OUD could increase access to effective treatment because Vivitrol does not require a prescriber to be DATA-waived and recent studies have shown Vivitrol to be effective in treating OUD. Additionally, the regulatory environment in Wisconsin facilitates community pharmacists involvement in MAT with Vivitrol, further increasing access to care. The purpose of this project is to engage patient and provider stakeholders and collect and evaluate perceptions and attitudes about pharmacists providing MAT with Vivitrol at a community pharmacy. The data collected will be used to improve and expand community pharmacy provided MAT with Vivitrol services.

Methods: Investigators will create a semi-structured interview guide containing questions about patient and provider perceptions and attitudes towards MAT with Vivitrol services provided in a community pharmacy. The interview will be conducted face to face or via telephone with patients who currently use a pharmacy for Vivitrol MAT and with patients who have not used the pharmacy for Vivitrol MAT. Additionally, prescribers who refer patients to the pharmacy for MAT with Vivitrol and prescribers who do not refer patients to the pharmacy will be interviewed. Representatives from a local inpatient addiction treatment facility will be interviewed as well. Interviews will be recorded, transcribed, and analyzed qualitatively using thematic analysis.

Reducing Clinical Variation in Antithrombotic Medication Use

Landon Neese, PharmD, Catherine Sesing, PharmD, BCACP, CACP, Cate Ranheim, MD

Background: To evaluate UnityPoint Health's efficacy and safety outcomes related to combination antithrombotic regimens and design an intervention to bring use of these agents more in line with evidence-based clinical practice guidelines.

Methods: The Tableau visualization tool using the Electronic Data Warehouse (EDW) will be queried to evaluate adult patients over 18 years of age with coronary artery disease (CAD) and an indication for anticoagulation, including atrial fibrillation, prosthetic heart valves, peripheral vascular disease, and venous thromboembolism. Medication therapies and indications for anticoagulation have been added to the CAD application and queried from the Lumedx Apollo Advance database to determine the association between aspirin use alone, double antithrombotic therapy, triple antithrombotic therapy, and adverse outcomes, including major bleeding events, at UnityPoint Health hospitals. The incidence of ischemic events, including stroke, venous thromboembolic disease, and stent thrombosis in addition to outcome metrics such as length of stay, 30-day readmission rate, mortality, and average direct variable costs, were assessed in these patients. As a result of these findings, Epic post-PCI order sets were modified to improve these metrics and rates of complications, based on evidence-based clinical practice guidelines.

Evaluation of Heart Failure Access Clinic Optimization on Improving Transitions of Care Following Hospitalization

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Background: Nearly 6.5 million adults in the United States are diagnosed with heart failure. Several approaches are proposed in literature to decrease associated readmission and mortality, many focusing on improving transitions of care processes. The Heart Failure Access Clinic (HF Access) Transition of Care model was launched at the William S. Middleton Memorial Veterans Hospital with process optimization occurring January 2018. Through this optimization, an order was embedded in the electronic health record to refer admitted patient to the Heart Failure Nurse Case Manager (NCM) for inpatient education and scheduling of a HF Access appointment within one week of discharge. The purpose of this project is to evaluate if the HF Access Clinic Transition of Care model is working as intended and to determine impact of HF Access appointments on patient outcomes.

Methods: Retrospective chart reviews were completed for all heart failure admissions between April and September 2018. Admission data was gathered based on ICD-10 codes and verified by administration of intravenous diuretic and/or vasoactive drug. Exclusions included death during admission or discharge to hospice. Fourteen reviewers completed the reviews, and two separate reviewers completed an interrater analysis. Data was evaluated with descriptive statistics.

Development of an Acute Care Pain Stewardship Program

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Background: The opioid epidemic has escalated for years, and has touched the lives of many. According to the Substance Abuse and Mental Health Services Administration, over 350,000 people died from opioid overdoses between the years of 1999 – 2006. On January 1, 2018, the Joint Commission updated standards for pain assessment and requirements in accredited hospitals, including identifying and monitoring high-risk patients, promoting safety in the utilization of prescription drug monitoring programs, and ensuring leader involvement in systematic practice changes. While Froedtert Hospital has made progress in establishing committees to address this issue, continuity of care and pharmacy-driven protocols have yet to be developed. The goal of this project is to improve the current pain management process at Froedtert Hospital, with intentions of expanding identified best practices to the rest of the system. We aim to better the regulatory compliance, safety, and effective treatment of pain in patients at Froedtert Health.

Methods: A multidisciplinary team has identified three primary areas to focus attention, which include pre-operative, inpatient, and discharge workflows. Deliverables include the creation of a pain stewardship pharmacist position to work with a new comprehensive pain service. In addition, pharmacy-driven innovations in documentation and education will also be evaluated. Information technology tools will be utilized to augment the current electronic health record in order to better equip staff members with the knowledge needed to manage complex pain patients.

Results: In order to create lasting solutions, discovery and identification phases were completed to assess the current process, including SWOT analyses, swim lane process mapping, and an effort/impact matrix. Identified opportunities for innovation include standardization of admission pain history documentation, as well as acute care and discharge patient workflows.

Conclusion: Establishment of pharmacy-run initiatives and a new, interdisciplinary consult service will help drive the change that is needed for compliance and better outcomes for our patients.

Achievement of Individualized A1c Goals in Veteran's Prescribed Liraglutide in Combination with Oral Antidiabetic Agents and/or Insulin

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Background: According to the 2018 ADA Standards of Care, agents proven to reduce major adverse cardiovascular events and/or cardiovascular mortality should be selected as first-line dual therapy in combination with metformin for type-2 diabetic patients with comorbid ASCVD. The glucagon-like peptide 1 (GLP-1) agonist, liraglutide (Victoza ®), has demonstrated cardiovascular risk reduction as defined by the LEADER Trial published in 2016. Specifically, this trial demonstrated decreased rate of first occurrence of death from cardiovascular causes, non-fatal myocardial infarction (MI), and non-fatal stroke in type-2 diabetic patients treated with liraglutide vs placebo. Clinical trials have positively demonstrated an effect of liraglutide on a series of additional clinical outcomes in type-2 diabetic patients including weight management, improved glycemic control, improved A1c, and reduced insulin requirements. Following the publication of the 2018 ADA Standards of Care, liraglutide prescribing within the William S. Middleton Memorial Veteran's Hospital increased from 42 patients receiving liraglutide (February 2018) to 216 patients receiving liraglutide (July 2018). Given the prescribing trend, closer evaluation of clinical outcomes pertaining to use is both relevant and prudent.

Methods: A retrospective chart review was completed. Participants eligible for chart review included those receiving care through the William S. Middleton Memorial Veteran's Hospital with type-2 diabetes mellitus who were prescribed liraglutide between January 25, 2010 and October 1, 2018. Veterans were not included if they received liraglutide monotherapy; if they used liraglutide for less than 3 months, unless liraglutide was discontinued due to an adverse reaction; or, if they were transitioned to liraglutide after previous therapy with an alternative GLP-1 agonist.

Leveraging Electronic Health Record (EHR) to Improve Accuracy of IV Medication Compounding and Labeling Practices

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Background: Intravenous (IV) medication use is a complicated and error-prone process with high risk of causing patient harm. As part of a continuous quality improvement project, UW Health will be utilizing EHR functionalities to target reducing errors during the compounding and labeling of IV infusions. One identified gap is that current sterile compounding procedures are not clearly defined. Specifically, it's not always obvious when drug volume and/or manufacturer overfill should be withdrawn from base solution prior to admixture. The 10% rule of when to remove volume is not consistently used. Additionally, beyond-use dates (BUDs) are not printed on all medication labels. These issues force pharmacists and technicians to interpret the labels and use prior experience and training to determine preparation techniques and assign BUDs. This leads to potentially inaccurate total volume, concentration and/or BUD listed on labels. This project is expected to increase patient safety by standardizing sterile preparation practices so that medications are prepared consistently and labeled accurately.

Methods: Phase 1 of this project involves reviewing beyond-use-dates, storage conditions (container type, temperature and light sensitivity), and preparation instructions for each patient-specific sterile preparation medication record in the EHR. They were assessed against United States Pharmacopeia (USP) <797>, state law requirements, prescribing information, and published references for accuracy and updated where appropriate. References used to support decisions are stored within the EHR to allow for easy maintenance, QA purposes and to serve as resources during regulatory reviews. In phase 2 of the project, preparation techniques are being reviewed to determine if it is appropriate to remove manufacturer overfill and drug volume from the base solution prior to admixture. Medication labels will be updated to display calculated total volume and concentration. Calculations will include manufacturer overfill and drug volume when appropriate. Additionally, labels will be updated to provide technicians with instructions on when and what volume of base solution to remove for each preparation. Labeling and preparation errors will be be tracked via a review of IV preparation photos pre- and post-implementation. The number of medication records compliant with USP<797> regulations and other best practices will also be documented.

Results: 1214 medication records were reviewed for phase 1 of this project. Of those, 34% had inaccurate or were missing beyond-use-dates. 17% had inaccurate light sensitivity status and 6.26% had inaccurate temperature storage conditions. Additionally, 21% had preparation instructions that were unclear. All records were updated in the EHR. Phase 2 of this project is underway.

Combining Smart Pump Analytics and Incident Reporting Software to Develop an Intravenous Medication Error Risk Assessment Tool

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Background: Idministration of intravenous medications exposes patients to a multitude of potential adverse drug events (ADEs). Dose-error reduction software (DERS) and an optimized drug library can assist in the interception and prevention of medication errors, decreasing overall ADE frequency. Despite a high prevalence of U.S. healthcare facilities deploying smart pumps with DERS for intravenous medication infusion, many institutions have yet to fully examine the safety potential of this technology. Recent surveillance by the Institute for Safe Medication Practices (ISMP) suggests that the majority of actions taken by those reviewing smart pump data focus on reducing alert fatigue and increasing drug library compliance. ISMP recognizes the value in assessing these parameters, but suggests further advanced metrics may be of significance. In an effort to further explore the role of smart pumps in medication safety and develop a risk assessment tool for future evaluation, this project aims to identify relationships between smart pump utilization characteristics and categorical trends found amongst voluntarily reported medication events.

Methods: This quality improvement project will involve review of smart pump records within three inpatient centers and multiple outpatient departments of a rural, central Wisconsin healthcare system. Using convenience sampling, data will be extracted manually from smart pumps within the system through infrared interfacing. In addition, wirelessly transmitted information submitted to vendor web-portal analytics will be assessed. Syringe pumps and Continuous Ambulatory Delivery Devices (CADDs) are not included in this project's analyses. Several data points such as compliance with DERS, dose delivery modality, and flow rate will be assessed at drug-specific and therapeutic class levels. Patterns identified within selected smart pump domains will be compared to information within internal voluntary incident reporting software (e.g., medication error type, frequency, and severity category). National safety designations including high-alert and look-alike/sound-alike medications as proposed by the FDA and ISMP will also be factored into the overall analysis. Data will be stratified according to patient care setting where applicable. Final interpretation of data will be used to draft an intravenous medication error risk assessment tool for proactive identification of error-prone medications in future evaluations. This project has received exempted status from the Institutional Review Board.