

USING MEDICATION RECONCILIATION TO STREAMLINE OPTIMAL MEDICATION
SELECTION

UNIVERSITY OF HAWAI‘I AT MĀNOA SCHOOL OF NURSING AND DENTAL
HYGIENE

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Abstract

Problem Statement

The average bio-behavioral medication takes four to six weeks to take effect and if non-compatible with the patient, they are delayed another four to six weeks for the second medication trial to take effect, and another for each failed medication. This delay in effect is crucial for bio-behavioral medications to be optimally selected the first time around.

Purpose

The purpose of this Evidence Based Practice study is to assess if using the Medication Reconciliation (MR) form as a guide can increase the provider confidence level in optimally selecting the initial medication for a new bio- behavioral diagnosis.

Methods

Custom MR forms were completed for eligible patients. After 6 weeks of implementation, providers were asked to fill out a Likert Scale survey on their confidence levels of selecting the optimal drug of choice for a new diagnosis.

Results

The mean of the confidence level prior to implementation was a 3.5/5 scale, whereas post implementation was a 4.5/5 scale (Graph 1). There was a 20% increase in confidence level after utilizing the MR forms.

Discussion

The MR form was found to increase confidence level in selecting the optimal drug as well as help in other areas for this practice, such as categorize patient's eligibility for Transcranial magnetic stimulation (TMS) and confirm patient registration with Prescription Drug Monitoring Programs (PDMP). Some limitations to this project were the small sample size, n=2 and could only be done with patients who remembered their medications and history. The MR form can serve as a key for the connection between the patient and APRN and help with medication adherence and prevent medication errors in outpatient settings. Next steps for this project would be transcribing it into their EMR system and assessing which patients it would be most effective for.

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List of Abbreviations

APRN	Advanced Practice Registered Nurse
DNP	Doctor of Nursing Practice
EBP	Evidence Based Practice
IHI	Institute of Health Improvement
MR	Medication Reconciliation
PCP	Primary Care PLUS
PDSA	The Plan Do Study Act
PICOT	Population, Implementation, Comparison, Outcome, Time
SONDH	School of Nursing and Dental Hygiene
QI	Quality Improvement
US	The United States

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Using Medication Reconciliation to Streamline Optimal Medication Selection

Medication reconciliation (MR) is a vital component of safe patient care and improving the safe use of medications in healthcare settings and that has been a Joint Commission National Patient Safety Goal since 2009 (Shah, Ishmael, & Wright, 2015). In addition to safe patient care, MR can also help reduce polypharmacy, provide a standardized medication history, and reduce insurance costs (Shah, Ishmael, & Wright, 2015). The goal of this quality improvement (QI) Evidence Based Project (EBP) is to increase the healthcare providers confidence level in the initial choice of a bio-behavioral medication by completing a medication reconciliation form, to ultimately decrease the number of trials it takes to get to the most effective choice.

Prescription drug spending per capita is far higher in United States (U.S.) than in many other high-income countries, like Germany, Canada, Switzerland, Sweden, and Norway (Sarnak, Squires, Kuzmak, & Bishop, 2017). By 2015, U.S. spending on pharmaceuticals surpassed more than one thousand dollars per person and was 30 to 90 percent higher compared to the other high-income countries (Sarnak, Squires, Kuzmak, & Bishop, 2017). This is highly attributed to average cost of a prescription in the US being about three times the cost for the same drug in many other countries (Kesselheim, Avorn, & Sarpatwari, 2016). Locally this is a problem for Hawaii due to the existing high costs of living as well as the growing aging and mental health population in this state. In Hawaii, alone, \$1.673 billion was spent on just prescription costs in 2014 (NHE Fact sheet, 2020). On a national level, prescription drug spending increased at a rate of 5.7% to \$369.7 billion in 2019, much faster than 3.8% growth in 2018 (NHE Fact sheet, 2020).

Reducing the amount of medications a patient takes can reduce this cost, but so can reducing the amount of medication trials. With each attempt, there are various consequences of

failure, from the patient not receiving the treatment in a timely manner, the physician needing to follow up with the patient until they find a solution, insurance policies paying for multiple drugs, regardless of efficacy, and the time sacrificed of everyone who was involved. In addition, on average, bio-behavioral medications take about four- six weeks to show any effects and would delay each patient's care if the incorrect medication is selected first. Although MR forms are more commonly used in in-patient discharge settings, helping the patient understand any new medications they received and ones that were discontinued, can be useful in out-patient settings. In the out-patient setting, many patients do not know the names or doses of their current medications, a few patients may bring in their pill bottles, which is helpful, however they themselves have little to no knowledge of their medication history.

Selecting an optimal drug of choice for every patient can be tedious through multiple trials and even cause unwanted side effects. Current practices usually involve patients trialing multiple different types of medications even repeating medications due to a poor history taking or insufficient information documented in their charts. These trials, often involve multiple patient visits, multiple prescriptions being filled, unwanted side effects and ultimately unsatisfied patients and staff. Patients need to be made aware that their investment in their own health, starting with knowing the names and types of medications they take/ have taken, can benefit their treatment, such as allowing providers to be able to assess which medications will be the most effective for that individual patient. Kesselheim, Avorn & Sarpatwari (2016) also found the most realistic short-term strategies to address high prescription prices in the U.S. include ensuring timely generic drug availability; providing greater opportunities for meaningful price concessions by governmental insurance; and more effectively educating patients, prescribers,

payers, and policy makers about these choices these other methods could also help decrease the prescriptive costs in the US.

Background

This evidence-based project (EBP) was carried out at Primary Care Plus (PCP) in Aiea, Hawaii, with a wider primary care patient population, as well as an addiction medicine population. As there are a countless choice of drugs for some conditions, it can be crucial for certain classes of medications, such as bio-behavioral medications, to be selected as soon as possible. Bio-behavioral medications are known to take about four to six weeks for any effect to be noticed, and with each incorrect medication trial, the optimized treatment of the patient can be delayed (Harmer, Goodwin, & Cowen, 2009). Having a standardized medication reconciliation form on file can also serve as a source of history for other drug class failures for insurance required prior authorizations and can also help prevent a waste of time if a non-effective medication is repeated.

Problem and Purpose Statement

Many patients are unaware of the type of medication they have taken or are even currently taking. This lack of knowledge makes it difficult for when the provider needs to decide on which new medication to trial. In the setting of bio-behavioral medications, providers should not repeat failed medications, or if they had an adverse reaction because they already take long to take effect and often come with many side effects (Siskind and Kesely, 2019). The purpose of this project to implement MR forms into out-patient settings is copious; to increase the provider's confidence in selecting the initial drug of choice, keep the provider and patients on the same page, remove any discrepancies with each new medication prescribed, and to ultimately reduce prescription costs by reducing the need to trial multiple different types of drugs.

Another way of acquiring the most compatible bio-behavioral medication is through a biological test called GeneSight Psychotropic testing. GeneSight psychotropic tests analyze the patients DNA to assess which antidepressants and antipsychotics are the most safe and compatible for patients by grouping them into three bins: green (“use as directed”), yellow (“use with caution”), and red (“use with increased caution and more frequent monitoring”) (Macaluso, M., & Preskorn, 2018). The use of the MR record can be cross matched with the GeneSight psychotropic tests results, but the testing may not always be covered by insurance and the results take some time to return to the office.

PICOT

Will providers (P) have a greater level of confidence in selecting the optimal drug (O) for patients from PCP when using medication reconciliation forms (I) versus no previous use of forms (C), from December 2021-March 2022 (T)?

Project Goals and Objectives

The goal of this EBP is to increase confidence in the first drug of choice the provider selects for a patient, by reducing the number of drug trials to reach the optimal drug of choice. In turn, this would reduce patient visits, reduce prescription costs, and help the patient reach the point of effective treatment faster. For providers to reach this stage, the patient needs to provide a sufficient history of their medication history and regimen. Implementing a MR form in the out-patient setting of PCP, will provide a form for the providers to refer to, keeping them updated on what the patient is currently on and what medications were previously trialed and discontinued.

The following is an estimated timeline of the project goals:

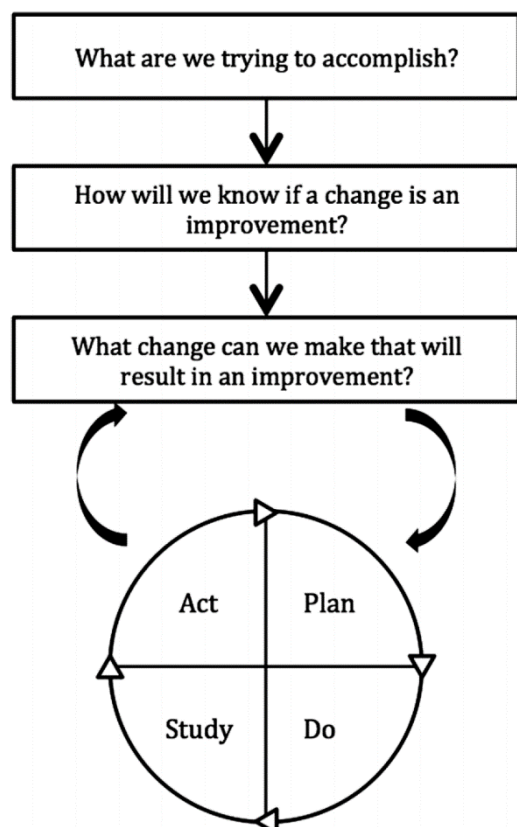
1. Research literature and select validated MR form for use at project sites, PCP, by September 2021.

2. Train at least 50% of the providers to use the MR forms by December 2021.
3. Providers will use MR forms with at least 50% of patients they see from January 2021-March 2022.
4. Survey response from providers in March 2022 for confidence level in selecting drug of choice for treatment will at least be a 3.5 out of 5 on a Likert scale.

Conceptual Framework

Medication reconciliation is an ongoing process, and an established record will continuously be updated over time. The Plan Do Study Act (PDSA) QI method was designed by the Institute of Health Improvement (IHI) to improve healthcare on a cycling basis (Taylor et al., 2013).

There are four parts to the PDSA method that follow a cycle pattern, Plan: Determine the goals and outcomes, gather information about who and what will be involved, Do: Clarify current



knowledge of the problem and carry out the implementation, Study: Analyze the data and outcomes of the implementation, and Act: Making changes to the current implementation to improve or adapt to changes and repeat (Taylor et al., 2013). The PDSA method allows for sustainability of an EBP as the framework consistently cycles to improve implementations set in place by reassessing data and making changes based off data (Taylor et al., 2013). The PDSA framework was used to guide this EBP study to ensure consistency and sustainability in this project.

Figure 1- The Plan Do Study Act (PDSA) Method, Framework for Improvement (Taylor et al., 2013)

Literature Search

A literature search was conducted through the databases of PubMed, CINAHL, and Google Scholar. The search terms included all aspects of the PICOT statement and related topics such as, “medication reconciliation”, “medication review”, “bio-behavioral medications”, “prescription costs”, and “medication history.” Subject headings (MH), “Medication Reconciliation Forms”, “Addiction Medicine”, and “GeneSight”, were utilized. Major headings (MM), “Medication Reconciliation Benefits” and “Bio-Behavioral Medications Delay Effect” were utilized as alternative search terms. Boolean operators were used to ensure the results were related to the keyword medication reconciliation for concepts such as patient safety and benefits for providers. A date limitation of 2009-2021 was placed to obtain the most up to date information. A total of 506 articles were resulted, and these were narrowed down to 48.

Mosby’s level of evidence was used to critically appraise the 48 resulting articles obtained (Ackley, Swan, Ladwig, & Tucker, 2008). 17 articles were deemed to have sufficient quality of evidence pertinent to this study which is included in the synthesis of the literature (Table 1). Articles were excluded based on irrelevance to the clinical setting, specificity to certain healthcare specialties, or health promoting schools’ approach.

Table 1- Mosby’s Level of Evidence and Number of Relevant Articles

Mosby’s Level of Evidence	Number of Articles (Total of 17)
Level 1: Meta-Analysis / Systematic Reviews	5
Level 2: Experimental Design (RCT)	0
Level 3: Evidence obtained from well-designed controlled trials without randomization	2
Level 4: Case controlled, cohort, longitudinal studies	2
Level 5: Correlation studies	0
Level 6: Descriptive or qualitative studies	6
Level 7: Authority opinion or expert committee reports	1

Other: Performance improvement, case reports, literature review, etc.	1
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Synthesis of Literature Evidence

Medication Reconciliation Benefits

Benefits for Patients

Healthcare is always evolving and some of the primary goals are patient safety, prevention, and reducing associated costs. Utilizing MR forms assists in all three of those aspects. MR forms are to be reviewed with the patient and provider and offers the opportunity to discuss any discrepancies or questions any party may have. The ultimate benefit for the patient is having a visual list of what medications they are on- knowing the what, when, how and why, regarding each medication. It can serve as a physical list that they can continuously use across their healthcare team for consistency and update with each visit.

McNab, Bowie, Ross, MacWalter, Ryan, & Morrison, 2018; Mixon et al., 2019; Schnipper et al., 2018; Shah, Ishmael, & Wright, 2015, found that having a healthcare professional regularly review a MR form helps reduce unintentional medication discrepancies in different healthcare settings. Whereas Presley et al., (2020) attempted to implement an EBP by using MR in smaller rural hospitals, such as a Veterans Affairs (VA) setting, and found that unintentional medication discrepancies were reduced.

Heard, Anderson, Dart, & Green (2016) conducted a prospective observational study using a structured MR form, the Medication History Assessment Tool (MedHAT), and found that keeping a structured MR record up to date helps with accuracy in history taking. The patients were more easily able to recall their medication regimen and history in detail (Heard, Anderson, Dart, & Green, 2016).

Bio-behavioral medications often are associated with many side effects thus patient input is imperative when selecting the drug, which is found to also help improve subsequent adherence (Harmer, Goodwin, & Cowen, 2009; Huhn, Nikolakopoulou, & Schneider-Thoma, 2019; Siskind, & Kisely, 2019.) Providers should, therefore, partner with patients to assist them in making informed choices, educate them on the importance of medication adherence and, balance evidence for the efficacy of treatments with potential adverse drug reactions. In addition to the unwanted side effects, patients want a medication that works for them, trialing through ineffective ones only delays their treatment and places them at risk for their condition becoming worse. MR forms can help streamline the provider in selecting the optimal medication initially. Filling out their MR form and taking on the responsibility of keeping it up to date is an unseen benefit for the patient.

Benefits for Providers and other Healthcare Staff

As providers, knowing the patient's medical history is crucial when adding on or switching out prescriptions, any history of adverse reactions should always be avoided, and any drug-drug interactions must also be noted. Many patients are often unable to recall their current medications, let alone medications they've taken in the past. With a standardized physical copy of their MR form, it becomes a tool they can carry with them to each visit and update with each new prescription. It becomes a physical list foundation that they can continuously use across their healthcare team for consistency and update with each visit. Birney, Charland, Cole, & Aslam Arain, (2016) implemented the use of MR forms, and healthcare staff expressed satisfaction in the use of a MR form because it improved resident quality of care and had improved outcomes. The healthcare staff voiced that they were looking forward to using it during future MR reviews.

Other benefits for healthcare staff were noted in literature. Seidling, Stützele, Hoppe-Tichy, Allenet, Bedouch, Bonnabry, et al., (2016) surveyed thirteen hospitals for the best medication safety strategies and favored medication reconciliation and electronic prescribing with clinical decision support as the two most promising interventions. Ryan, Caudle, Rhee, Shah, Ishmael, & Wright, 2015; Wilson, Murphy, & Newhouse, 2013 emphasized the benefit of the role of the nurse using MR, as they are generally the first professional group to interview patients and serve as patient advocates. This important relationship offers APRNs the first chance to triage, ask questions and intervene.

Strengths, Weaknesses and Literature Gaps

A weakness noted in the literature is the lack of level 2: Experimental Designs (RCT) and level 5: Correlational studies or studies in the out-patient setting. Gaps in the literature include no standardized MR form specific for bio-behavioral clinics. More evidence-based practice for MR use in outpatient bio-behavioral settings could be developed for future studies.

Methods

Project Design

The design for this QI pilot project was based on the Plan Do Study Act (PDSA) QI model. To this DNP student's knowledge, there have not been any EBP's utilizing MR forms in outpatient settings to help streamline optimal medication selection. Therefore, this project is aimed at creating a custom MR form that can be used at the site for QI and to increase provider confidence in the initial selection of medications for a new diagnosis.

Setting

The setting for this project is at Primary Care Plus (PCP), a Nurse Practitioner and Physician Assistant staffed clinic, that meets the specific needs of people with urgent or chronic health issues. There are currently four providers at this site. PCP also specializes in Addiction

Medicine, offering comprehensive health management of Substance Abuse Disorder. They offer treatment with Transcranial magnetic stimulation (TMS), Suboxone®, Vivitrol®, Chantix® for opioid, alcohol, and nicotine problem management. Combined with psychotherapy and other support programs, success in both abstinence and harm reduction models are substantial.

Participants

The participants were chosen with purposive sampling, and inclusion criteria included being a healthcare provider at the site of implementation, PCP, with prescriptive authority. The selection process for the participant involved utilizing the content expert, an APRN on site for recruitment. Once a participant displayed a verbal interest of the project, the participant was educated on the use of the MR form and at the completion of implementation, a formal Google form and hard copy survey was distributed, in the form of a Likert scale, measuring confidence level of medication selection for a new medication as a provider.

Intervention

The intervention for this QI project involves creating a MR form that consists of an organization chart to be utilized by healthcare providers that includes the patient's medication history, including ones that have been trialed, and failed, and reasons for failing. After a stakeholder meeting with my CE, and DNP chair, this chart was to also include reasons the medications were discontinued, as this can play an important role in treatment, an area for allergies, and a list of their current medications and other diagnoses (Appendix B). A MR chart used by the IHI from the Baptist Memorial Hospital in Memphis, Tennessee, included a column for allergies, the medication name, including dose, route, frequency, and last dose. (Appendix A). We will adapt this form to fit the patient population of the implementation site. Ryan, Caudle, Rhee, Hickman, Tsui, Barnes, et al., found that a blank MR form was difficult for

patients to fill out and instead, using a CUSTOM form that included the most common medications from their clinic (diabetes) improved accuracy (2013).

Research shows having the patient be involved in their care is positive for their prognosis and treatment (Siskind, & Kisely, 2019). Research also shows memory is more easily retained as one physically hand-writes it down (Balemans, M., Kooloos, J., Donders, A., & Van der Zee, C., 2016; Mynlieff, Manogaran, St. Maurice, & Eddinger, 2014). As the patient directly writes into their MR forms, the providers at the site can review it with them at the initial visit and even refer to it on consequent visits. Jarrett, T., Cochran, J., Baus, A., & Delmar, K., 2019 found patients self-reporting of their medications improved when using a MR form. 82% of the patients reported previously unrecorded OTCs, PRN medications (3% previously unreported), and herbal supplements/ vitamins (28% reported previously unrecorded vitamins) (Jarrett, T., Cochran, J., Baus, A., & Delmar, K., 2019).

Implementation Plan

A MR form will be adopted from the Baptist Memphis Hospital MR form (Appendix A), including custom details specific to this patient population. Once the MR form has been created and approved, the DNP student will hold a training session on how to complete the form and how to utilize it. The MR form will ideally be used for every patient who requires a new medication, or a medication change, including, but not limited to, existing patients with a new condition or new patients. The post-implementation surveys will be designed by the DNP student and delivered to the providers that were trained and utilized the MR forms.

Data Collection

The data was collected using an electronic Google form & hard copy version of seven questions measuring confidence level in the providers, as well as other benefits to the

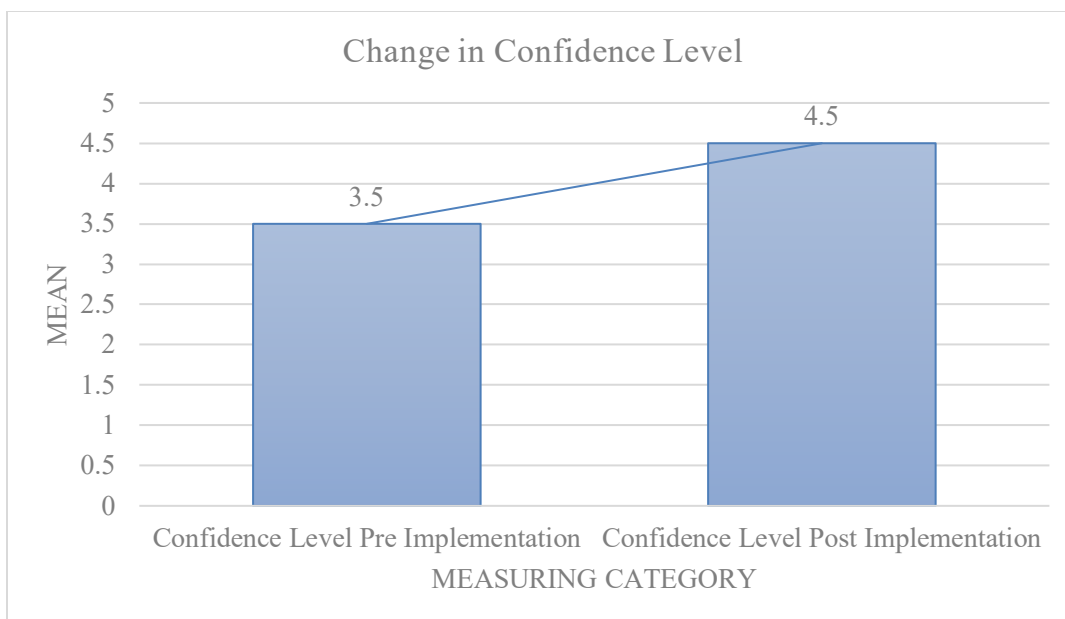
implementation (Appendix C). This survey tool was developed prior to the implementation of the project and was collected within seven days of completing the implementation. The results from the survey were inputted into a spreadsheet using Microsoft Excel. The data was stored on this DNP student's password and biometric protected computer.

Analysis

There were two surveys returned, both in hard copy form. Due to the low subject count, $n=2$, the results were compared using quantitative data analysis. The Likert scale was written with answers as a,b,c,d and e, and assigned numerical values for analysis, where $a=1$, $b=2$, $c=3$, $d=4$, and $e=5$. To reduce any external bias that could have contributed to any changes in score, following questions in the survey were asked if any changes in scores were correlated to the use of this implementation form.

Results

The two participants were from PCP that were APRNs with prescriptive authority. The mean of the confidence level prior to implementation was a 3.5/5 scale, and the mean of the confidence level post implementation was a 4.5/5 scale (Graph 1). The project goal was to have at least a 3.5/ 5 scale post implementation. There was a 20% increase in confidence level after utilizing the MR forms. The following questions in the survey also asked if the providers felt that their increase in confidence level was due to the use of the MR form and had a mean= 4.5/5 scale. In addition, all participants were willing to recommend the use of the MR form (mean= 5/5 scale) as well as had a high willingness to complete the MR forms (mean= 5/5 scale).



Graph 1: Change in Confidence Level of Selecting the Optimal Drug, n=2.

Discussion

The results showed a 20% increase in provider's level of confidence in selecting the optimal drug at first interaction after using the MR form implementation, demonstrating that the MR form had effectiveness. Modeling the Heard, Anderson, Dart, & Green (2016) study, that increased accuracy in medication history taking after using MR forms, can help motivate to the sustainability of the project, because with continued use, it will likely strengthen the cycle of more accurate MR history taking, thus giving the APRN a more robust history to refer to. This cycle models the PDSA QI framework. Harmer, Goodwin, & Cowen, 2009; Huhn, Nikolakopoulou, & Schneider-Thoma, 2019; and Siskind, & Kisely, 2019, discussed that including patient input, such as filling out the MR form alongside the provider, can help improve medication adherence. Just as Birney, Charland, Cole, & Aslam Arain, (2016) found that healthcare staff expressed satisfaction in the use of a MR form, the staff at PCP also expressed satisfaction and were willing to recommend the use of the MR form (mean= 5/5 scale) as well as had a high willingness to complete the MR forms (mean= 5/5 scale).

The strengths to this project were that there was an increase in confidence level in selecting the optimal drug choice and helped categorize, if patients were eligible for Transcranial magnetic stimulation (TMS), a service that the implementation site provides. TMS can only be covered by select health insurances in the state of Hawaii, if a patient fails at least four forms of pharmacological treatment of depression and other psychiatric/ neurologic disorders. The MR form also helped organize if a patient was registered with Prescription Drug Monitoring Programs (PDMP), an electronic database that tracks controlled substance prescriptions in a state for this site. A limitation to this project is that the sample size was small, $n=2$, and it would be difficult to generalize these results to larger practices or other outpatient settings. The project is also limited to patients who did remember their medications, and history.

The role of an APRN is to guide the patient, serve as an advocate, and provide continuing care. Utilizing a MR form will keep the patient and APRN connected, allow them to discuss and plan their treatment together, provide an opportunity to ask questions and continuously update their care as the MR form gets updated every few visits, which follows the PDSA healthcare conceptual framework. The future steps in this project is to incorporate it directly into the EMR system of PCP so that it is not an individual file, but a form that is directly able to be opened on their platform. We were in the process of connecting with Kalra Technologies, a Patient Journey Platform, that the site recently acquired, to make the MR form into an Electronic form the patients can fill out, at home, prior to their first visit. If successful in these steps, the sustainability in the project seems probable.

Conclusion

MR provides benefit in numerous amounts of ways, beyond the in-patient setting. This project was able to demonstrate a benefit in the utilization of the forms by showing a 20%

increase in provider confidence with selecting the optimal drug choice, and help develop a categorizing tool for TMS eligibility and clearly recognizing if the patient was registered with the State's PDMP. These findings demonstrate that the MR form is effective in an outpatient setting and offers an opportunity for providers and patients to meet on the same page. The MR form can serve as a key for the connection between the patient and APRN and help with medication adherence and prevent medication errors.

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Appendix C
Post Implementation Survey

Confidence Levels in Medication Reconciliation (MR) Implementation

1. What was your level of confidence in selecting the optimal initial drug of choice for every new prescription prior to **no use** of the MR forms?

- a. Not very confident
- b. Not confident
- c. Neutral
- d. Confident
- e. Very confident

2. Now that you've participated in and completed the MR Implementation, what is your **current level of confidence** in selecting the optimal initial drug of choice for every new prescription?

- a. Not very confident
- b. Not confident
- c. Neutral
- d. Confident
- e. Very confident

3. Did the level of confidence in selecting the optimal initial drug of choice for every new prescription increase, prior to no prior use of forms? (If it did not increase, skip to Question #4).

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly agree

4. If your confidence level DID increase, do you think it was because you utilized the MR forms?

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly agree

Medication Reconciliation Form Effectiveness and Sustainability

5. How useful and effective did you think the medication reconciliation form was to you, your patients and staff?

- a. Not useful at all
- b. Slightly useful
- c. Moderately useful
- d. Very useful
- e. Extremely useful

6. Now that you've participated and completed MR Implementation, do you recommend completing a MR form for each patient seen?

- a. Strongly do NOT recommend
- b. Do NOT recommend
- c. Neutral
- d. Recommend
- e. Strongly Recommend

7. Now that you've participated and completed the MR Implementation, are you willing to complete a MR form for each patient?

- a. Not willing at all
- b. Somewhat willing
- c. Undecided
- d. Somewhat willing
- e. Very Willing

General Feedback: Please state any suggestions/ critique to improve this project:

Appendix D

Table 2: Table of Survey Results Measuring Provider Confidence Level, n=2

	Confidence Level Pre Implementation	Confidence Level Post Implementation	Confidence level Increase Reason, due to Implenentation	Usefulness & Effectiveness of MR form	Recommendation for use of MR form	Willingless to Complete MR Form
Provider A	4	5	4	5	5	5
Provider B	3	4	5	4	5	5
MEAN	3.5	4.5	4.5	4.5	5	5