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POSTER ABSTRACTS

Review of Inpatient Procalcitonin Orders at Aurora St Luke's Medical Center

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Background: Procalcitonin (PCT) is used as biomarker to improve diagnosis and optimize antibiotic use in patients presenting with infections. Like most biomarkers, PCT has limitations including false-negative values in early infection and falsely elevated values in the absence of bacterial infection in renal dysfunction, trauma, and post-surgical patients. At Aurora St. Luke's Medical Center (ASLMC), PCT is frequently ordered, but there are no standard practice recommendations relative to serial ordering or response to PCT lab values.

Objective: The purpose of this evaluation was to examine PCT ordering in the non-critical care inpatient setting to identify areas for lab use improvement.

Methods: In Quarter 4 2017, PCT was ordered 2519 times. A laboratory report was used to randomly select 100 patients who had a PCT order in November 2017 who met inclusion criteria: Age ≥18yrs, ASLMC inpatient (non-ICU), non-oncology, non-solid organ transplant, and living at time of review. Patient electronic health records were reviewed to determine perceived PCT indication, use of repeat vs. single PCT trends, renal function/use of PCT in dialysis patients, ordering provider, and antibiotic therapy duration.

Results: The median age of the cohort was 64 (IQR 53-76) years and 54% of the patients were male. Of the 100 patients reviewed, 82 had a single PCT during hospital admission while 18 had more than one PCT. Respiratory infection was the most common perceived indication for PCT (43%), followed by fever/leukocytosis (25%), and skin/tissue/bone infection (9%). Six patients were classified as CKD1-4, and 14 were on HD before or during their hospital stay. With respect to antibiotic therapy, the overall median duration of therapy from PCT result to antibiotic discontinuation or patient discharge was 3 days (IQR 1-4).

Discussion: Data from this review were compared to a previously completed (Fall 2017) internal retrospective analysis of 87 community acquired pneumonia (CAP) ASLMC patients. Thirty-three (38%) of those CAP patients had no PCT drawn. In that cohort, the median duration of antibiotic therapy was 3 (IQR 2-5) days and was similar to the "pulmonary/respiratory symptoms" cohort in this review that had a median of 2(IQR 2-4) days. In this review, 14 were HD patients. While publications have examined PCT use in varying degrees of renal dysfunction, there is currently no gold-standard for interpretation in this population. According to published literature, on average 36% of CKD patients without infection have PCT ≥0.5ng/mL. It has been proposed to use this value, rather than 0.lng/mL, as a threshold value in CKD stage 5/HD patients, with PCT being drawn prior to HD, and ≥ 0.25ng/mL as a threshold in CKD 1-4 patients, though this has not been validated. The main limitation of this analysis is its retrospective nature. This project was presented to the Aurora Antimicrobial Stewardship Committee in June 2018. As a result, subsequent lab ordering and interpretation statements to better guide use of PCT are being implemented.

Emerging Treatments for the Management of Neonatal Abstinence Syndrome

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Background: Neonatal abstinence syndrome (NAS) is a manifestation of behavioral dysregulation that can be caused by in utero exposure to opioids. NAS treatment can require lengthy hospital stays, with many infants requiring prolonged pharmacological treatment. Current guidelines recommend morphine or methadone treatment, with adjunctive phenobarbital and clonidine. Emerging studies suggest alternative treatment with buprenorphine or clonidine monotherapy which could reduce adverse effects and length of treatment.

Objective: The study objective was to evaluate the effectiveness of alternative treatments, namely buprenorphine and clonidine, for the management of NAS. The outcomes evaluated were duration of treatment and hospital stay, as well as serious adverse drug reactions.

Methods: A search was performed of NAS patients using the pharmacological treatment options of sublingual buprenorphine and clonidine. The study search included articles published between 1992 and 2018 and compared 6 articles. Included for comparison were 2 randomized controlled trials comparing buprenorphine to morphine, 1 retrospective cohort analysis comparing buprenorphine to methadone, 1 retrospective cohort analysis comparing buprenorphine to morphine or methadone, 1 randomized controlled trial comparing clonidine to morphine, and 1 review looking at the efficacy of non-pharmacological treatment. Studies utilizing clonidine as an adjunct therapy for NAS were excluded from the search.

Results: Non-pharmacological treatment integrated into NAS treatment is found to be efficacious. Increased successful patient outcomes were seen in institutions with standardized treatment for NAS. Treatment with buprenorphine or clonidine reduces the duration of treatment length for NAS significantly compared to morphine.

Conclusion: Non-pharmacological management is important in NAS treatment and should comprise standard initial care for neonates. Research on the use of buprenorphine and clonidine as standard therapy has shown promise, decreasing duration of treatment and length of hospital stay.

Bridging Warfarin Therapy in the Periprocedural and Surgical Settings

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Background: Managing warfarin therapy in the peri-procedural and surgical settings requires one to weigh the risk of bleeding with the risk of thrombosis for each individual patient. Evidence-based clinical practice guidelines currently recommend bridging anticoagulation in patients requiring warfarin interruption prior to surgery who are at a high risk for thromboembolism as defined in the consensus guidelines of the American College of Chest Physicians, and it is recommended not to use bridging anticoagulation in patients who are at low risk of thromboembolism. However, relatively little high-quality evidence has historically been available to guide decision making in patients at moderate risk of thromboembolism. Therefore, clinical practice has been to bridge those at moderate thrombotic risk. The results of recent literature indicate that bridging anticoagulation in certain patients is associated with an increased risk of bleeding and no difference in rates of thrombosis when compared to patients who are not bridged. This literature has led to a shift in clinical practice, re-evaluation of the need for bridging anticoagulation, and an update to our institution's internal guideline on bridging anticoagulation in the peri-procedural and surgical settings which no longer recommends bridging most moderate thrombotic risk patients.

Objectives: To characterize the concordance of pharmacist bridging anticoagulation clinical practice with newly updated institutional guidelines after targeted pharmacist education as compared to clinical practice prior to the education.

Methods: A two-part series, single center, retrospective chart review was performed. Patients on stable warfarin therapy, who underwent an elective surgical procedure requiring an interruption of warfarin therapy, who received bridging anticoagulation with low molecular weight heparin, and were managed by a pharmacist in anticoagulation clinic were included in the analysis. The educational presentation was created to meet the requirements outlined by the Accreditation Council for Pharmacy Education (ACPE).

Results: Part one of the retrospective chart review included a total of 51 patients, and described a historical practice that was seventy-one percent concordant with institutional guidelines prior to targeted education. Of the patients needlessly bridged, sixty percent were low thrombotic risk and forty percent were moderate thrombotic risk. The results of the post-targeted pharmacist education analysis are pending.

Conclusions: Pending.

Evaluation of Adherence to the 2013 ACC/AHA Cholesterol Guidelines for Patients at Risk for Atherosclerotic Cardiovascular Disease

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Background: Statins are a well-studied medication class that have been shown to reduce the risk for atherosclerotic cardiovascular disease (ASCVD). 1 The absolute reduction in ASCVD events provided by statin therapy depends on the statin intensity (~30% and ~45% anticipated relative risk reduction for moderate and high intensity, respectively) and is proportional to the patient's underlying ASCVD risk. According to the 2013 American College of Cardiology/American Heart Association (ACC/AHA) cholesterol guidelines, statin therapy is recommended for a person who falls into any one of four benefit groups, which include patients with a history of clinical ASCVD, LDL ≥ 190 mg/dL, type 1 or type 2 diabetes, or an ASCVD risk ≥ 7.5% with LDL between 70-189 mg/dL. 2 The last group is the most highly debated benefit group. In these patients, ACC/AHA guidelines recommend the use of moderate or high intensity statin.

Objective: To assess clinician adherence to the 2013 ACC/AHA cholesterol treatment guidelines regarding statin therapy for patients without a history of ASCVD and a 10 year ASCVD risk ≥ 7.5%.

Methods: One third year pharmacy student conducted a retrospective chart review for one primary care provider at the Madison Veterans Hospital (VA). Patients were identified using a computerized algorithm which selected patients with a 10 year ASCVD risk ≥ 7.5% currently not on statin therapy. Patients were included if they were between the age of 40-75 years old with a 10-year ASCVD risk ≥ 7.5%, and had established care with one primary care provider at the Madison VA. Patients were excluded if they had an established history of ASCVD. The following data was collected for each patient: gender, age, body mass index, race, diabetes, hypertension, LDL ≥ 190 mg/dL, numerical 10-year ASCVD risk using the ACC/AHA risk calculator, family history of ASCVD, history of statin use and reason for discontinuing, smoking history, and baseline lab values including lipid profile and vitamin D levels. Each case was discussed with a clinical pharmacist and clinical judgement was used to make a final recommendation for statin therapy.

The primary outcome was the percent of patients recommended to receive statin therapy according to ACC/AHA guidelines. Secondary outcome measures included the percent of patients recommended to receive statin therapy using the 2013 ACC/AHA guidelines in combination with clinical judgement, and the number of patients recommended to receive a moderate intensity statin or a high intensity statin.

Results: Of 28 patient chart reviews, 27 patients (96.4%) were recommended to initiate moderate-to-high intensity statin therapy according to ACC/AHA guidelines. Of these 27 patients, 20 (74%) were recommended to receive a moderate-to-high intensity statin using clinical judgement (moderate intensity: n=14; high intensity: n=6).

Conclusions: Given the cardiovascular impact of statin therapy, improved adherence to guideline recommendations would have positive implications on veterans' health. This small, retrospective chart review demonstrates non-adherence to the 2013 ACC/AHA cholesterol guidelines even after considering appropriateness in the context of clinical judgement. This demonstrates an opportunity for a pharmacist's intervention to improve adherence to cholesterol treatment recommendations.

Pharmacy Led Population Health Management Hepatitis C Viral Screening: Identifying and Contacting Veterans Born Between 1945 and 1965

Daniel Mobley, 2019 PharmD Candidate, Michael Nagy, PharmD

Background: New oral antiviral therapies for hepatitis C virus (HCV), first approved in 2014, demonstrated drastic improvements in efficacy (about 95% cure rate) and safety from prior HCV treatments.1 Curing HCV reduces potential cirrhosis, liver failure, and liver cancer. In 2014, the United States Department of Veterans Affairs (VA) made screening and treating veterans with HCV a priority and budgeted $751 million to HCV treatment in fiscal year 2018.2,3 It is estimated the prevalence of HCV in the "baby boomer" generation, people born between 1945 and 1965, is 2.6%, which is six-fold higher than other adults.4 The VA and Centers for Disease Control and Prevention term this generation the birth cohort and specifically targets them and other high risk veterans for HCV screening.5 Separately, the VA also recommends all veterans be screened once for human immunodeficiency virus (HIV) regardless of age.

Objectives: 1.) To measure the acceptance rate of HCV and HIV screening for eligible veterans in the birth cohort through a targeted primary care pharmacy intern led telephone-based service. 2.) Evaluate the outcomes of veterans who accepted HCV and HIV screening.

Methods: Veterans born in the birth cohort who did not have a reported VA HCV antibody screening result were identified in the electronic health record and contacted between November 2017 and May 2018 by a pharmacy intern using a standardized script. Veterans were excluded if a terminal illness or a life expectancy of less than six months was documented, or if HCV screening was completed previously outside the VA system. Veterans who qualified were called and offered HCV screening to coincide with a previously scheduled upcoming blood draw. If the veteran did not have a reported HIV screening completed, then HIV antibody screening was offered in addition. Veterans who could not be reached by phone received a voicemail and an informational letter on HCV. Negative results were mailed to veterans with their permission and any veteran who screened positive was contacted by the HCV clinic.

Results: One hundred and seventy five veterans were reviewed in the birth cohort without a completed HCV screening documented in the VA system. Of those, 30 were excluded (23 screened previously; 7 with limited life expectancy). Of the eligible 145 veterans, 110 (75.9%) were spoken with over the phone and 95 (65.5%) accepted HCV screening. Overall, 92 (63.4%) of these veterans successfully completed the HCV screening and 1 (0.9%) veteran screened HCV positive. Also, 39 of 51 (76.5%) eligible veterans accepted an HIV screening, all of whom screened negative. Of the 35 veterans who did not answer their phone, fifteen additional HCV screenings and 1 HIV screening were completed by the end of the study period.

Conclusions: The majority of eligible veterans accepted screening for HCV and HIV in coordination with their next blood draw. Using the electronic health record is a convenient method to identify eligible patients and a pharmacy intern has the skillset to provide information and offer screenings to eligible veterans, helping expand pharmacist providers' clinical impact and services.

Pharmacist Provider Confidence and Knowledge with Implementation of a Pilot Pharmacist Testosterone Therapy Management Service

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Background: SIn patients with hypogonadism, exogenous testosterone can significantly improve quality of life. However, given serious risks involved with supplementation, the Endocrine Society recommends prudent evaluation prior and monitoring after prescribing.

Juxtaposed to the Endocrine Society recommendations, the Office of the Inspector General reported in April of 2018 that in the Veterans Health Administration (VHA), two-thirds of patients did not have documentation of risks/benefits discussed prior to testosterone initiation, follicular stimulating hormone and luteinizing hormone were rarely assessed, and symptom improvement, adverse effects, and testosterone or hematocrit levels were being only monitored after initiation 25-33% of the time. In the Madison VHA current standard of practice, primary care providers independently manage the majority of testosterone replacement and similar findings were noted upon local chart review. A solution was proposed to facilitate guideline-adherent management of testosterone by leveraging pharmacist providers on the primary care team.

Primary care pharmacists at the Madison VHA have prior authorization review experience, a scope of practice for chronic disease state management, and collaborate with other primary care team members to optimize patient care. A pilot clinical pharmacist testosterone therapy management service was implemented in a Veterans Affairs primary care setting in September 2017.

Objectives: To assess primary care pharmacist provider confidence and knowledge in the management of testosterone replacement therapy before and after two focused educational sessions.

Methods: All pharmacist providers were invited to two 30 minute educational presentations that reviewed the Endocrine Society Guideline recommendations, laboratory interpretation, and focused on how to manage testosterone replacement therapy in primary care. Five example patient cases highlighted common management challenges of testosterone replacement. A brief survey assessed confidence level and knowledge before and after the educational sessions. The Wilcoxon signed-rank test evaluated pharmacist confidence and the Fischer's Exact test assessed knowledge.

Results: A total of 21 pharmacists returned a completed survey before and after attending two educational sessions.

Confidence: After the educational sessions, pharmacist's confidence significantly increased in the ability to identify the proper indication for testosterone supplementation, appropriately monitor labs, confidently manage therapy, and agreed that it is worth their time and effort to ensure that testosterone is properly prescribed.

On average, pharmacists disagreed with the statement that for most men the benefits of testosterone supplementation outweigh the risks and that veterans are properly receiving testosterone most of the time.

Knowledge: Pharmacist providers were generally aware of the proper indication, with training improving the ability to discern symptoms from a true hypogonadism. Knowledge of required laboratory monitoring improved after the educational sessions with statistically significant improvements in the need of fasting lipid panel ($p = 0.04$); thyroid stimulating hormone ($p = 0.05$); and prolactin ($p=0.03$). Furthermore, non-significant improvements in knowledge were seen across all laboratory requirements. After training pharmacist providers were able to identify important co-morbidities, including a statistically significant improvement in recognition of obstructive sleep apnea ($p < 0.01$).

Conclusions: After brief and targeted training, pharmacist providers felt confident and demonstrated improved knowledge for the management of testosterone replacement therapy in a primary care setting.

Utilization of a Forcing Function to Prevent Expired Tobramycin Nebulizer Administration

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Background: Tobramycin nebulizers have different expiration dates depending on storage. When stored in the refrigerator, their expiration date is 14 days; however, when stored at room temperature, this decreases to just 24 hours. Recently, expired tobramycin nebulizers were administered to a patient following improper storage at room temperature. This project focused on implementing a forcing function in order to prevent tobramycin nebulizers from incorrect storage. A forcing function A forcing function is a method to completely prevent an error from occurring, thereby eliminating reliance on human vigilance. eliminates the need to rely on human vigilance to prevent an error from occurr

Forcing functions are often described as the most effective way to reduce errors. Hermann Hospital performed a root cause analysis of serious adverse drug events and in their discussion they describe the power of forcing functions in helping to drastically and permanently improve safety.1 Pharmacies must employ safety strategies to ensure proper storage of all medications.

Objective: To conduct a root cause analysis (RCA) and failure modes and effects (FMEA) of a medication error related to incorrect storage of tobramycin, and to propose an intervention to decrease the incidence and potential harm of future errors.

Methods: This project involved partnering with a long term acute care hospital in Madison, WI. It involved an information gathering phase in which we discussed recent errors that had taken place. After selecting one error, we conducted an RCA, including a timeline of events and a fishbone diagram, to identify system-level contributing factors. The RCA directed the second phase which included a proposed intervention to decrease errors. To assure the intervention would be effective and not cause unintended errors, we conducted an FMEA. We evaluated the proposed intervention to assure that it would not depend on human factors, but was system-level change intended to prevent errors.

Results and Conclusions: Latent factors that contributed to the error include: improper labeling of storage areas and the refrigerator key, separation of the refrigerator from the MedDispense machine, no indication on the MedDispense stating nebulizers appropriate storage, improper training, high census on patient floor, and more. Based on our timeline analysis, we felt that the poor labeling of the MedDispense and refrigerator key and the ability to inappropriately store the nebulizer were the most relevant.

Our proposed intervention is a forcing function which involves placing a divider into the MedDispense sleeve that will prevent tobramycin nebulizers from placement in the drawer. We also proposed labeling the MedDispense drawer to remind staff of proper storage.

According to our FMEA, potential errors resulting from our intervention include the removal of the barrier and the loss of the refrigerator key; we will attempt to prevent these errors by educating staff on the barrier and placing an attachment to the refrigerator key making it more difficult to misplace. Our intervention will address system-level characteristics by reducing reliance on memory, reducing ambiguity of the workflow, and using forcing functions.

Hypoglycemia Screening in Ambulatory Veterans

Alex Gidal, 2019 PharmD Candidate, Michael Nagy, PharmD

Background: Hypoglycemia is a major concern in the treatment of diabetes. Blood sugars below 70 mg/dL can cause uncomfortable side effects such as dizziness, confusion, hunger, nausea, and irritability.1 In more serious cases, hypoglycemia can cause significant morbidity due to falls or other accidents, and in rare cases may lead to death. To help prevent these adverse events, the Veterans Health Administration (VHA) started the Hypoglycemia Safety Initiative which aims to improve patient awareness of hypoglycemia and improve self-management. Pharmacists within the VHA system regularly participate in ambulatory chronic disease state management, so they are well positioned to help veterans identify and manage hypoglycemia.

Objectives: ***Primary objective -*** Quantify the incidence of hypoglycemia in outpatient veterans at high risk. ***Secondary objectives -*** Report the rate of acceptance of hypoglycemia education, as well as medication related problems.

Methods: Veterans were contacted if they were taking either insulin or a sulfonylurea, their most recent hemoglobin A1c in the past 12 months was <7% and had at least one of the following: age above 74, serum creatinine greater than 1.7, or a diagnosis of cognitive impairment or dementia.

Patients who met inclusion criteria were screened by a pharmacy intern. Screening phone calls included a brief medication history, education on the signs and symptoms of hypoglycemia, and education on self-management of acute hypoglycemia. Patients were asked if they experienced signs and symptoms of hypoglycemia, if they were measuring blood sugars at home, and blood sugar readings were recorded if available. Patient cases were discussed with a pharmacist, and patients were referred for follow up if problems were identified. Descriptive statistics were used for data analysis.

Results: Ultimately, 28 veterans were contacted over the course of 3 months. Of these, 4 (14%) reported at least one episode of hypoglycemia.

Data for this project is still being analyzed, other outcome measures will explore recommendations to therapy, frequency of education accepted by patients, and feasibility.

Conclusions: This project demonstrated the implementation of a telephone screen capable of detecting a clinically significant amount of previously unidentified hypoglycemia in veterans on diabetes medications. Many of these patients accepted education on self-management of hypoglycemia, furthering the aims of the VHAs Hypoglycemia Safety Initiative.

Antibiotic Callback Programs & the Pharmacist-Patient Analysis Relationship: A Qualitative Implementation of an Antibiotic Call-Back Program

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Background: An antibiotic callback program was recently implemented in a community pharmacy in Baraboo, WI. Antibiotic callbacks are done to promote proper antibiotic stewardship, assess patient improvement, and to mitigate side effects. Randomized controlled trials have demonstrated the benefit of pharmacist callbacks. Dudas et al examined the impact on patient satisfaction by comparing patients who received a pharmacist follow-up call post-discharge compared to no call. The callback group had statistically significant improved satisfaction at 86% and 61% satisfaction, respectively (p=0.007.) Additionally, the pharmacist resolved medication related problems in 19% of patients and found new medical problems requiring referrals in 15% of patients. This project investigated if this data was applicable to antibiotic call-backs in the community pharmacy setting.

Objectives: The objective of this project was to implement an antibiotic callback program in a community pharmacy with the primary goals of improving patient care, increasing patient-pharmacist relationships, and improving patient and pharmacist satisfaction.

Methods: A new workflow was designed based on the layout and current flow of the pharmacy and feedback from the pharmacy staff. An antibiotic callback form was created as a reminder tool, a sheet where all necessary information could be recorded, and for billing use. The pharmacy and technician manager were trained on the new workflow and they subsequently trained the pharmacy staff. The pharmacy manager collected all data over a four-week period, de-identified it, and submitted the information to the authors for analysis. Inclusion criteria were patients receiving oral antibiotics who were willing to receive a phone call. Patients were called within two business days of antibiotic pick-up, and up to three call attempts were made.

Results: In the four-week period when data was collected 36 patients were identified eligible for the antibiotic call-back program. Of these patients 33 (92%) enrolled in the program. Clinical education was provided in 7 (21%) of the phone calls, 7 (21%) pharmacist phone calls strengthened the pharmacist-patient relationship, and 12 (37%) of the phone calls resulted in patients stating the antibiotic was going well with a neutral response to the phone call. A total of 3 (9%) patients were unable to be reached despite a second attempt and 1 (3%) patient was dissatisfied with the phone call. Pharmacists involved in the program additionally noted positive impact on job satisfaction citing feeling further connected to their patients and the wellbeing of the community around them.

Conclusions: This project has shown that an antibiotic callback program in the community pharmacy setting can positively impact patient satisfaction, patient-pharmacist communication, and clinical outcomes. The outlined preliminary results support that a callback program may help maintain the pharmacy's good standing in the community and increase patient pharmacy loyalty. Further unexpected improvements in job satisfaction provide additional rationale for long-term support of such a program. Additional data is required to strengthen the preliminary positive results of this pilot project.

Methylprednisolone: Tablet vs. Dose Pack

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Background: A medication error recently occurred at a community pharmacy in which a patient who was prescribed one methylprednisolone dose pack was instead dispensed a single tablet of methylprednisolone 4 mg. The prescription vial lacked a unit to follow the quantity, not differentiating between tablet versus dose pack. One of the many contributing factors that leads to a wrong drug dispensed error is interruptions in workflow. Increased risk of medication errors due to interruptions in workflow can be mitigated through human factors engineering (HFE) via implementation system interventions such as forcing functions and constraints. These system interventions reduce the risk of medication errors by being independent of human vigilance to be successful.

Objective: To conduct a root cause analysis (RCA) and a failure modes and effects (FMEA) of a medication error related to the wrong methylprednisolone dispensed, and to propose an intervention to decrease the incidence and potential harm of future errors.

Methods: Partnering with a local community pharmacy, the project was conducted in two phases. In the first phase, we conducted a root cause analysis of the error, including a timeline of events and a fishbone diagram to identify system-level contributing factors to the dispensing error. Using the results from the root cause analysis, the second phase included proposed interventions to decrease errors. A failure modes and analysis was conducted to identify all potential gaps to reduce the chance unintended errors and potentially increase the effectiveness of the intervention. We also evaluated the proposed intervention to assure that it would not be dependent on human vigilance, making an effective system intervention.

Results: Several latent factors that contributed to the error were identified, including: 1) methylprednisolone tablets and unit dose pack being located in different areas, 2) high volume workload and workflow interruptions, and 3) no units being associated with the quantity on the prescription label. Based on our timeline analysis, we felt that factors #1 and #2 were the most relevant and we chose to design an intervention that addressed these factors. Our proposed intervention is to place both package forms of methylprednisolone next to each other and place a constraining function, such as a clear box with a lid, around the methylprednisolone to decrease the likelihood of the wrong medication being picked off the shelf. The intent of the intervention is to close the gaps identified in factors #1 and #2. Based on our FMEA, the most vulnerable components of our intervention are lack of implementation of our intervention, or lack of warnings on the box itself. We will proactively attempt to mitigate these vulnerabilities by adding warning labels onto the box and to increase staff awareness and education about the intervention we created. Our intervention will leverage system level characteristics by reducing reliance on memory, simplifying the workflow, and uses forcing functions.

Implementation of a Pharmacist Smoking Cessation Intervention Workflow in a Community Pharmacy

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Background: Cigarette smoking remains the leading cause of preventable death in the United States.[1] There is an estimated 1 in 6 adults in the US that are current smokers.[1] Tobacco use has been associated with decreased lifespan of adults by 11 years for women and 12 years for men.[2] To combat the public health posed by cigarette smoking, it is imperative that current smokers have access to tobacco cessation programs. Pharmacists are one of the most accessible healthcare providers and pharmacist-led smoking cessation programs have shown to have successful abstinence rates in the population.[3,4]

Objectives: Quantify incidence of active cigarette smokers prepared to quit within 30 days. Determine rates of acceptance of tobacco cessation services and referrals to providers. Determine feasibility of incorporating tobacco cessation screening and services into pharmacy workflow.

Methods: During the verification process, pharmacists reviewed and identified current smokers via the patient's' electronic health record (EHR). For patients without a smoking status documented on the EHR, an "ask about tobacco use" reminder card was placed in their prescription bin. During consultation, pharmacists or interns assessed patients with reminder cards on current tobacco use. Patients endorsing tobacco use were then assessed on their readiness to quit within 30 days and eligibility for nicotine replacement therapy (NRT) using a questionnaire (Figure 1). After smokers were identified as ready to quit within 30 days, pharmacists were able to offer two options for patients with prescription insurance. The first option was to fax a recommendation form (Figure 2) to the patients' primary care provider to request a NRT prescription. The alternate option was to offer a provider communication form (Figure 3) to let patients facilitate communication with their prescriber to further discuss clinically appropriate therapeutic options for smoking cessation. If recommendations were accepted, outcomes were tracked for 1, 3, and 6 months. Time spent by pharmacists making recommendations and offering services were also tracked and documented.

Results: In the pilot implementation, 65 patients were interviewed over the course of one week. Two patients (3%) endorsed current tobacco use. Neither patients were identified as prepared to quit within the next 30 days. However, both patients were amenable to pharmacist follow-up. Of note, one patient expressed sincerest gratitude for the pharmacists' interest in their health. Total time spent by pharmacists offering smoking cessation services to the two smokers were less than 5 minutes.

Conclusions: Prevalence of smokers is low in this specific site. No patients were ready to quit in 30 days. Incorporation of intervention workflow might be beneficial and more impactful at sites with higher prevalence of smokers. The intervention has demonstrated feasibility as an additional process incorporated into workflow at this retail pharmacy. Furthermore, patients have shown gratitude for the efforts of the pharmacist at consultation, which may serve to strengthen pharmacist-patient relationships. Limitations to the pilot implementation are low sample size and lack of generalizability in high volume pharmacies.

Implementation of a Pharmacist-Led Fracture Liaison Service for Primary Prevention Within a Rural Veteran Population

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Background: The World Health Organization defines osteoporosis as either a hip or lumbar spine bone mineral density (BMD) less than or equal to 2.5 standard deviations from the mean. Two-million fractures are a result of osteoporosis and 1 in 5 men will likely be diagnosed with osteoporosis in their lifetime. With the aging U.S. population, the cost of osteoporosis care is estimated to reach twenty-five billion dollars by 2025. Osteoporosis screenings are one method to treat and prevent fractures in high risk patients. However, it can be challenging to perform screenings for patients living in rural communities with reduced healthcare access. 1

Purpose/Objectives: Currently, the Department of Veteran Affairs (VA) utilizes fracture liaison services to offer Dual-energy X-ray Absorptiometry (DEXA) scans to patients with fracture histories to measure BMD, a necessary metric in determining osteoporosis diagnosis and determining interventions to reduce fracture risk. While this service has demonstrated utility, it focuses on secondary rather than primary prevention. The main objective of this project was to implement a population management screening service for male patients > 70 years old classified as rural and receiving care at the VA West Annex Clinic. The primary outcome of this evaluation is to assess fracture risk using the fracture assessment tool (FRAX). Secondary outcomes evaluated include prior DEXA status as well as vitamin D, calcium, and corrected calcium levels.

Methods: In January of 2018, a list of 232 patients age ≥70 was generated. Patients were classified as either rural or highly rural for further analysis. In February 2018, the following metrics were determined to assess patient risk: current diagnosis of osteoporosis, previous fracture, tobacco use, oral glucocorticoid use, rheumatoid arthritis, chronic liver disease, type 1 diabetes mellitus, alcohol use, and calcium, albumin, corrected calcium and vitamin D levels, and femoral neck BMD (if previous DEXA scan). In March through May of 2018, retrospective chart reviews were conducted to identify the presence of any of these risk and lifestyle factors that could contribute to risk of osteoporosis in order to calculate a FRAX score for each patient, and any past DEXA scans and results were recorded in preparation for telephone outreach to schedule DEXA scans for each patient in September of 2018.

Results: Of the 232 patients in this evaluation, 225 were classified as rural and 7 as highly rural with an average distance from the Madison West VA Clinic of 52 miles. The average patient age was 76.4 years. The final results including FRAX scores and past DEXA status will follow at the PSW Annual Meeting in August after the chart reviews and data analysis are completed.

Conclusion: There is a need for fracture screening services in the United States for primary prevention of a fracture. Patients living in rural communities would benefit greatly from such a screening service due to challenges accessing medical services. Screening eligible patients will give guidance to ambulatory care pharmacist to identify those who are most at risk for a fracture and allow time to initiate medication and lifestyle interventions.

Implementation of a Pharmacist Toolkit and Standardized Assessment of Chronic Opioid Prescriptions to Reduce Opioid Prescribing and Dispensing Across a Health-System's Community Pharmacies

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Objective: 1.) Assess the current process for pharmacist assessment of opioid prescriptions for chronic non-malignant pain (targeted prescriptions) within the community pharmacy setting. Evaluate pharmacists' confidence with direct patient communication and with proposing recommended changes to prescribers related to these prescriptions. 2.) Design a community pharmacist tool kit that would include a standardized assessment tool and additional resources that would assist community pharmacists with evaluating target prescriptions, providing recommendations to prescribers and facilitating discussions with patients when appropriate. 3.) Implement the standardized assessment tool and corresponding toolkit in UW Health's community pharmacies. 4.) Measure the impact of the new tool, additional resources, and workflows on opioid dispensing and pharmacist confidence with reviewing and facilitating patient discussions and providing recommendations on targeted opioid prescriptions.

Methods: 1.) Design a survey to evaluate pharmacist assessment of, and confidence with, opioid prescription review and corresponding patient counseling in the community pharmacy setting. Concurrently gather baseline opioid prescribing data to assess current dispensing state. 2.) Design an community pharmacist tool kit that would include a standardized assessment tool and additional resources that would assist community pharmacists with evaluating target prescriptions, providing recommendations to prescribers and facilitating discussions with patients when appropriate. 3.) Implement the standardized assessment tool and corresponding toolkit in UW Health's community pharmacies. 4.) Measure the impact of the new tool, additional resources, and workflows on opioid dispensing and pharmacist confidence with reviewing prescriptions, facilitating patient discussions and providing recommendations on targeted opioid prescriptions.

Results:

1. Number of chronic opioids within all included pharmacy locations, stratified in respective risk category.
   a. Prior to intervention
      i. Low Risk: 521
      ii. Medium Risk: 149
      iii. High Risk: 102
   b. Post intervention (up to April 2018)
      i. Low risk: 499
      ii. Medium Risk: 149
      iii. High Risk: 90
   c. Number of interventions made: Up to April 2018, UW Health pharmacists have completed nearly 100 interventions
   d. Number of opportunities: Based on current dispensing data, over 600 opioid prescriptions are filled within our UW Health system pharmacies every month, nearly 250 of those dispenses are moderate or high risk opioids.
   e. Number of naloxone dispenses: Since the start of this project UW Health system pharmacists have dispensed over 130 naloxone prescriptions, this doubled the dispenses seen in 6 months of the prior year.

Conclusions: The community pharmacists were a key part of this initiative, as they are positioned in a role to help support the patient in an opioid dose reduction most often within UW Health. An important success factor for this initiative was empowering pharmacists to support their patients and provider colleagues for opioid dose reductions in patients using opioids for chronic pain. Of note, opioid tapers, especially for chronic pain patients can be a slow and tedious process and may take months to see any impact of an intervention.

Describing Interruptions in Community Pharmacy Settings by Level of Urgency: A Qualitative Study

Andrea Gray, 2020 PharmD Candidate, Michelle Chui, PharmD, PhD

Background: It has been demonstrated that interruptions are a common occurrence across a variety of healthcare environments.1 The result is that health care providers are constantly needing to divide their attention, and review work that was placed on hold to respond to the interruption. This can increase stress and lead to errors. There has not been much exploration of interruptions in community pharmacy settings. While it has been shown that interruptions lead to errors, eliminating all interruptions in a pharmacy is not a valid goal. Considering this complexity, it is important to explore and describe sources of interruption. More work is needed to investigate and classify sources and content of pharmacist interruptions to guide attempts to mitigate interruptions and optimize workflow.

Objectives: This study aims to quantify and describe sources and content of interruptions experienced by pharmacists in a community pharmacy setting in terms of urgency. This will aid in attempts to minimize interruptions that could lead to dispensing errors while acknowledging the dynamic nature of pharmacy practice that necessitates a certain amount of interruptions to optimize patient care.

Methods: This study employed qualitative methods of data collection, including observations and semi-structured interviews. The pharmacies where the data was collected were chosen to represent a variety of settings and viewpoints and included two each of independent, mass merchandise, and hospital/clinic affiliated pharmacies. An interruption was defined as a break in the task of the pharmacist while engaged in any of the activities related to the dispensing of medications in a community pharmacy.

Data analysis was accomplished using Nvivo 11 (QSR International) software for coding. The coding was used to quantify, categorize, and describe sources of interruptions. The value added interruptions by technicians were placed on a continuum based on the feasibility of delaying response.

Results: A total of 864 interruptions were identified. The interruptions were categorized based on the source of the interruptions.

Technician initiated interruptions accounted for the majority (37%) of the total interruptions and were sub-coded based on the content of the interruption. The content of these interruptions were classified as value added (consults, patient questions, transfers, overrides, information transfer, questions about technician duties) and non-value added (conversations and other miscellaneous noise).

The value added interruptions were placed on a continuum based on the level of urgency. Some types of interruptions are not able to be delayed without compromising patient care, while those on the other extreme are not urgent and could be delayed.

Conclusions: Since value added interruptions accounted for the majority (74%) of technician initiated interruptions, these are the interruptions that could be targeted for more effective management. Placing these interruptions on a continuum based on urgency will allow more effective interventions to be designed. Targeting interventions based on level of urgency will yield more effective and efficient solutions.

Dissemination and Implementation of an Interprofessional Training Program Within the Department of Veterans Affairs

Molly Lehmann (Obermark), PharmD, Stephanie Gruber, PharmD, BCACP, Sjari Kakumanu, MD, Kim Kies, MA, MPH, PhD, Edward Portillo, PharmD

Primary Objective: To assess if the Replicating Effective Programs model, a specific dissemination and implementation framework, serves as an appropriate model for expansion of an interprofessional transitions care service for Chronic Obstructive Pulmonary Disease (COPD) management within the Veteran population.

Background: Dissemination and implementation science is defined by the National Institutes of Health as the expansion of effective interventions within clinical practice. At the William S. Middleton Memorial Veterans Hospital, a specific dissemination and implementation science framework, Replicating Effective Programs (REP), was applied to facilitate expansion of an interprofessional COPD service, beginning with design and assessment of targeted training delivered to an interprofessional healthcare team. Utilization of the REP model to develop and assess this interprofessional training program serves as an example of how dissemination and implementation science can be effectively employed to promote team-based clinical interventions across the Department of Veterans Affairs.

Methods: A training program consisting of nine audiovisual training modules was developed from October through December 2017 to provide service-specific training to an interprofessional team of healthcare practitioners. Collaborating with the leadership of a primary care provider, the training program was disseminated in January 2018 to four groups of healthcare professionals including pharmacists (n=15), nurse care managers (n=12), triage nurses (n=18), and respiratory therapists (n=5). Outcomes of the dissemination and implementation process included (1) healthcare practitioners' perception of the training as well as (2) practitioners' confidence in their abilities to enact service requirements after training completion. Objectives were measured using quantitative and qualitative assessment questions with data collected in April 2018 through survey distribution and profession-specific focus groups. Quantitative assessment questions were developed for each group of healthcare professionals to assess for changes in mean self-efficacy rankings pre and post-training using the Wilcoxon-signed rank test. Focus group data were recorded, transcribed, and evaluated using NVivo-QSR InternationalTM by two individuals without affiliation to the Department of Veterans Affairs.

Results: Pooled focus group data provided attestation that the training enhanced practitioners' confidence in their role within the service, streamlined interprofessional coordination, and encouraged collaboration between professionals. Opportunities for further improvement were also identified, such as incorporation of a video modeling clinic example and accompanying written materials. Quantitative survey results were obtained from 41 interprofessional trainees, including pharmacists (n=15), nurse care managers (n=9), triage nurses (n=12), and respiratory therapists (n=5). Statistically significant improvements in trainee self-efficacy were observed in 30 of the 40 survey items (75%), with pooled focus group data supporting an improvement in trainees' conviction to enact core elements of the service.

Conclusion: Dissemination and implementation science can be used as a model to train interprofessional teams within the Department of Veterans Affairs to deliver coordinated, comprehensive care for COPD management. This evaluation provides further reference for healthcare professionals seeking to utilize dissemination and implementation science processes to implement effective interprofessional services.

Evaluation of Outpatient Periprocedural Management of Direct Oral Anticoagulants in a Veteran Population

Hannah Hecht, 2020 PharmD Candidate, Carla Staresinic, PharmD, BCACP

Background: The William S. Middleton VA Anticoagulation Clinic manages approximately 750 patients on DOACs. The use of DOACs is steadily on the rise as clinicians and patients have found the decreased need for routine laboratory monitoring to be highly favorable.1-2 Guideline-directed periprocedural plans based on anticoagulation agent, renal function, and procedural bleeding risk are important for optimal safety and efficacy of DOACs.3 Currently, it is recommended that DOACs are withheld between 2-5 elimination half-lives depending on the procedural bleeding risk1,3 The goal of this project was to evaluate current practices for DOAC interruptions around outpatient invasive procedures and identify opportunities for improvement.

Objectives: The primary objective was the percent of time the periprocedural plan was in accordance with Madison VA AC guidelines. Secondary objectives included the percent of procedures where the periprocedural plan included input from anticoagulation staff, the number of cancelled procedures due to anticoagulant issues, the frequency and types of pre-procedure coagulation testing, and the incidence of post-procedural bleeding or thromboembolic events within 30 days of the procedure.

Methods: This quality assessment project was a retrospective chart review of patients who were systematically identified from the VA electronic data base as having an active DOAC prescription and one of the following invasive procedures performed as an outpatient between 12/1/2017-5/31/2017: colonoscopy, endoscopy, cataract, transurethral resection of bladder tumor (TURBT), transurethral resection of prostate (TURP), or electromyography. Patients were excluded from analysis if the initial issue date of the DOAC prescription was after the procedure date of interest. The following surgical procedures were determined to be standard bleeding risk: electromyography and cataract removal. Whereas a colonoscopy or endoscopy with potential polyp removal and TURBT/TURP were deemed high bleeding risk surgical procedures. A thorough chart review was performed to gather data regarding the documentation of the periprocedural plan for DOAC interruption and resumption. Endoscopy and colonoscopy were only treated as high bleeding risk surgical procedures, regarding the plan for DOAC resumption, only if a polypectomy occurred.

Results: To be presented at PSW

Conclusions: To be presented at PSW

Impact of Changes in Screening Processes on the *Smart Meds* Project

Sarah Lopina, 2019 PharmD Candidate, Brook Dantama, 2019 PharmD Candidate, Abigail Sharpe, 2019 PharmD Candidate, Katherine Hartkopf, PharmD, BCACP, Helene McDowell, MS, Toya Johnson, MBA, Hayley Chesnik, MS, Amanda Margolis, PharmD, MS, BCACP, Kari Trapskin, PharmD

Background: TTraditional comprehensive medication review (CMR) services are performed in the community setting where documentation occurs outside of the medical record, limiting pharmacist-prescriber communication, collaboration, and follow-up. The Smart Meds program, created in March of 2017, embeds CMR services within primary care clinics to improve pharmacist-prescriber collaboration and follow-up for patients with complex medication regimens. When the program began, pharmacists were responsible for identifying eligible patients and sending the completed CMRs to a Smart Meds intern, who then extracted patient data and performed follow-up telephone satisfaction surveys. Based on identified process barriers, in April 2018 a new screening process was implemented where Smart Meds interns completed patient identification with the aim of improving efficiency and accuracy.

Objective: To assess the utility of Smart Meds interns identifying eligible patients via prospective chart reviews.

Methods: At implementation of the new prospective chart review process, a Smart Meds intern met with a primary care pharmacist from the pilot clinic to finalize the workflow. Program inclusion and exclusion criteria were updated to better quantify which patients were eligible for the program, and a standardized prospective process for the Smart Meds interns to identify eligible patients was compiled. Intern-to-pharmacist communication occurred via InBasket messaging within the electronic health record. Utility of the process change was evaluated through chart review of patients identified to determine if CMRs were completed. Retention of patients in the Smart Meds project, defined as completion of all aspects of the Smart Meds service including a CMR and follow-up satisfaction survey, was also evaluated. To evaluate potential barriers and facilitators for both the former and current process, continuous written feedback was solicited from participating pharmacists and Smart Meds staff.

Results: During the former process, a total of 65 CMRs were performed out of 683 patients eligible (9.5%), of which 35 (54%) were retained throughout the Smart Meds process. Barriers to the former screening process included missing quality analysis follow-up when completed CMRs were not retained, and failure to complete CMRs for eligible patients based on limited pharmacist time. Facilitators to the former screening process included application of pharmacist clinical judgement to determine CMR eligibility. The data collection for the new prospective process is ongoing and will be presented at the PSW Annual Meeting.

Conclusions: Final conclusions on the utility of intern-to-pharmacist communication will be presented at the PSW Annual Meeting.

Financial Barriers for Pharmacy-Based Immunization Services

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Background: Pharmacy-based immunization services play an important role in making vaccines available to the public and preventing disease. However, these services have not been fully implemented because barriers in the healthcare reimbursement environment exist.

Objective: To determine the barriers related to vaccine reimbursement identified by pharmacists.

Methods: A survey regarding potential barriers to full provision of immunization services in related to reimbursement for vaccine administration was distributed to the pharmacist membership of the Pharmacy Society of Wisconsin in July 2017.

Results: Twenty-seven responses were received. Survey results show 59% of respondents identify the time the pharmacist spends preparing and administering the vaccination may not be reimbursed as the largest barrier to vaccine provision. Respondents also identified variability when submitting claims for different vaccines or to different payers (56%), inability for their pharmacy to submit vaccine claims for all types of vaccines (44%), patients receiving incorrect information from their insurance provider about which vaccines are covered (41%), and inability to receive reimbursement for supplies (41%) as additional barriers. Administering vaccines too infrequently to have an efficient process in place for submitting claims and the time it takes to submit a claim were not considered barriers by any of the survey respondents. Conclusion: Numerous barriers to reimbursement of pharmacist-provided vaccines must be removed which could increase access to and administration of vaccines, therefore reducing the prevalence of vaccine-preventable diseases. The Medical College of Wisconsin, Pharmacy Society of Wisconsin, and Wisconsin Pharmacy Foundation aim to address these barriers through implementation of a statewide protocol, improving patient engagement, revising trainings, and convening financial stakeholders.

Acknowledgments: This project is funded in part by the Advancing a Healthier Wisconsin Endowment (AHW) at the Medical College of Wisconsin.

Let's Get AAMPed! Implementation of an Automated Adherence Medication Packaging System

Dmitry Walker, PharmD, Joe Cesarz, PharmD, MS, Carrie Boeckelman, RPh, BCACP, Melissa Ngo, PharmD, BCACP

Background: Patient medication adherence is one of the most important factors of ensuring clinical benefit is achieved from pharmacological therapy. UW Health offers medication adherence packaging services from three outpatient pharmacies. At the main site for this service, two technician FTEs and 0.5 pharmacist FTE are dedicated to adherence packaging services. The increase in the demand for the service has surpassed the site's ability to provide adherence packaging services to all interested patients, with the existing pharmacy staff. In large part, this is due to the medication adherence packaging being prepared and labeled via a manual technician-driven process.

A decision has been made to implement technology to automate the filling, packaging, and labeling parts of the medication adherence packaging process, in order to improve the process efficiency and accommodate the increase in current patient volume and facilitate the expansion of the program.

Objectives: 1.) Outline the existing process for medication adherence packaging. 2.) Design operating procedures and workflows for utilizing medication adherence packaging technology. 3.) Implement medication adherence technology at an existing community pharmacy. 4.) Measure and analyze the impact of medication adherence packaging technology on efficiency.

Methods: A process map for the previous medication adherence packaging process was created through direct observation to evaluate existing workflows. Pharmacist and technician self-reported time studies were performed over a 45 day period to measure the active and passive time requirements of the existing process. To determine the necessary medication inventory for the new technology, an analysis was performed utilizing prescription fill data from the previous year. Pertinent policies and procedures were updated to reflect changes to the process due to the implementation of new technology. A go live date was established with the vendor to ensure that installation, training, and support would be provided for the transition. Communication and new workflow implementation planning was achieved through bi-monthly team meetings with all impacted pharmacists and technicians. Additionally, individual training on the software and hardware operation was conducted by a vendor representative with each team member. The primary investigator, ambulatory informatics analyst, and pharmacy manager dedicated on-site support-time to facilitate the transition to the new workflow. Impacted patients were educated on the change through written communication and by pharmacy technicians over the phone. Following implementation, the staff utilizing the technology worked with the primary investigator to identify and correct issues in the new workflows. Post implementation time studies were performed to measure the active and passive time required for medication adherence packaging. An analysis of the findings from the pre and post implementation time studies was performed to compare the time requirements for the workflows and to predict required staffing levels based on patient volume.

Results and Conclusions: The amount of total time required to prepare a patient's 28-day adherence packaged medication supply was reduced from 68 to 52 minutes. Technician time was reduced from 52 to 20 minutes, and pharmacist time has been reduced from 16 to 14 minutes, allowing a pharmacy to grow patient volume, without increasing staffing levels.

Improving Oncology Clinic Throughput at an Academic Medical Center

Eric Chmielewski, PharmD, Heather Jones, PharmD, MS, Tim Miller, PharmD, Kendra O'Connell, RN, BSN, OCN, Meredith Winkelhake, RN, BSN, OCN

Background: Extensive wait times in outpatient cancer treatment centers can be a considerable source of dissatisfaction for patients and can lead to significant negative sequelae including patient non-adherence to chemotherapy regimens and appointments. The purpose of this study is to increase oncology chemotherapy clinic throughout at an academic medical center using two approaches: 1. redesign hazardous drug product preparation workflows to standardize turnaround time and increase efficiency and 2. work together with nursing and scheduling leadership to determine adjustments to patient scheduling practices and templates to better factor in nursing and pharmacy workload.

Objectives: The objectives of the project were to: assess the current state of patient scheduling and hazardous drug preparation turnaround time and workflows, develop and implement standardized turnaround times for preparation and delivery of hazardous drugs and non-hazardous chemotherapy, develop and implement patient scheduling templates that account for newly defined pharmacy turnaround times and nursing workflows, and measure the impact of implementing these initiatives on oncology infusion clinic throughput.

Methods: A workgroup was established comprised of pharmacy managers, oncology pharmacists and oncology pharmacy technicians. Industrial engineering strategies, including an affinity diagram, interrelationship digraph and tree diagram were performed in order to identify factors, root causes and bottlenecks inhibiting efficient hazardous drug output as well as determine and prioritize strategies to mitigate these issues. Within the pharmacy hazardous sterile products area, workflows were redesigned based on workgroup recommendations. Data from bar code medication preparation technology was analyzed to establish standardized turnaround times. Standardized turnaround times were then applied to provide standards for pharmacist timing of medication orders. Pharmacy turnaround times and estimates of nursing workload were then evaluated and compared to patient scheduling templates to assess whether these templates needed to be updated. Additionally, a patient call-ahead system was implemented and piloted for two drugs to assess the impact on patient time spent in clinic.

Results: After implementation of clean room setup and workflow redesign and setting standardized turnaround times in January 2018, average turnaround time decreased from 52 minutes in September 2017 to 39 minutes during the period January to June 2018. Reported safety events related to medication delays decreased from 36 events reported from September to December 2017 to 9 events reported from January to June 2018. The percent of doses delivered in 30 minutes or less increased from 36% in September 2017 to 52% during the period January to June 2018.

Conclusion: Clean room setup, workflow redesign, and implementation of standardized order turnaround times and pharmacist timing of orders had a positive impact on turnaround time, the number of safety events reported. The impact that these interventions and the implementation of a patient call-ahead program have yet to be assessed. Future steps for this project will examine this data and expand the patient call-ahead system to decrease patient wait times in the cancer center.

Indications on Take Home Prescriptions: Impact on Patient Medication Taking Behavior and Medication Adherence

Katherine Sencion PharmD, David Hager, PharmD, BCPS, Jack Temple, PharmD, MS

Background: Proposed benefits to indications-based prescribing include improvements in communication between providers and pharmacists, patient medication taking behavior, and medication reconciliation during transitions of care. Groups like the Agency for Healthcare Research and Quality (AHRQ) and Brigham and Women's Hospital have launched extensive projects aimed at improving prescribing by incorporating indications in prescriptions, with the goal of instilling the "Right Indication" as the 6th right of safe medication use. Moreover, studies have shown a correlation between patient medication adherence and understanding the reason a medication was prescribed. The most common barrier for incorporating indications on patient prescriptions has been the additional workload on providers and the concern for provider wellness. Yet, experience at other institutions have indicated that adding indications took less than 5 seconds per prescription for the majority of patients; thus, the benefits to indications-based prescribing outweigh such concerns. With this knowledge, UW Health will develop and implement workflows to facilitate required indications-based prescribing, and study the potential impacts on medication safety, adherence, and patient satisfaction.

Objectives: The objectives of this project are to develop optimal EHR methods to add indications to all take home prescriptions, implement these methods to require indications on all new take home prescriptions, and evaluate the impact of indications-based prescribing on medication safety, medication adherence, and patient satisfaction.

Methods: An implementation workgroup comprised of clinician and operational stakeholders is charged with the development of optimal EHR workflow that will enable indications-based prescribing while minimizing provider burden. The implementation workgroup is also charged with developing the education strategy that will encompass provider and pharmacist education, as well as nursing and medical assistant education necessary to ensure indications-based prescribing is maintained throughout refill protocols. Development statistics that will be measured include the number of customized medication records (e-RXs), the average number of indications for e-RXs, the number of e-RXs with more than 20 indications, the number of hours dedicated to implementation and maintenance, and the number of e-RXs requiring patient friendly conversions. Implementation statistics that will be collected include the number of free-texted indications, the average number of prescriptions per patient encounter, and the average number of characters for indications.

A research workgroup comprised of clinician and operational stakeholders is charged with studying the impact of implementing indications based prescribing. Medication safety will be studied by measuring the number of intervention-related phone calls placed by pharmacists to prescribers, alongside the number of clerical or clarifying phone calls. Medication taking behavior will be studied by comparing the rate of first fills and first refills for patients covered by Quartz Unity before and after requiring indications on prescriptions. Medication adherence will also be studied long term on the same group of patients. Finally, patient satisfaction will be assessed by incorporating 4 questions into an existing pharmacy customer satisfaction survey.

Results and Conclusion: Research in progress

Implementation of a Fully Compliant Medium-Risk Compounding Strategy at a Pharmacy Services Building

Tresa Binek, PharmD, MBA, Aaron Webb, PharmD, MS, Brad Ludwig, RPh, MS

Purpose: To establish workflow, processes, core measures and related workload metrics to insource medium risk sterile compounding within a 797 compliant environment at an academic medical center's pharmacy services building in order to meet USP standards for the manufacturing of compounded sterile products. To then use the aforementioned processes to validate the pharmacy services business case for insourcing medium risk compounding within the pharmacy services building.

Objectives: 1.) Develop plan to ensure 797 compliance by partnering with the UW-School of Pharmacy for stability and sterility testing, concentrating the list of batch compounded products, training pharmacy staff, providing preparation guidance and developing new quality assurance procedures. These procedures may include, but are not limited to the standardization and reorganization of the sterile products database, the process for quarantining products, sterility/stability testing for products. 2. Establish new, internal workload measures and productivity metrics in alignment with the new workflows to validate and budget for expected personnel expense. 3.) Define core measures to evaluate the pharmacy services facility's impact on pharmacy output as it pertains to waste, inventory standards, individual staff performance and the sterile products production process. 4.) Evaluate the financial impact of medium risk compounding, compare to pharmacy services business case then prepare annual budget for medium risk compounding operational expenses.

Methods: 1.) Revise list of batch compounded products, then partner with the UW-School of Pharmacy to establish USP 797 compliant dating for products. To concurrently utilize a new system for housing the complete list of spa stock compounds, recipes for compounds, quarantine documentation and the date and time of release of the products from quarantine. 2.) Establish new, internal productivity metrics in alignment with the new workflows to validate and budget for expected personnel and other operating expenses. 3.) Define core measures to evaluate the pharmacy services facility's impact on pharmacy output as it pertains to waste, inventory standards, individual staff performance and the sterile products production process. 4.) Evaluate the financial impact of medium risk compounding, compare to pharmacy services business case then prepare annual budget for medium risk compounding operational expenses.

Anticipated Project Deliverables: 1.) Create and implement an USP 797 compliant workflow that is standardized, incorporates safety checks and is as automated as feasible. 2.) Job description for quality control and quality assurance technicians . 3.) Develop new workload and productivity metrics. 4.) Develop max and par levels for spa stock inventory, incorporating estimated turnaround time for BUD testing. 5.) Create budget for FY19 as it pertains to the sterile product area personnel, drug and auxiliary expenses. 6.) Justification of business case by calculating and presenting on the return on investment for the sterile product services provided at the Pharmacy Services Building.

Results: 1.) Sterile product stock list condensed to 57 line items, in which extended beyond use dating is being established for 30 high use line items. 2.) Contract established with the UW-School of Pharmacy for initial stability and sterility testing, as well as for ongoing sterility testing that is required for each batch produced. 3.) New pharmacy operating system is being customized based on the operational workflow which is designed to optimize current space and to provide a layer of automaticity for product validation, product labeling and quarantine. 4.) Additional results to follow after full implementation.

Utilization of USP 800 Gap Analysis Tool and Initial Progress Towards Compliance

Jodi Meyer, 2020 PharmD Candidate, Allison Martin, 2019 PharmD Candidate, Berook Addisu, PharmD, BCPS

Background: Chapter 800 of the United States Pharmacopeia (USP), which becomes enforceable by regulatory bodies on December 1, 2019, concerns the safe handling of hazardous drugs (HDs), from receiving at the facility through administration to the patient and disposal. These new standards have been created to protect healthcare workers and patients from incidental exposure to HDs. Compliance with USP 800 requires involvement of many aspects of hospital workflow, including shipping and receiving, engineering controls, environmental safety, and direct patient care. Due to the extensive nature of these new standards, the William S. Middleton Memorial Veterans Affairs Hospital is not currently in compliance with all aspects of USP 800 and a review and update of current policies and procedures was warranted.

Objectives: The goals of this project are to complete a gap analysis of the Madison VA's current compliance with USP 800, prioritize these gaps, and implement changes to work towards complete compliance.

Methods: An initial gap analysis was completed with the Associate Chief of Pharmacy using the CriticalPoint gap analysis tool (CriticalPoint LLC). Key stakeholders, including nurses, pharmacists, pharmacy technicians, an industrial hygienist, an occupational health clinician, and environmental/facilities managers were engaged in interdisciplinary workgroups to determine and prioritize action items.

Results/Conclusion: Implementation and analysis are ongoing. Results (including baseline assessment of USP 800 standards and implemented changes) and conclusions will be presented at PSW Annual Conference.

Implementation and Evaluation of a Pharmacy-Led Initiative to Expand On-Hand Naloxone Access to a Veterans Affairs Police Department

Carlie Wilke, 2020 PharmD Candidate, Theresa Frey, PharmD, BCPP, Berook Addisu, PharmD, BCPS, Deputy Chief Michael Cain

Background: Drug overdose death is the leading cause of unintentional death in the United States. Nationally, veterans receiving care within the Veterans Affairs (VA) have almost twice the rate of accidental opioid overdoses when compared to the general public. Access to naloxone, a potent opioid receptor antagonist, has been shown to improve outcomes in opioid overdose patients. Naloxone access efforts at the Madison VA have focused on patient or family member access. However, opportunities exist to expand access to naloxone in all areas of the hospital and outlying clinics for patients, visitors, and employees. Despite often serving as first responders in non-clinical areas of the healthcare setting, police officers are not adequately equipped to effectively manage an opioid overdose.

Objectives: The primary objective of this project is to implement an initiative requiring the on-hand availability of naloxone by all Madison VA police officers. Secondary objectives include assessing the effectiveness of a naloxone training program and a comparison between pharmacists and police officers regarding their knowledge related to opioid overdoses and confidence in their ability to effectively administer naloxone in an emergent situation.

Methods: A standard operating procedure regarding police administration of naloxone at the Madison VA will be developed, approved by the Pharmacy and Therapeutics Committee, and implemented. Key stakeholders will include hospital executives, the mental health, pharmacy and police departments, as well as the code blue committee. Police and pharmacy participants in the naloxone administration training will be given a twenty-question pre- and post-training assessment that addresses competency, concerns, readiness, and opioid overdose knowledge. The surveys will be scored out of a total of 100 points. The effectiveness of the naloxone training program will be assessed by comparing survey results before and after the training session. Additionally, survey results will be compared between police officers and pharmacists to determine if there is a difference between work groups.

Results: Ongoing, pending the continued work and implementation of the naloxone training program and standard operating procedure.

Conclusions: Will be presented at the PSW Annual Conference.

Diversion Specialist

Barb Ranzenberger, CPhT

Pharmacy continues to occupy an ever-evolving role within the healthcare landscape. Increasingly, pharmacists are called on to spend more time on their clinical duties rather than the medication management and preparation responsibilities traditionally performed by pharmacists. With the higher demand on a pharmacist's time, pharmacy technicians have been stepping in to fill these non-clinical roles. Our poster explores the Billing and Diversion Specialist role at Gundersen Health System.

Prior to the creation of the Diversion Specialist position, diversion monitoring was handled by a technician who was responsible for several tasks within the pharmacy including non-standard billing requests, ordering of IV room supplies, and ordering fluids. Diversion monitoring consisted of a handful of Epic reports that were monitored daily; however, a large portion of the monitoring process was reactionary and investigatory. As a result of staff changes, the Diversion Specialist position was created to continue the medication diversion monitoring efforts of the previous staff.

The structure of our Diversion position exists as a team of two technicians each of whom monitors different areas of our facility for possible diversion. Our diversion monitoring efforts prior to the creation of the specific roles were rather humble and mostly reactive; however, the role has expanded and evolved into a more proactive approach. Our Diversion Specialists monitor every controlled substance that is dispensed from our inpatient pharmacy daily. Discrepancies between dispenses and administrations are identified, analyzed, and researched by our specialists. They work directly with Nursing and Anesthesia staff to resolve open discrepancies and correct documentation errors. Our diversion monitoring efforts have expanded from a collection of isolated reports that covered areas deemed 'high-risk for diversion' to a comprehensive system that looks at all controlled medication dispenses and administrations throughout our facility. Currently, this covers the inpatient pharmacy, inpatient nursing units, hospital outpatient departments, and procedural locations.

Our Diversion Specialist role is still relatively new (only one year old); however, with this dedicated position, we have been able to expand the role to include patient-care areas previously not covered by diversion monitoring efforts. Also, we have developed more comprehensive reports that more fully cover our departments and account for all controlled substances that are handled on a daily basis. In our procedural areas, for instance, we were able to reduce discrepancy activity by over 70% in the first month of monitoring. Dedicated pharmacy staff and education of the procedural staff both contributed to this dramatic decrease.

Purchasing Technician

Brian Wittenberg, CPhT, Sophie Becker, CPhT

Pharmacy continues to occupy an ever-evolving role within the healthcare landscape. Increasingly, pharmacists are called on to spend more time on their clinical duties rather than the medication management and preparation responsibilities traditionally performed by pharmacists. With the higher demand on a pharmacist's time, pharmacy technicians have been stepping in to fill these non-clinical roles. Our poster explores the Purchasing Technician role at Gundersen Health System.

Prior to the creation of a specialized role, purchasing was handled by an administrative staff member who managed a variety of tasks including functioning as the office assistant for the department. Inventory management was a manual, walk-through process, and medication ordering was based on this inventory method. Over time, the need for a dedicated purchasing technician grew, and we began hiring people specifically for this role.

With the development and implementation of new technology, the Purchasing Technician role has evolved greatly. We have moved to a perpetual inventory system which monitors inventory levels in real time rather than by periodic manual inventories. Our hospital purchasing technicians handle medication ordering and receiving (including controlled substances) for all of our hospital outpatient departments. The purchasing role has also expanded to incorporate the monitoring and management of backorders, including the acquisition of additional stock and stock rotation to cope with each backorder as it occurs.

As the Purchasing Technician role has grown and expanded to properly execute the tasks within its job description, it has also expanded to become an integral resource to the rest of the department. They work with our Pyxis Technicians to maintain proper inventory at our more than 100 Pyxis machines throughout our facility. We have also been able to incorporate the 340B Drug Pricing Program into our ordering practices to reduce costs which ties into budgeting and overall department efficacy. Purchasing Technicians also assist our Diversion Monitoring staff by maintaining necessary DEA documentation of controlled substances.

Since hiring our first dedicated Purchasing Technician 15 years ago, we have expanded to five full-time positions each of which is able to specialize and streamline the various tasks for which they are responsible.

Implementing New Sig Code System to Increase Order Entry Accuracy

Collin Dean, 2019 PharmD Candidate, Cody Griffith, 2019 PharmD Candidate, Melissa Kerhin, 2019 PharmD Candidate, Allison Martin, 2019 PharmD Candidate, Macy Porlier, 2019 PharmD Candidate, Christine Wacek, 2019 PharmD Candidate

Background: VRecently a medication error occurred where a hospice patient's as needed liquid morphine dose was increased and a scheduled liquid morphine prescription was subsequently deleted. The pharmacist checking the prescription did not notice the entry error or that the scheduled dose was discontinued. Fortunately, the incorrect dose was not administered to the patient as pharmacy staff caught the error and notified the patient's long term care facility. The medication error occurred in the prescription order entry process while using the pharmacy's current sig code system. This error illustrates the importance for pharmacies to develop strategies to prevent sig code dispensing errors. The ISMP published an error alert within PharmacyToday regarding the use of sig codes and recommended risk-reduction strategies for pharmacies to follow.

Objective: To conduct a root cause analysis (RCA) and a failure modes and effects analysis (FMEA) of a medication error related to prescription order entry, and to propose an intervention to decrease the incidence and potential harm of future errors.

Methods: We partnered with an independent, closed door, long-term care pharmacy to examine an error that took place within the last six months. In the first phase of the project, we conducted an RCA of the error including a timeline of events and a fishbone diagram to identify system-level contributing factors to the error. The RCA led to insight on the second phase of the project, which included a proposed intervention to decrease errors. In order to ensure that the intervention would be effective and would not cause inadvertent errors, we conducted an FMEA to identify unforeseen errors with the proposed intervention.

Results: We found numerous underlying factors that contributed to the error, including inconsistent sig codes, poor zooming function on the computer, inability to view the patient profile and prescription verification screen simultaneously, difficult-to-read multi-sig codes, and the ability for multiple users to create sig codes. Based on our timeline analysis, we concluded that factors related to the design and naming of the sig code system contributed most to the error. We chose to design an intervention that addressed these factors. Our proposed intervention was to create a task force consisting of two frontline staff that would be responsible for running sig code reports and updating current sig codes. The task force would also provide staff with educational materials on updated sig codes. Based on our FMEA, the most vulnerable components of our intervention are new sig codes not being used and new sig codes being input incorrectly. To mitigate these vulnerabilities, the task force would provide staff education as well as periodic sig code error reports.

Conclusions: Our intervention would change system level characteristics by standardizing the sig code process. This would increase access to information and could potentially reduce the incidence of medication errors.

Implementation of a Student Managed Oral Chemotherapy Prospective Refill Program in an Oncology Retail Pharmacy

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Background: As the paradigm for chemotherapy treatment has shifted from inpatient to outpatient, clinicians have seen a drastic increase in the use of oral chemotherapy. Oral chemotherapy involves individualized treatment cycles, increased monitoring, and high costs to both payers and patients. Although given orally, safety and cost concerns associated with oral chemotherapy agents typically require dispensing at a specialty pharmacy where programs are in place to ensure safe use and timely refills. At UW Health oral chemotherapy is dispensed from the UW Health Oncology Pharmacy, where currently a refill program to ensure appropriate and timely refills for each patient receiving oral chemotherapy does not exist. Therefore, a need was identified for an enhanced prospective refill program for patients receiving oral chemotherapy from the UW Health Oncology Pharmacy. Unfortunately, staff resources were not available to provide a refill program at this time, so students completing advanced pharmacy practice experiences (APPEs) in the oncology pharmacy were identified as a means to provide this service.

Purpose: To develop an oral chemotherapy refill program that is sustained by APPE students in the UW Health Oncology Pharmacy.

Objectives: 1.) Develop sustainable workflows for an oral chemotherapy refill program managed by APPE students. 2.) Create training materials to utilize when onboarding a new APPE student. 3.) Measure outcomes associated with oral chemotherapy refill program

Methods: Workflows for UW Health's Specialty Mail Service Pharmacy were reviewed to identify adaptable elements to model for the oral chemotherapy refill program at the oncology pharmacy. Adaptations were made to allow for identification of patients, assessment of treatment plans and tracking of upcoming appointments/labs. Patients were identified using a pharmacy software report created to generate a daily list of all patients that filled oral chemotherapy the previous day. Once patients were identified for the refill program, patients were tracked using electronic medical record functionality that allowed for enrollment of patients and the ability to specify their next outreach date. Workflow and training documents were created outlining how to utilize each report, how to assess patients on their day of outreach, recommended scripts for talking to patients, and key reminders for the program. The program was initiated in March 2018.

Results: Three APPE students, thus far, have managed the oral chemotherapy refill program. The average time commitment to complete program tasks is two hours, while also contributing to the regular pharmacy workflow. On average, 29 patients are assessed for outreach per day. Eight of those patients are called to determine if a refill is needed and five of those eight patients require refill interventions. Patients that were assessed but did not require outreach were patients that already refilled their prescription, had an upcoming appointment, were not due for a refill, or were holding their oral chemotherapy. Student satisfaction with the program will be presented at the PSW Annual Meeting.

Conclusions: An oral chemotherapy refill program can successfully be implemented and managed by APPE students. Additional conclusions to be presented at the PSW Annual Meeting.

Increasing Pharmacy Students' Knowledge of Medical Interpretation: Early Collaboration with Medical Interpreter Students

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Background: The Medical College of Wisconsin (MCW) School of Pharmacy and Milwaukee Area Technical College (MATC) Medical Interpreter Program designed a unique interprofessional educational (IPE) simulation session for 51 first-year, pharmacy students who collaborated with 20 first-year medical interpreter students.

Objectives: 1.) Share knowledge and build professional relationships between pharmacy and medical interpreter students. 2.) Increase respect for roles, responsibilities, and expertise of different professions. 3.) Demonstrate to pharmacy and medical interpreter students the complementary professional expertise and skills that each discipline contributes to optimal patient care.

Methods: The Medical College of Wisconsin (MCW) School of Pharmacy and Milwaukee Area Technical College (MATC) Medical Interpreter Program designed and developed an innovative interprofessional educational (IPE) session where 51 first-year pharmacy students collaborated with 20 first-year medical interpreter students in a simulation. First, students learned the roles and responsibilities of a medical interpreter and pharmacy. Next, students learned the rules of providing limited English proficient patients access to a qualified interpreter. The simulation centered around a pharmacist obtaining a medication history of a limited English proficient patient and making use of a medical interpreter for interpretation. Afterwards, all students participated in a rich debrief reflecting on the session.

Results: To track longitudinal IPE progress, students are evaluated using a 20-question pre/post retrospective assessment called Interprofessional Collaborative Competency Attainment Survey (ICCAS)1. ICCAS is categorized by the Interprofessional Education Collaborative (IPEC) core competency domains including (1) roles/responsibilities, (2) interprofessional collaboration, (3) values/ethics, and (4) teams/teamwork. 2 Students' assessment responses demonstrated an improved understanding of healthcare roles/responsibilities, and increased understanding of collaborative patient/family-centered approach to healthcare, increased collaboration with other professions, and improved communication skills and team dynamics.

Conclusions: Pharmacy students highly valued the opportunity to work with the medical interpreter students early in their education verses after they graduated. Many pharmacy students were unaware that a pharmacist or healthcare worker needed to refrain from using an English-speaking family member. Pharmacy and medical interpreter students both commented they enjoyed the activity and wanted to repeat the simulation again during the year. Following the activity, pharmacy students freely asked medical interpreter students for feedback on their simulation and desired input on how they could improve their performance. Both pharmacy and medical interpreter students commented that there was a greater respect gained after the activity toward the other profession following the activity.