Interprofessional Approach to Medication Reconciliation in the Hospitalized Medicare Patient.

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Interprofessional Approach to Medication Reconciliation in the Hospitalized Medicare Patient.

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By

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Abstract

Background

Poor medication reconciliation processes in acute care hospitals, combined with poor communication across the healthcare team, and a failure to bring specialized pharmacy resources to the team can be attributed to adverse drug events that in turn result in hospital readmissions within 30 days of discharge (Sutherland, David-Kasdan, Beloff, Mueller, Whang, Bleday, & Urman, 2016)

Project Design

The aims of project included: 1. Utilize an interprofessional team that included, nursing, pharmacy, RN care management, and physicians to develop hospital policy and procedures for medication reconciliation, 2. Develop a risk stratification method to identify patients at highest risk for medication related complications post discharge, 3. Improve patient medication management at discharge, and 4. Improve patient and staff satisfaction and confidence surrounding medication reconciliation.

Results

The interprofessional team members and staff were more satisfied and engaged in their jobs after collaborating in this DNP project as evidenced by the Collaboration and Satisfaction About Care Decisions (CSACD) survey conducted pre improvement and post improvement (Baggs, 1994). An early warning system was created, based upon the 2012 Beers Criteria and developed into a screening tool for the nursing staff. This was implemented in the electronic medical record to automate a referral for the interprofessional team for patients at high risk for an adverse drug event. During implementation, 35 of the 163 admissions were categorized as high risk and were evaluated by the interprofessional team. Also, 20% of the patients during the two-
month implementation phase had medication errors identified and corrected by this team. Chronic prescriptions at discharge were reduced by 1.25 prescriptions per patient through the process, potentially lowering patient risk.

**Recommendations**

Due to the small sample size and short duration of the project implementation phase, it is recommended that further study and additional process improvement projects be implemented to validate the data.

**Conclusion**

This project demonstrated that nursing staff and interprofessional team members may be more satisfied and feel more engaged as a result of collaborating in a quality improvement project with other healthcare professions. An early warning system may be developed to identify patients at risk for adverse drug events, making it possible for organizations to assign the appropriate resources to these patients. An interprofessional team process to improve medication reconciliation could result in the identification and correction of medication errors, reduce the quantity of chronic prescriptions at discharge, and possibly enhance patient satisfaction regarding the medication management process.
Problem Description

Introduction

Adverse drug events are the highest cause of hospital readmissions and can be attributed to failures during the hospital stay. Such failures include poor medication reconciliation processes and lack of patient understanding of medications at discharge. The literature suggested that these failures may contribute to 35% of patient readmissions (Sutherland et al., 2016). Applying the aggregate of knowledge and skill found in an interprofessional team, including the patient in the team, improving the medication reconciliation process, improving patient understanding of their prescribed medications, and applying more pharmacist resources for the patients at highest risk may reduce the incidence of adverse drug events impacting patients (Van Dongen, Habets, & Beurskens, 2016).

Problem Background

The Institute for Healthcare Improvement (IHI) recommends medication reconciliation as the most effective method of preventing adverse drug events in the hospital (IHI, 2019). Medication reconciliation is defined as the process of comparing medications that a patient is or should be taking with newly prescribed medications in order to resolve potential problems (Thomas, 2013). Medication reconciliation has demonstrated effectiveness in preventing adverse drug events, of which 20% are attributed to poor communications at the transitions of care like hospital discharge (Thomas, 2013). The quantity of different medications prescribed to older patients is also a concern (Hudhra, Garcia-Caballos, Casado-Fernandez, Jucja, Shabani, & Bueno-Cavanillas, 2016). Hospital patients aged 65 and older, who have at least five to ten different prescriptions, are considered to have polypharmacy (Hudhra et al., 2016).
Polypharmacy is a patient safety risk, particularly at vulnerable patient transitions such as discharge from the hospital (Hudhra et al., 2016). Medication reconciliation can reduce the risk of polypharmacy in the Medicare aged patient (Hudhra et al., 2016). Hospitalized patients age 65 and older are suffering from readmissions to the hospital attributed to preventable adverse drug reactions due to poor communication at discharge (Rabi & Dahdal, 2007). Medicare aged hospital inpatients have many difficulties related to medications; failed medication reconciliation of lengthy medication lists, difficult to understand medications, vulnerable transitions of care, lack of discharge education, polypharmacy, prescribing of medications inappropriate for their age or condition, comorbidities that make comprehension more difficult, and simply age related deficiencies leading to high risk for adverse drug events and hospital readmissions (Hudhra et al., 2016).

Although readmissions may be reduced as a long-term project outcome, it is important to understand the relationship between interprofessional team interventions and improved hospital reimbursements from value-based purchasing performance (Hudra et. al., 2016). In 2013 the Centers for Medicare and Medicaid Services (CMS) imposed mandatory public reporting of avoidable thirty-day readmissions and financial penalties on hospitals that to receive Medicare and Medicaid payments (Rice, Barnes, Rastogi, Hillstrom, & Steinkeler, 2016). The all-cause readmission rate among Medicare aged patients, between 2007 and 2011 was 19% (Rice et al., 2016). Even after receiving a great deal of focus, the 2012 all cause readmission rate for hospital’s was 18.6% (Rice et al., 2016). The estimated annual cost of readmissions for Medicare patients in the United States is $26 billion dollars (Rice et al., 2016). An observational study of 534 randomly selected readmitted patients from 10,275 medical discharges from an academic hospital, found that adverse drug events accounted for 13% readmissions (Dalleur, Beeler,
Schnipper, & Donze’, 2017). An adverse drug event is a patient injury resulting from a medication rather than any underlying disease process (Kanaan, Donovan, Duchin, Field, Tjia, Cutrona, & Garber, 2013). A recent report funded by CMS identified that 26% of readmissions were caused by adverse drug events and were preventable (Pellegrin, Lee, Uyeno, Aysen, & Goo, 2017). The IHI as part of the 5 Million Lives Campaign, developed a guide to preventing adverse drug events utilizing medication reconciliation at all transitions of care (IHI, 2019). Medication reconciliation processes conducted by an interprofessional team may further improve the process through enhanced collaboration among professionals and increased satisfaction and engagement (Van Dongen, Habets, Beurskens, & Van Bokhoven, 2016). Although it is important to utilize an interprofessional team to address medication reconciliation, pharmacists are an essential team member due to their unique knowledge of medications and medication interactions (Thomas, 2013). Pharmacist involvement in the medication reconciliation process has been found to reduce the frequency of adverse drug reactions (Thomas, 2013). The individuals responsible for medication reconciliation should have extensive knowledge of medications and an understanding of how medications impact the continuum of care (Keeys, Kalejaiye, Skinner, Eimen, Neufer, Sidbury, & Vincent, 2014). Medication reconciliation is effective in preventing adverse medication events and is considered an important component of patient safety programs (Thomas, 2013). Because of their extensive knowledge, pharmacists assume a key role in medication reconciliation processes, such as policy and procedure development, improving and continuously monitoring the medication reconciliation processes, therapeutic and operational knowledge of information systems that support medication reconciliation, and community advocacy especially regarding medication safety and education about medications (Thomas, 2013). When healthcare organizations are ineffective in medication
reconciliation across the continuum of care, medication errors and adverse drug events occur and result in thousands of preventable patient deaths per year and an estimated societal cost of over $177 billion in the year 2000, many years ago now (Thomas, 2013).

**Local Problem**

This project was implemented in a 90-bed community hospital located in a rural community in the west north central region of the United States. Although Medicare aged people comprise only 10% of the population, adverse drug events in this age group is both a costly national and local problem (United States Census Bureau, 2018). The community was very rural with a population of only 9.6 people per square mile (United States Census Bureau, 2018). The medication reconciliation process was conducted solely by nursing staff and then verified by the hospitalist physician within the organization. There was no interprofessional collaboration in the medication reconciliation process. Pharmacy was not involved in the medication reconciliation process and did not have any oversight. The hospital lacked a specific medication reconciliation policy or procedure and did not have a monitoring process to determine medication reconciliation completion rates, accuracy, or timeliness. Medication reconciliation was not part of annual training requirements and no specific competency process existed for nursing staff responsible. Physicians, having the ultimate responsibility for medication reconciliation according to accrediting bodies, were anecdotally complaining about the process and lack of support (IHI, 2019). The organizations biennial employee engagement survey conducted by third party vendor Press Ganey, demonstrated cooperation between departments and interdepartmental communication to be the two lowest scoring areas of employee satisfaction, meaning the lowest satisfaction with these two areas (Campbell County Health, n.d.). The hospital was “professionally siloed”.

The hospital conducted Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient experience surveys. The data is submitted to CMS in order for hospitals to be deemed eligible to receive Medicare or Medicaid payments (CMS, 2017). There are nine standard “domains” to assess how patients perceived their patient experience. One of these domains is specifically about understanding of medications and if hospital staff “explained new medications”. The hospital typically experienced low performance in this domain, which may indicate there is a problem with medication understanding from the patient’s perspective. The percentile ranking for this hospital against 2,400 hospitals nationally was the 44th percentile, meaning that patients in the majority of other hospitals had a better experience with medication understanding than patients in this organization.

Discharge phone calls were conducted by a care manager to inquire about patient well-being after discharge, if the patient was successfully able to schedule and attend their follow up appointments, and if they were having difficulty following their discharge plan. The care managers anecdotally stated that they often found patients were unable to fill their prescriptions, were not taking medications appropriately, did not understand their discharge instructions, and so forth.

Available Knowledge

Literature Review

Purpose of the evidence review

Evidence review was completed in order to identify evidence-based practices most applicable to the process improvement desired. Lack of nursing leadership, a lack of nurse manager direction, or a lack of vision and strategy, are organizational characteristics that pose a significant barrier to the use of evidence-based practice to improve clinical practice by nurses.
(White & Dudley-Brown, 2011). Hospital readmissions are a $26 billion dollar per year problem, but one that can potentially be impacted by nurses at the point of care using evidence-based practice to improve clinical practice (Rice et al., 2016). See Addendum A for the Literature Review Summary Table.

**Significance to Nursing**

An estimated 41 – 56% of patients discharged from the hospital have a medication discrepancy highlighting the need for an interprofessional improvement process to address the problem (Bishop, Cohen, Billings, & Thomas, 2015). Many hospitals do not have an interdisciplinary system or interprofessional collaboration for medication reconciliation, but rather have disjointed efforts fraught with errors (Bishop et al., 2015). Traditionally nurses have provided discharge education (Bishop et al., 2015). Medication reconciliation may be performed by a nurse from a different department or the patient’s physician, and then the medications are dispensed by pharmacists (Bishop et al., 2015). The entire process lacks continuity of care for the patient (Bishop et. al., 2015). Doctoral prepared nurse leaders utilize a systems approach to solve problems and may redefine the traditional fragmented assignments and roles in healthcare (Zaccagnini & White, 2017). A key message of the Robert Woods Johnson Foundation and Institute of Medicine report (IOM, 2010), is “Nurses should be full partners with physicians and other healthcare professionals in redesigning health care in the United States” (Zaccagnini & White, 2017, p. 41).

**Methods**

**Search Strategy**

A search strategy to find potential solutions to the problem of poor medication reconciliation and the potential adverse drug events in Medicare aged patients was begun. The
databases EBSCOhost, CINAHL with full text, Medline Plus and PsychArticle were searched using the following search terms: patient understanding discharge medication, medication management, medication reconciliation, discharge adverse events, pharmacist medication reconciliation, interprofessional collaboration, interdisciplinary healthcare, and adverse drug events.

Inclusion criteria utilized for this review included both quantitative and qualitative studies, peer reviewed, and published articles focused on Medicare aged patients, hospital inpatients, interprofessional communication, interprofessional collaboration, and pharmacy leadership topics (Sandstrom, Borglin, Nilsson, & Willman, 2011). Exclusion criteria included studies that were opinion papers, articles older than 10 years, irrelevant to inpatient hospital patient care, or foreign noncomparable hospital system structures (Sandstrom et al., 2011). The searchable question for the synthesis of the evidence was best suited by a PICO-T alternative, PIOT for knowledge or quality improvement projects (Reavy, 2016, p. 64). The searchable question for the problem was: How are Medicare aged hospital inpatients and staff members (P) impacted by interprofessional collaboration (O) and teamwork to address medication reconciliation processes (I)?

*Critical Appraisal Process*

The evidence appraised was focused on medication reconciliation by a pharmacist, adverse drug events, interdisciplinary pharmacy led medication reconciliation processes, interprofessional healthcare teams, and possible screening criterion to risk stratify patients who were most likely to suffer adverse drug events and be readmitted to the hospital.

*Synthesis of the Evidence*
Pharmacist led medication reconciliation processes demonstrated a statistically significant reduction in medication errors according to a study of 110 adult hospital inpatients (Khalil et al., 2016). Another study of 644 patient medical records indicated that patients receiving six to twelve medications at the time of discharge are deemed high risk for “potentially inappropriate prescriptions” and could experience an adverse drug event (Hudhra et al., 2016, p. 189). Ziaian et. al.’s 2012 prospective cohort study involving 377 patients aged sixty-five plus demonstrated that an unfortunate 65% of patients had poor understanding of their discharge medications and 24.2% of patients had a provider caused error during medication reconciliation (2012). Another study evaluated the 2012 Beers Criteria for Potentially Inappropriate Medication Usage in Older Adults as a potential risk stratification tool to predict patients at high risk for hospital readmission and adverse drug events (Kanaan et al., 2013). The Beers Criteria is used to identify medications prescribed to elderly patients in which the risk outweighs the benefits and are often implicated in adverse drug events (Kanaan et al., 2013).

Several important considerations from the literature included: medication reconciliation processes led or performed by pharmacy services are effective in reducing post hospital discharge adverse drug events by 35% (Kanaan et al., 2013). Patients who received twelve or more prescriptions and patients aged 65 and older with six or more prescriptions were at high risk for adverse drug events (Hudra et. al., 2016). Complete and accurate medication reconciliation processes were effective in the prevention of medication errors and adverse drug events (Hudhra et al., 2016). Finally, interprofessional collaboration through a team approach to a problem improved the satisfaction of nurses, pharmacists, and physicians which improved patient outcomes (Hawkes, Nunney, & Lindqvist, 2013).
The American Society of Health System Pharmacists (ASHP), stated that pharmacists are the most suitable healthcare professional to lead medication reconciliation interdisciplinary teams in the hospital setting (Thomas, 2013). An interdisciplinary team is limited to the knowledge of a particular discipline, but interprofessional collaboration describes the interaction between individual professions, nursing and pharmacy, who additionally add their education, knowledge, roles, and identities to the team (Zaccagnini & White, 2017). Interprofessional collaboration fosters positive attitudes, eliminates professional silos, and decreases feelings of negativity and tensions between nurses, pharmacists, and physicians and improves communication about medications (Hawkes et al., 2013). Nurses and DNP’s in particular are prepared to lead and establish interprofessional teams to improve patient care because of their scientific knowledge, understanding of organizational improvement, healthcare policy, leadership, and desire to improve health outcomes (Zaccagnini & White, 2017). An interprofessional team that includes nursing and pharmacy may be most effective since there is significant support for both professions to lead such teams.

**Rationale**

**Theoretical Model**

A theoretical framework that can be utilized to address the Medicare aged patient and adverse drug events is the Transitions Theory (McCarthy & Fitzpatrick, 2014). Transitions theory is a middle range theory that was developed over three decades beginning in the 1960’s (McCarthy & Fitzpatrick, 2014). Refer to Appendix B. Transition means the passing from one condition or status to another and can either lead to greater stability having successfully made the transition or can disrupt connections between life phases as a negative consequence (McCarthy & Fitzpatrick, 2014). Transitions Theory can be applied to the needs of patients at the time of
discharge from the hospital. Preparation and knowledge are personal factors that affect the nature of the transition and can be addressed by nurses as they ready patients for discharge (McCarthy & Fitzpatrick, 2014). Interprofessional collaborations could provide positive patient interactions, develop patient confidence, help patients have an improved ability to understand their medications, and be successful in the transition to discharge (Zaccagnini & White, 2017).

Social identity theory is a model that applies to the interprofessional staff members satisfaction and engagement with the level of collaboration in the medication reconciliation improvement process (Owen et al., 2014). Social identity theory recognizes that the identities of people and professional staff members is developed through membership in social or professional groups whose members have shared knowledge, values, and purpose (Owen et al., 2014). It is important that the social group be considered relevant, important to the organization, or an “in group”, otherwise social identity can be a threat to interprofessional collaboration (Owen et al., 2014). Refer to Appendix C. Members of the interprofessional team may have a higher degree of satisfaction and engagement with their work when collaborating in a meaningful improvement project that has perceived value to the organization (Owen et al., 2014).

Project Framework

The Logic Model was utilized to identify short term, intermediate term, and long-term outcomes for the DNP project (W.K. Kellogg Foundation, 2004). The Logic Model requires SMART goals (specific, measurable, attainable, realistic, and time related) to develop these outcomes and guides the direction of the DNP project manager (W.K. Kellogg Foundation, 2004). Please refer to Appendix D.

Specific Aims
The aim of project included: 1. Utilize an interprofessional team that includes, nursing, pharmacy, care managers, and physicians to develop hospital policy and procedures for medication reconciliation, 2. Develop a risk stratification method to identify patients at highest risk for medication related complications post discharge, 3. Improve patient medication management at discharge, 4. Improve patient and staff satisfaction and confidence surrounding medication reconciliation.

Context

Population and Local Care Environment

There were two populations involved in the DNP project, Medicare aged hospital inpatients and affected staff members at the hospital. Included patients were admitted to the eleven bed Intensive Care Unit and the sixteen bed Medical Surgical Department during the project implementation. The patients were 65 years of age or older and expected to be discharged from the hospital. The second population for the DNP project was the interprofessional team members, nurses, pharmacists, physicians, and care managers, who collaborated to improve the medication reconciliation and discharge education processes.

Relevant Elements of Project Setting

The project setting was an acute care community hospital, the population was Medicare aged hospital inpatients of the Intensive Care Unit and the Medical Surgical Department. Because the hospital was small, both departments were utilized to measure data in order to have a sufficient sample size for the DNP Project. The medication reconciliation process relied on RN’s to complete medication reconciliation. The hospital lacked collaboration between professionals and a medication reconciliation process that involved an interprofessional team. Anecdotally, the physicians complained that the quality of medication reconciliation was subpar
and the nurses anecdotally complained that they lacked the necessary time and resources to complete the process accurately.

**Organizational Culture and Readiness for Change**

Organizational culture and readiness for change can be demonstrated through the stable employee group with shared learning experiences by their shared beliefs, assumptions, values, expectations, and behavioral norms (Hall & Roussel, 2017). For an organizational culture to change, there must be both shared governance and individual accountability (Hall & Roussel, 2017). There was premise for change at the staff and physician level with anecdotal complaints along with poor performance in key quality indicators demonstrated momentum for change, an opportunity to collaborate, and organization support existed to support the change.

**Strengths and Weaknesses**

A SWOT Analysis was conducted and identified the following strengths and weaknesses. Strengths of the organization included being a sole community provider with limited financial competition. The resources identified for the project all reported to the Chief Nursing Officer for continuity. The senior leadership team was supportive of improving patient care and quality. The hospital was financially able to support initiatives. Due to its geographical isolation, the hospital offered many services atypical to its size. There was a great deal of support to improve employee engagement including: anecdotal physician support, employee engagement surveys, and existing performance improvement teams.

The weaknesses identified through the SWOT analysis included: extremely rural geographically, extreme winter weather conditions, difficult supply chain management, and isolated patients to the region. The identified socio-economic determinants of health were abundant and include poverty and homelessness. There was a largely blue-collar population and
lower levels of education as compared nationally with 19.2% holding a bachelor’s degree versus 29.3% nationally (US Census Bureau, 2018). Finally, the project was potentially resource intensive requiring expensive salary costs for the meetings required to improve the processes

**Interventions**

**Logic model narrative**

The program logic model was completed during the project planning phase and links both the projects long and short-term outcomes with program processes and the program assumptions (W.K. Kellogg Foundation, 2004). The DNP project, an interprofessional approach to medication reconciliation and education, had the following short-term outcomes:

- **Outcome 1:** The healthcare team stakeholders in the medication reconciliation process had a 50% improvement in level of confidence by August 2020.
- **Outcome 2:** 75% of identified patients received the medication reconciliation interventions by the interprofessional team by August 2020.
- **Outcome 3:** Patients reported a 25% increase in satisfaction with the process regarding new medications during discharge phone calls by August 2020.
- **Outcome 4:** The interprofessional team developed the tool and implemented risk stratification using the tool, based upon the 2012 Beers Criteria, and applied the tool to 75% of the patients by August 2020.
- **Outcome 5:** The interprofessional team identified and reduced overall medication related errors by 20% by August 2020.
- **Outcome 6:** Reduced the total quantity of prescriptions by at least two for patients receiving eight or more prescriptions by August 2020.
• Outcome 7: Established and implemented an organizational quality monitoring and oversight strategy by September 2020.
• Outcome 8: All staff and stakeholders completed the training and education by June 2020.

Interventions

The interprofessional team formed and included the DNP project manager, a pharmacist, staff nurses and two physicians. The team formed as soon as the DNP project received formal approval. The initial meeting of the interprofessional team included completion of the required education about the project and completion of the pre implementation level of satisfaction and engagement survey (Baggs, 1994). Since the sample size was potentially small, the DNP project manager planned to deliver the satisfaction and engagement survey to stakeholders during the meeting by paper or by mobile device technology and ask them to complete it before leaving to offer the opportunity to participate. Physicians were hand delivered a paper satisfaction and engagement survey and asked to complete the survey and return to the DNP project manager. Please see Appendix F for the intervention’s algorithm

The interprofessional team within the first two to four weeks after the initial meeting planned to develop the risk stratification tool, update and create policies and procedures, create a process to select the patients, and plan communication strategies. Then staff nurses and all stakeholders were educated during their regular department staff meetings about the process. Attendance was tracked for compliance. Education was specific to each stakeholder group and the potential positive impact of the improvement process. Education was planned to be delivered in person at the regular staff meeting, and in writing by email in order to reach stakeholders. Education for physicians about the process was completed at the regular medical staff meeting.
The interprofessional team established a “go live date”, most likely June 2020 depending on project approval. Please see the project tools in Appendix K through Appendix O. After the implementation, the interprofessional team and all stakeholders expected to complete the post implementation survey of satisfaction and engagement at a final interprofessional team meeting and at staff meetings as before. The completion of this phase was followed by reporting of results.

**Correlation of interventions with the Theoretical Model**

As discussed, transition means the passing from one condition or status to another and can mean either greater stability for the Medicare patient having successfully made the transition or can mean a disruption between life phases as a negative consequence (McCarthy & Fitzpatrick, 2014). Successful discharge from the hospital and subsequently remaining well at home is an exit transition from the healthcare system as well as a transition from illness to health (McCarthy & Fitzpatrick, 2014). Nurses also experience the transitions theory in using nursing therapeutics to prepare the Medicare patients for discharge, and can also have feelings of failed transition if their interventions are not successful. Social identity theory applies to the interprofessional staff members level of engagement and satisfaction with collaboration in the medication reconciliation improvement process (Owen et al., 2014). Outcome 1 regarding stakeholder confidence level in the medication reconciliation process, is correlated to social identity theory (Owen et al., 2014). Outcome 2: patients received the interprofessional team interventions and Outcome 3: patients have increased satisfaction with the process, are related to the core concept of “feeling connected”. Connection with the interprofessional team improved patient comfort and confidence and nursing therapeutics brings new knowledge to the patient (McCarthy & Fitzpatrick, 2014). Outcome 4, 5, and 6 are all related to the theoretical framework...
core concept of “location and being situated” and apply to the patient feeling safe in the healthcare process (McCarthy & Fitzpatrick, 2014). Outcome 7: creating processes and continuous quality monitoring, relates to the nursing therapeutics core concept of creating a healthy environment and continuous assessment (McCarthy & Fitzpatrick, 2014). Outcome 8: stakeholder and staff training and education, needs to be conducted with the social identity theory in mind. If the social / professional group does not believe that the project is meaningful work and important for the organization, there is a threat to interprofessional collaboration versus individual identity of the professional team members (Owen et al., 2014).

**Timeline**

Refer to Appendix F for the DNP project timeline which includes the timeline and all of the important milestones for the DNP project.

**Measures**

The measure for project Outcome 1, the confidence and satisfaction of all of the clinical stakeholders in the medication reconciliation process, was the Collaboration and Satisfaction About Care Decisions Tool (CSACD) developed by Dr. Judith G. Baggs (Baggs, 1994). The CSACD is a nine item Likert survey on a seven-point scale. The CSACD tool was specifically developed by J. Baggs (1994) to measure the collaboration and satisfaction between physicians and nurses. The CSACD tool, located in Appendix H, has been published multiple times over many years to assess the quality of the interactions and satisfaction of the interactions between health professionals when making care decisions (National Center for Interprofessional Practice and Education, 2013). Permission to use this instrument to measure the project outcomes was granted by Dr. J. Baggs on Feb. 9, 2020. Please see Appendix H.
Outcome 2, was measured using the developed medication reconciliation checklist. The checklist data collection included a yes or no answer for each outcome. The results were measured by both concurrent and retrospective review of each patient electronic medical record and results recorded and calculated in a simple Excel spreadsheet. Outcome 3, was included in the medication reconciliation checklist and was measured using semi structured interview comment trending. Outcome 4 measured if the risk stratification tool was used or not used with a checklist. Outcome 5 data was collected using the medication reconciliation checklist to track errors identified by the interprofessional team. Outcome 6 measured the quantity of medications on admission compared to the quantity at discharge. Outcome 7 measures were quality oversight tools such as dashboards, checklists, and meeting minutes. The measure for Outcome 8, staff education and training completed was an attendance and completion log.

Analysis

The Likert survey tool and multiple checklists were utilized to collect and trend data for each outcome, analyzing if the goal was met or not met. The checklists captured nominal, descriptive data used to describe the project interventions, in this case, the percentage of the time the interprofessional team applied an outcome measure to the target population or successfully executed a project intervention as designed (Reavy, 2016). Percentages are relative frequency data that demonstrate the number per 100 in which the project outcome occurred. Please refer to Appendix J Outcomes Evaluation Table.

The survey instrument is a seven-point Likert survey with nine questions, with 1 being “strongly disagree” and 7 being “strongly agree” (Baggs, 1994). The CSACD Tool was delivered pre- and post-project implementation and measured the level of confidence of each of the stakeholder groups in the medication reconciliation process. Data collected from the discharge
phone calls was categorized by the following patient responses: did or did not understand medications, instructions were helpful or not, instructions were given by whom, did or did not have problems at home with medications. This data was compiled into a report demonstrating patterns or similarities for each question. A retrospective chart review was conducted to identify and track reductions in total prescriptions in patients who were initially prescribed eight medications or more. Results were deidentified for patient confidentiality and trended by percentage and quantity of patients who had a reduction in prescription quantity.

**Ethical considerations**

All of the patients within the target population, received the benefits of the medication reconciliation improvement project. The patients were already hospital inpatients and could have received the current medication reconciliation practices, but would receive the enhanced process deployed by the interprofessional team. The DNP project manager minimized the risk of any harm to the patients through the protection of all patient data and avoiding any deception about the nature of the DNP project, as it was unnecessary in evaluating a performance improvement initiative (CITI, n.d.). Ethical considerations about coercion of the staff members surveyed to determine their level of satisfaction and engagement were addressed. In order to avoid coercion of staff members who responded to the survey, staff members could not report directly to the DNP project manager. Communication and the collection of the surveys was performed by the hospital’s nurse manager. Participation in the survey process was voluntary and participants were notified about how to file concerns in advance.

**Conflicts of interest and biases**

Conflicts of interest may arise from any situation in which either financial or nonfinancial factors, or the appearance of such, could compromise the DNP project managers objectivity in
completing all of the requirements for the project (CITI, n.d.). This project was based on a quality improvement project to improve existing clinical practices. The hospital was not an academic medical center and the members of the interprofessional team did not receive any financial incentive. The hospital’s mission obligated the organization to serve patients, reduce the cost of care, and improve the lives of those in the community. The project data was only utilized for the benefit of improved patient care, the “free” sharing of knowledge, reporting to the appropriate hospital quality improvement committees, and for the successful completion of the DNP program by the DNP project manager.

**Threats to quality**

The first threat to quality was the small size of the hospital and small sample size available for the project. The interprofessional team collected data from every patient included in the population to address this threat. Each available stakeholder was offered the opportunity to take the survey as well. Another threat to the quality of this project was the cost of the resources involved and the need to have these professional resources allocated for the project. To offset the labor costs, the organization received possible savings from long-term project outcomes such as fewer readmissions, decreased number of adverse drug events, and improved patient experience. All of these improvements can positively impact hospital financials through value-based purchasing bonuses (Medicare.gov, n.d.).

**IRB application and project determination**

On May 29, 2020 notification of approval of the Institutional Review Board (IRB) expedited application was received from Boise State University Institutional Review Board, approved under IRB protocol #186-SB20-088. Please see Appendix T. The DNP project implementation began very shortly after receiving approval and it became apparent that
modifications were needed to the approved protocol to accommodate social distancing requirements, video delivery of staff meetings at the hospital, and cost reductions for salary and wages in place due with the ongoing COVID-19 pandemic. On June 10, 2020 the Modification Form was submitted and received by the Boise State University Social & Behavioral Institutional Review Board (SB-IRB). On June 15, 2020 approval was received for Modification #1 to the IRB protocol #186-SB20-088. Please see Appendix U.

Results

Steps of the interventions

Once the original IRB approval was received the DNP project manager met with the Director of Pharmacy and the Director of Medical Surgical and Intensive Care. The purpose of this meeting was to discuss the project implementation timeframe, education requirements, expectations and duties, and to deliver the staff education to the involved department leaders for informational purposes. The DNP project manager submitted an IRB Modification Form due to COVID-19 necessitated changes. COVID-19 precautions included a need for social distancing, and staff meetings and team meetings were still largely being conducted through remote conference media such as “Webex”. Additionally, the organization was struggling financially due to the pandemic and the DNP project manager needed to be very judicious when assigning resources to the project. The web-based education system was able to deploy the education and survey to all identified staff, collect the results, and direct them to the DNP project manager. This ensured social distancing requirements, reduced labor costs to deliver and collect the surveys, and increased confidentiality for participants. While awaiting the approval decision for the modification, the DNP project manager met with the organization’s RN Clinical Analyst in the Information Technology Department. The IT RN was able to build several important project
interventions into the organizations electronic medical record. Please refer to Appendix V and W for “screen shots” of the electronic medical record, early warning system, and pharmacy consult order. Although it was a long-term goal, with the support of the leadership and the assistance of the IT RN, an early warning system for high-risk adults was built into the Electronic Medical Record (EMR) in the nursing admission assessment. When the primary care nurse completed the admission assessment and the patient met three criteria: age 65 and older, quantity of prescriptions of 8 or more, and taking one or more of the three specific medication classes selected from the 2012 Beers Criteria by the team pharmacist, then a referral order was sent to the interprofessional team pharmacist. The interprofessional team pharmacist reviewed the patient’s chart and activated the interprofessional team if a concern was noted. The IT RN also built the discharge follow up questions for the improvement project into the electronic medical record and they were designed to activate for patients within the project population. These automations to the project interventions were developed with the support of the department leaders, but not launched pending the IRB decision for the modification request. Please see Appendix X for the discharge phone call questions created in the electronic medical record.

After IRB approval of the modification, the interprofessional team formed and the first meeting was held. The interprofessional team members approved the risk stratification tool with three inclusion elements that were incorporated into the EMR as an early warning system (EWS), as well as date to launch the early warning system in the electronic medical record. The interprofessional team agreed upon process flow, additional staff education, policies, and team meeting times. The DNP project manager met with one of the team physicians and discussed the team meeting times and the process flow. The IT RN was invited to join the team to support
electronic monitoring and build reporting options in the electronic medical record to automate the data collection.

Details of the process measures and outcomes

As discussed previously, the COVID-19 pandemic created some need for adaptation of the survey, education delivery, and outcomes data collection strategies. Staff confidence and engagement in the process improvement was measured utilizing a survey process that was originally designed to be delivered in person and on paper. Due to COVID-19 pandemic safety and financial concerns, this survey was delivered utilizing a web-based education delivery system (Outcome 1). In reality, this delivery mechanism was more cost effective, convenient, and more confidential for the participants than the originally planned method. Results from the survey were delivered directly to the DNP project manager electronically and with all participant identification removed. The survey, based upon the CSACD, was delivered before and after the implementation to measure the levels of staff satisfaction and engagement (Baggs 1994).

Outcome 2 was developed to ensure that patients received the improved process with the team and was measured using a report from the EMR rather than manual tracking originally planned. Utilizing the automated report once created, was much more efficient and cost effective than any manual process. There were 35 patient admissions that were flagged as high risk utilizing the EWS criteria: age, quantity of prescriptions, and prescribed one of three specific drug classes. All (100%) of the high-risk patients received the improved process using the interprofessional team. Retrospective audits were conducted to ensure that 100% of the high-risk patients received the improved medication reconciliation process. Retrospective audits were necessary because it was identified that the nursing staff were able to cancel the automated referral order in the EMR and did so several times early in the implementation. The nursing staff
relayed to the team that they cancelled the order if they believed they did not need assistance and / or the initial medication list was incomplete and needed further attention before sending the referral. The nursing staff were re-educated and instructed to complete all of the fields in the EMR and to send the referral. It was noted that the nursing staff cancelled the referral for 7 of the 35 (20%) of patients that met criteria. This resulted in a team discussion of the unexpected problem and re-education of the nursing staff on multiple dates. The IT RN Analyst also conducted enhanced monitoring using the EMR to ensure that all patients identified as high risk received the intervention. The team pharmacist monitored admissions to the hospital to ensure that all appropriate patients were included in the team process, the referral was received, and the nursing staff did not cancel the generated order in the EMR. This double check process resulted in additional costs for the implementation. Patients that were identified as high risk for adverse drug events constituted 21% of the total admissions to the Medical Surgical and Intensive Care Unit during the implementation dates. There were 163 patients admitted to Medical Surgical and Intensive Care Unit. Of these, 35 patient admissions were high risk according to the EWS. There were seven patients that were readmitted to the hospital within 30 days as well.

Outcome 3 involved measuring trends in patient comments collected during routine patient discharge phone calls. This outcome was measured using “a nursing task” function included in the EMR. After discharge, patients who met criteria for the DNP project were asked three additional questions around medication understanding: 1. Did you understand the medications that you were prescribed? 2. Did someone explain your medications while in the hospital? 3. Were you able to take the medications as prescribed when you went home? This process was automated in the EMR, and once the patient was discharged, the RN Care Manager asked the additional questions via telephone call. The responses were collated into a report sent
electronically to the DNP project manager. Appendix X can be reviewed for the discharge phone call questions included in the electronic medical record. See Appendix AA for discharge phone call trends and results. There were 55 patients aged 65 and older that responded to the discharge questions. Patients stated that they were able to take the medications as prescribed 93% of the time. When asked if medications were explained, 91% of the patients answered yes someone explained their medications, 7% answered no, and 1 patient (1.8%) did not answer that question. Most patients (87%) answered that they understood their prescriptions. There were 22 individual comments received that did not correlate with these results. Many patients (41%) stated they did not understand or had further questions and several (18%) said that they were relying on a family member to assist with their medications. Please see Appendix BB for the categories of comments received during discharge phone calls for the patients in the project population. This disparity between the individual comments (59%) indicating further questions and the high percentage of affirmative answers to the specific questions about understanding may indicate that patients stated to the RN that they understood their medications when they actually may not. Literature found indicated that 54% of patients had insufficient knowledge of their medications one week after hospital discharge (Ziaeian et al., 2012).

Outcome 4 included the development of the risk stratification tool. The interprofessional team selected three criteria from the 2012 Beers Criteria: age 65 and older, 8 or more prescriptions upon admission, and three drug classes selected from the 2012 Beers Criteria lengthy list deemed to be the most problematic for the organization. The Beers Criteria was developed by Dr. Mark Beers in 1991 to identify and decrease use of potentially harmful medications in nursing home patients (Berryman, et. al., 2012). The interprofessional team narrowed the lengthy list of drug classes from the 2012 Beers Criteria for the purposes of
creating an EWS that was user friendly and likely to be completed at the point of care. The three drug classes selected by the team for the EWS are: anticholinergics such as diphenhydramine, benzodiazepines such as lorazepam, and NSAIDS such as aspirin. If a patient met the three criteria in the EWS, a notification was sent electronically to the team pharmacist, who began the medication reconciliation improved process and activated the interprofessional team as needed. The improved medication reconciliation process involved the most appropriate resources for the highest risk patients. The EWS was built into the electronic medical record, Meditech at this organization. The EWS is located in the admission assessment completed by the RN in the Medical Surgical or Intensive Care Departments. Patients meeting the three criteria are considered to be high risk for an adverse drug event and a referral is generated electronically to the team pharmacist who begins the improved medication reconciliation process.

Outcome 5 included the identification and reduction of overall medication related errors by 20%. For the purposes of this project, errors are intended to mean medication issues that could potentially cause harm to the patient or cause poor patient outcomes. Errors are defined as unintentional, preventable, prescribing errors or omissions that reach the patient and could potentially cause harm (Khalil, et. al., 2016). Errors that were included in this process improvement project were: dosage errors, possible interactions with other medications, prescribing errors, high risk drugs for the patient due to age, condition, or weight, administration errors, duplications, and missed medications or prescriptions (Khalil, et. al., 2016). Medication reconciliation audits were completed by the interprofessional team using the charts of the 35 identified high risk patients, including readmitted patients. Seven patient admissions or 20% of the high-risk admissions were found to have active medication errors that were potentially harmful. Two patients had duplication errors, for example prescriptions for both Metoprolol
tartrate and Metoprolol sulfate that were detected and corrected by the interprofessional team pharmacist when the duplication went unrecognized by nursing staff in the initial medication reconciliation process. Four patients were found to have multiple types of medication errors. The seven patients had a combined quantity of twelve different types of medication errors. Seventeen patient charts were reviewed between 6/29/2020 and 7/31/2020 with sixteen individual medication errors found in seven patient medication reconciliation reviews. During the initial month of implementation, 41% of patients had medication errors identified and corrected by the interprofessional team. During the month of August 2020, eleven charts were reviewed and no errors were identified by the interprofessional team, but the readmitted patients were excluded. Please see Appendix CC for the types of medication errors found by the interprofessional team. The interprofessional team audit results included 35 high risk admitted patients aged 65 and older, with eight or more prescriptions, and prescribed one or more of the three high risk drug classes. Seven of the 35 patients or 20% of patients were found to have potentially harmful medication errors during the interprofessional team improved medication reconciliation process while they were actively admitted to the hospital. Seven of the high-risk patients were readmitted to the hospital during the DNP project implementation and fewer errors were found on the readmission interprofessional team review. The error rate declined significantly per month of the project implementation with no errors found in August 2020, potentially due to these readmitted patients having been previously addressed and corrections made.

Outcome 6 was intended to reduce the total quantity of prescriptions by two or more for patients with eight or more prescriptions. Once the patient was discharged from the hospital, the team compared the quantity of prescriptions at admission to the quantity at discharge and adjusted for acute prescriptions required while in the hospital to determine the total number of
prescriptions reduced. The seven readmitted patients were excluded from this outcome as they had multiple interprofessional team evaluations. There were 28 patient discharges used to evaluate this outcome, with the readmissions excluded. The first thirty-day period included 17 patients with a combined total number of prescriptions of 248 upon admission to the hospital, averaging 14.6 prescriptions each. The same patients were discharged with 236 prescriptions, adjusting for medications only required during the acute hospitalization, they had an average of 13.8 prescriptions at discharge. The number of prescriptions was reduced by 4.84% in July, but only by one prescription per patient. The second thirty-day period included eleven patients with 154 prescriptions, an average of 14 prescriptions each, upon admission to the hospital. At discharge the patients had 130 prescriptions, an average of 11.8 prescriptions each, excluding the acute stay medications. The patient population in August reduced prescriptions by 2.2 per patient (15.6%). The quantity of prescriptions for 28 discharged patients was 402 prescriptions on admission, 14.35 per patient and was reduced to 366 prescriptions or 13.1 per patient at discharge. This was a 9% reduction in prescriptions when excluding acute stay medications. Each patient was discharged with 1.25 fewer prescriptions, but the outcome was not met. See Appendix DD for a Table of the reduction in the percentage of prescriptions from admission to discharge.

Outcome 7 included the development of a quality monitoring process which will include quarterly reporting of 30-day readmission rates through the organization’s dashboard and chart audits of these readmissions by the Utilization Review Committee. If a readmission can be attributed to a medication error, the case will be reported to the Pharmacy and Therapeutics Committee which is co-chaired in this organization by Pharmacy and an Internal Medicine physician. Results from this DNP project will be disseminated as discussed later and the Quality
Committee will receive an annual report. Outcome 8 is 90% staff attendance of the education and was met when 95% of the Medical Surgical and Intensive Care staff attended the education offered at the Staff Meeting and online through the hospital’s web-based learning system.

**Outcomes analysis**

Outcome 1: The healthcare team stakeholders in the medication reconciliation process had a 50% improvement in level of confidence by August 2020 was met. Please see Appendix Y and Appendix Z. The pre- and post-survey mean score for each survey question were compared to evaluate the measure for success. Post survey staff and team member satisfaction with the level of collaboration in the medication reconciliation process improved significantly over the pre survey satisfaction for each of the nine survey questions (Refer to Appendix Z). Outcome 2: 75% of identified patients received the medication reconciliation interventions by the interprofessional team by August 2020 was met with 100% of high-risk patient admissions identified through the electronic early warning system receiving the interprofessional team interventions. Outcome 3: Patients will report a 25% increase in satisfaction with the process regarding new medications during discharge phone calls by August 2020 was not met. Discharged patients answered three questions about their medication understanding during discharge phone calls conducted by an RN. The lowest scoring question was about understanding their prescriptions though 87% of the patients said they did understand. Individual comments may suggest otherwise with the most common comments signifying that they still have questions or are relying on a family member to understand their prescriptions. Outcome 4: The interprofessional team developed the tool and implemented risk stratification using the tool, based upon the 2012 Beers Criteria, and applied the tool to 75% of the patients by August 2020 was met. All (100%) patients admitted or 163 admissions during the DNP implementation were
screened using this tool. 163 patient admissions were risk stratified using the tool and 35 admissions or 21.4% were found to be at high risk for adverse drug events and were referred to the interprofessional team process. Outcome 5: The interprofessional team will identify and reduce overall medication related errors by 20% by August 2020 was met. 41% of the 17 patients admitted in July 2020 had errors identified and corrected, though there were no errors found during the medication reconciliation review of the eleven patients admitted in August 2020. In total, seven of the 35 admissions or 20% had medication errors identified and corrected by the interprofessional team process. There were seven hospital readmissions that occurred during the approximately 60-day implementation. If the readmissions were excluded from the total 35 admissions, the patient medication error rate was 25% with 7 of 28 patients having errors identified and corrected. Outcome 6: Reduced the total quantity of prescriptions by at least two for patients receiving eight or more prescriptions by August 2020 was not met, but the results demonstrated a 9% reduction in the total number of prescriptions or 1.25 prescriptions per patient, excluding the readmissions. Outcome 7: Established and implemented an organizational quality monitoring and oversight strategy by September 2020 was met as discussed by establishing a reporting schedule to the organization’s quality committee that has oversight by the Board of Directors. Outcome 8: All staff and stakeholders will have completed the training and education by June 2020 was met with 95% of the staff and stakeholders completing the training and education. Outcome 4 which included the risk stratification tool development (long term) was met during implementation when an EWS was built in the EMR that triggered a referral to the interprofessional team for high-risk admissions.

**Contextual elements that interacted with the interventions**
The ability to incorporate long term goals into the EMR was a contextual element that interacted with the interventions in a positive way. Although this was a long-term outcome, the EWS was able to be built into the EMR making it more efficient and immediately available to staff. Success of this outcome was due to the small size and informal nature of the organization. Smaller organizations may be nimble to change, and allow more autonomy than may be possible in a larger or more formal organization. Having the ability to utilize the EMR to measure and monitor the project outcomes with automated reporting features was another positive. A contextual element that interacted with the interventions in a negative way, was the ability of the nursing staff to defeat the EWS early in the project. The nursing assessment contained the risk screening tool and was meant to trigger a high-risk patient consult to the interprofessional team as part of the EWS. Nursing staff was able to cancel the referral in the EMR. This cancellation was discovered by the IT RN analyst. Nursing staff were reeducated on several occasions by the department director. Nursing staff reported that they cancelled the referral when they believed that they were unable to collect an accurate medication list or needed to complete additional documentation. The interprofessional team agreed to add an additional EMR indicator to the nursing “work list”. This indicator on the “work list” notified the oncoming nursing shift and the pharmacist, that the medication list was incomplete, possibly inaccurate, or needed additional clarification. This addressed the concern for the nursing staff. Monitoring of the referral process was continued to ensure that no referrals were cancelled. The interprofessional team discussed the potential to “disable” the ability of the nurses to cancel referrals. The team decision was to focus on reeducation, discussing the reason with the nursing staff, and asking for collaboration in the improvement process rather than forcing hard stops into the EMR.

**Associations between outcomes, interventions, and contextual elements**
The project interventions led to project outcomes that were met within the context of the small, nimble, community hospital. Outcome 1 was particularly interesting within this context. Would the level of staff satisfaction and engagement improve within this context when participating as an interprofessional team and being directly engaged in the medication reconciliation improvement process? The literature regarding interprofessional collaboration showed that perceptions of nursing, physician and pharmacist professions seem to improve regarding the other professions when collaborating (Hawkes, Nunney, & Lindqvist, 2013). For example, each profession was perceived by the other, as being more caring, attitudes were significantly improved, and tensions decreased in one study of 325 nursing, pharmacy, and medical students (Hawkes, Nunney, & Lindqvist, 2013). During the project implementation, the interprofessional team members, including nurses, pharmacists, and physicians, were surveyed regarding their level of satisfaction and engagement with the process. This was done pre- and post-improvement process in order to determine if the organizations results were similar to the literature. Appendix Z compares the pre- and post-improvement survey results and a significant increase in satisfaction and engagement was noted. Collaboration as an interprofessional team to address a significant organizational problem led to improved staff satisfaction and engagement within this context. This result is similar to findings in the literature regarding collaboration among professionals, so interprofessional collaboration may lead to higher levels of staff satisfaction and engagement in other contexts as well.

**Unintended consequences**

The cancellation of the EWS automated referral of high-risk patients for medication reconciliation by the interprofessional team was an unanticipated event that resulted in some re-education requirements for the nursing staff. There were also some additional labor costs for this
nursing staff re-education time and additional IT costs and pharmacist labor to conduct monitoring to ensure that the referrals successfully reached the interprofessional team.

Another area not considered was the quantity of patients that were readmitted to the hospital during the DNP project implementation. Seven of the 35 patient admissions that were included as high risk were readmissions to the hospital. The total number of project patients was 28 with 35 admissions. This made it necessary to report results using both the number of admissions and the number of patients depending on the outcome being evaluated. This readmission rate in the identified high-risk patient group at 20% is significantly higher than the overall readmission rate, about 5%, at the organization, perhaps because the patients are older, taking more medications, and are prescribed high risk medications for their age group.

**Missing Data**

There were 20 respondents to the pre improvement process satisfaction with the level of collaboration survey. There were 22 respondents to the post improvement survey process. The overall response rate was 43% pre and 47% post improvement survey with 47 eligible professional staff members who could have participated in the survey. The interprofessional team physician responded to the initial survey, but was unavailable for the post improvement survey process due to an extended absence from the hospital. The survey was delivered to staff members anonymously through the web-based education system and was completely voluntary. Some staff members did not respond to the voluntary survey, thus preventing their data from being included.

**Actual project revenues/expenses**

The DNP project was not expected to generate any revenue, although there are positive long-term financial impacts if patients have better outcomes because of value based purchasing.
payment models (CMS, n.d.). There were additional pharmacist hours incurred during implementation to monitor the referral process for high-risk patients. There were fewer hours required to educate the staff due to the electronic delivery method, even with the need to reeducate nursing staff. There was a reduction in expense due to the inability to meet in person with the ongoing COVID-19 pandemic. These offsets caused the project costs to remain as expected. The DNP project manager researched the costs to implement an interprofessional medication reconciliation process using a remote telemedicine pharmacist through a third-party organization. It was determined that it would be “cost prohibitive” for the organization to use an outside pharmacy resource. Using the internal pharmacy resources to support this process was labor intensive. If the project is duplicated, it will be important to evaluate pharmacy resources for the long-term success of the process.

**Summary**

The specific aims of the DNP project were: 1. Utilize an interprofessional team that includes, nursing, pharmacy, RN care management, and physicians to develop hospital policy and procedures for medication reconciliation, 2. Develop a risk stratification method to identify patients at highest risk for medication related complications post discharge, 3. Improve patient medication management at discharge, 4. Improve patient and staff satisfaction and confidence surrounding medication reconciliation. An interprofessional team that included nursing representatives from the Medical Surgical Department and the Intensive Care Unit was created as well as including the primary nurses responsible for the patient care of a patient identified as high risk and requiring the interprofessional team interventions. The team included one internal medicine physician who served as the champion of the process with the Medical Staff and provided oversight as necessary. A doctoral prepared pharmacist was the official member of the
team developing the risk stratification process and improving policies and procedures, but the clinical pharmacist assigned to work in the Intensive Care Unit each day, assisted with the medication reconciliation improved process as well. An Information Technology (IT) RN Analyst was added to the interprofessional team as soon as it was recognized the contribution they could make to the processes. A risk stratification tool was developed by the interprofessional team, based upon the 2012 Beers Criteria. This tool was created in the EMR by the IT RN Analyst and served as an EWS that risk screened each admission to the Medical Surgical Department and Intensive Care Unit and automatically referred high risk patients to the interprofessional team pharmacist through the EMR to begin the improved process. This development of an automated EWS in the EMR was a long-term goal that was able to be implemented during the project implementation due to the collaboration with IT. Patient medication management was improved at discharge as evidenced by the reduction in the quantity of chronic prescriptions by 9% to 1.25 prescriptions per each patient. Patients also answered post discharge phone call questions about their medications and rated their understanding from 87% to 93% for each question. These results can be viewed in Appendix AA. Patient and staff satisfaction and confidence surrounding medication reconciliation was improved according to the CSACD survey results comparing the pre improvement process and post improvement process surveys of the staff members using the 9 question Likert survey (Baggs, 1994). These results can be viewed in Appendix Z.

A particular strength of this DNP project implementation was the development of the risk stratification tool by the interprofessional team that was built into the electronic medical record (EMR) and used as an early warning system identifying patients most at risk for adverse drug events and automatically notifying the interprofessional team to begin the interventions. Early warning systems are being developed to improve patient outcomes through the early detection of
patient clinical indicators that may identify patients likely to deteriorate and cause earlier, more aggressive interventions by the patient care team (Shiloh, et. al., 2016). Automating this process through the EMR was a long-term outcome of the DNP project, but was able to be implemented early in the project through the collaboration with the Information Technology Department.

**Interpretation**

**Association Between Interventions and Outcomes and Comparison with Previous Findings**

The DNP project interventions were associated with positive outcomes and the findings were comparable to results in the literature search. The Medical Surgical, Intensive Care, and Pharmacy staff members and interprofessional team members had an increase in their level of engagement and satisfaction through the process of collaborating with an interprofessional team and participating in an improvement process as measured through the CSACD survey process. The survey question regarding collaboration between the professions improved from a pre-improvement process mean score of 4.7 on the 7-point Likert scale to a 5.3 mean score on the post-improvement process survey. An increase of 11.3% in the mean score demonstrated a significant improvement in the level of satisfaction among the respondents. The results of the literature search suggested that improved collaboration between physicians and nurses led to an increase in job satisfaction (Baggs, 1990).

All of the patient admissions determined to be high risk according to the 2012 Beers Criteria received the benefit of the interprofessional team improved medication reconciliation process during the DNP project implementation. The literature review suggested that polypharmacy and potentially inappropriate prescriptions had negative impacts on patient safety and health, were costly and wasted nursing staff resources (Hudhra, et. al., 2015). Medication review at hospital discharge was suggested as an important strategy in any patient taking six or
more prescriptions as well as the recommendation that fewer prescriptions would improve patient outcomes with each additional prescription creating 12% more risk for the patient (Hudhra, et. al., 2012). Bringing the benefit of the interprofessional team, including a pharmacist, to the high-risk patient’s medication reconciliation process should improve patient safety, prevent adverse drug events caused by polypharmacy, and reduce the total number of prescriptions that a patient is taking by identifying potentially inappropriate prescriptions for the patients age and reducing the risk per each medication (Hudhra, et. al., 2012). Polypharmacy was implicated in the literature as a cause of cognitive impairment, falls, nausea, depression, weight loss, and responsible for adverse drug events leading to one third of all hospital admission in older adults (Berryman, et. al., 2012). The interprofessional team process successfully reduced the total quantity of prescriptions in the project patient population by 9% or 1.25 prescriptions for each patient, potentially reducing patient risk and improving patient safety as described in the literature. The interprofessional team also identified medication errors in 20% of the patient admission medication reconciliation processes and corrected these identified errors prior to patient discharge by collaborating with other professions. Adverse drug events lead to hospital admissions and readmissions and are often attributed to polypharmacy in the literature (Dalleur, 2017). One study believed adverse drug events to be 92.9% completely preventable because they are due to inappropriate prescribing and ineffective monitoring and could be corrected through careful review and collaborative processes (Dalleur, 2017).

Impact of Project on People and Systems

An EWS using elements from the 2012 Beers Criteria was developed by the interprofessional team during the DNP project to assist nurses to identify and intervene earlier in the care of elderly patients, those with polypharmacy, and those with potentially inappropriate
prescriptions (Hudhra et al., 2012). This EWS was implemented in the EMR and generated an automatic referral to the clinical pharmacist if the patient being admitted met the criteria. The automatic referral identified the patient as high risk for adverse drug events and launched an interprofessional team assessment of the patient’s medications. Through the process 35 of 163 (21.4%) admissions were identified as high risk. Seven patients (20%) were found to have medication errors and these were corrected. If this EWS, risk stratification, and automated referral to an interprofessional team is continued, it could have a significant impact on the patient safety and positive patient outcomes.

There was a positive impact on the staff through their collaboration as an interprofessional team and engagement in a process to address patient medication safety (Hawkes, Nunney, and Lingqvist, 2013). Interprofessional collaboration may build positive attitudes between nurses, pharmacists, and physicians about the other profession and has created an understanding that there is caring in each profession (Hawkes, Nunney, and Lingqvist, 2013). The survey process pre and post implementation showed an increase in the level of satisfaction and engagement of the team members and staff.

**Reasons for Differences Between Observed and Anticipated Outcomes**

There were very minimal differences identified between the observed and anticipated outcomes. The inconsistency in the error rate found from month to month may have been caused by the quantity of readmitted patient and possibly due to the fact that the interprofessional team would have evaluated their medication reconciliation process on the initial admission.

It was also unexpected that the nursing staff would cancel the referral order that was key to the early warning system and automated referral process of high-risk patients to the interprofessional team. The nursing staff were re-educated and anecdotally stated that they did
not want to burden the team or that they had not completed the nursing portion of the process yet and hoped to return later to that section.

A long-term outcome was met due to the nimbleness of the smaller organization in which the project was implemented. The early warning system and several other important project elements were able to be built into the electronic medical record to be utilized by the nursing staff. The DNP project manager was able to collaborate with the IT department RN analyst directly and there was no lengthy approval process required to make a change to the organizations EMR. This made it possible to meet the long-term outcome during the project implementation, though this might not be possible in a larger, more structured, or more formal organization.

**Costs and Strategic Trade-Offs**

Replication of this DNP process improvement project could be impaired due to lack of Pharmacy Department support, lack of leadership support, inability to receive IT RN Analyst support or receive approval to alter the EMR fields to support the improvement project. An organization could be unwilling or unable to commit the resources, particularly high-cost labor such as pharmacists. In a more formally structured, less nimble or large organization, it may be difficult to obtain approval to update processes. Some planned interventions were altered in the delivery mechanism, such as the staff survey process and the education delivery process due to the COVID-19 pandemic and the social distancing requirements. This actually enhanced the project and lowered some labor costs, but had to be adjusted for. It is possible that future pandemic concerns could negatively impact the replication of this project.

**Policy Implications**
The American Nurses Association (ANA, 2009) issued a statement regarding safe medication use in older adults in which there is a call for improved medication reconciliation and clear communication of medication administration. Nurses are positioned to advocate for patients and especially the older patient struggling with potentially inappropriate prescriptions. This DNP project had outcomes related to interprofessional team collaboration, reducing the quantity of chronic prescriptions at discharge, and risk stratifying patients at highest risk to have an adverse drug event. The DNP project findings could be applied to nursing practice and organizational policy development. On a local level, the organization’s medication management and medication reconciliation policy and processes were updated to reflect the interprofessional team involvement.

The AACN Essentials of Doctoral Education for Advanced Nursing Practice, Essential V states: “Political activism and a commitment to policy development are central elements of professional nursing practice…” and “the DNP graduate is able to design, implement and advocate for health care policy that addresses issues of social justice and equity in health care” (American Association of Colleges of Nursing [AACN], 2006, p. 13). Nurses could utilize the evidence-based policy implications from this project to improve medication reconciliation processes and establish organizational policy and procedures to improve patient safety. Nurse leaders within the organization utilized the project results demonstrating some improvement in patient care, to support the improved medication management policy and process to improve patient safety. The interprofessional team will maintain oversight of the procedure and annual review of the policy.

Limitations
Limitations of the DNP improvement project include the short duration of the implementation phase and the lower number of patients that were included as a result. With more available time and more data to include, the results could be deemed more reliable. In addition, the project was completed in a small community hospital setting in a remote rural area in a sparsely populated state. This setting, while benefitting the ability the DNP project manager in being able to implement the project, it could have some limitations if compared to a large, urban setting for instance.

The Meditech brand electronic medical record used in this organization has some inherent limitations to the project. For example, the ability of the nursing staff to cancel the referral order in the EMR might be preventable in other brands of electronic medical records. Meditech EMR was very limited as far as reports that could be received with data for the project and most of them were required to be in a PDF format that could not be downloaded to Excel and manipulated easily. This required some manual transfer of data to a better medium for the project reporting.

Conclusions

Usefulness of the Work

This DNP project, utilizing an interprofessional team to improve the medication reconciliation process for the most vulnerable hospital inpatients may be useful for hospital administrators, nurse executives, nurse leaders, and anyone interested in performance improvement. Outcome 6 of the DNP project demonstrated a 9% reduction in the overall quantity of prescriptions in the project population at hospital discharge. This is useful work, demonstrating a potential impact to patient safety with these interventions, by reducing polypharmacy. Polypharmacy is defined as taking five to ten different prescriptions and usually
one of the prescriptions is potentially inappropriate for the patient aged 65 and older (Hudhra, et. al., 2015). Polypharmacy has been implicated in a higher percentage of adverse drug events in elderly patients, higher healthcare costs, compliance issues, and drug interactions (Hudhra, et. al., 2015). The more prescriptions the elderly patient is taking, the more likely that some of them will be potentially inappropriate medications for the age group (Hudhra, et. al., 2015). Patients with polypharmacy are more likely to have a medication discrepancy at the time of hospital admission, increased adverse drug events after discharge, and hospital readmissions (Bishop, et. al., 2012). The literature search revealed that 4.7 to 6.5% of all hospital admissions are related to adverse drug events (Bishop, et. al., 2012). One study found the 49.2% of medication discrepancies found could be considered severe and could lead to adverse drug events if uncorrected (Bishop, et. al., 2012). Patients taking fewer medications and only prescriptions appropriate for their age and conditions are safer and have better outcomes (Bishop, et. al., 2012). An interprofessional medication reconciliation process that may reduce polypharmacy at discharge and identify discrepancies upon admission could be very useful for a healthcare organization.

The medication reconciliation process has long been fraught with difficulties in many organizations. This DNP project may be useful in demonstrating how an interprofessional team may address the medication reconciliation process and apply an EWS. More clinical improvement projects should be done to ensure validity. The EWS to identify high risk patients and apply scarce resources to that population as well as having the EWS built in the EMR for staff to utilize could be very important for patient safety. This work was also completed in a sole community provider hospital in a rural area with somewhat limited resources, but a high degree of autonomy and nimbleness as discussed earlier. Many hospitals should be able to replicate this
work or portions of the work, but larger, highly structured, or formal organizations may not be as nimble.

**Sustainability**

The potential for sustainability of an interprofessional team improvement process will depend upon the availability of the nurse, pharmacist, and physician resources and the willingness of the organization to commit resources and invest in patient safety and process improvement. Pharmacist resources in particular are very costly and can be limited in smaller hospitals. Sustainability for the EWS, risk stratification tool, and automated referral process required information technology expertise and labor hours and a willingness in the organization to customize or experiment with the EMR. Once developed, the EWS and other processes, are very efficient to maintain in the EMR and very sustainable to the organization. The more difficult portion to sustain is staff labor costs. Pharmacy resources cannot be increased in the organization in which the project was implemented due to financial constraints. Relying on existing resources makes it more difficult to sustain the medication reconciliation process long term at 100% compliance. Outside telemedicine resources were evaluated and a price estimate was received to determine if tele-pharmacy was an option for long term sustainability of the pharmacy component of this project. This option was found to be cost prohibitive and the external party was not prepared to offer the service in a timely manner. This process is sustainable within the smaller organization, but only utilizing internal resources and automated processes to improve efficiency.

**Potential for Spread to Other Contexts, Implications for Practice, and Further Study**

Medication reconciliation requirements are most commonly applied to hospitals, but the necessity to have accurate medication information for patients exists in any healthcare setting.
Interprofessional team members exist to some degree in many healthcare settings and could potentially be leveraged, although pharmacists might be found in retail settings or high acuity settings such as the hospital where complex medication are managed. This DNP improvement project could possibly be applied to outpatient settings like the Emergency Department, cancer centers, physician office practices and any location where older high-risk patients may present for care with complex prescriptions.

As discussed, this was a small sample size DNP improvement process with a short duration, but there are some implications for practice and further study. The improvement process could be replicated in other organizations over a longer duration and with a larger sample size for improved validity. The results of this DNP project demonstrated potential to improve patient care and safety in the following ways: ability to develop an EWS for patients at high risk for an adverse drug event, an interprofessional team intervention may be more impactful in the medication reconciliation process, an interprofessional team dynamic creates more satisfaction and engagement of staff. All of these areas would benefit from further study.

Next Steps and Dissemination

The final results from this DNP project were reported to the organizations Medical Executive Committee to reach key physician stakeholders. The final results were reviewed with the interprofessional team with thanks for all of their effort, support, and participation. Results may be used to justify additional pharmacist support to expand the process to other departments using tele-pharmacy or additional pharmacist positions. The Quality Committee will receive a presentation of the results by the end of the year. The DNP student intends to prepare and submit the final report for publication.
References


<table>
<thead>
<tr>
<th>TITLE OF ARTICLE</th>
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<th>OUTCOME MEASURES</th>
<th>RESULTS/KEY FINDINGS</th>
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</thead>
<tbody>
<tr>
<td>Caring for attitudes as a means of caring for patients – improving medical, pharmacy and nursing students’ attitudes to each other’s professions by engaging them in interprofessional learning.</td>
<td>Hawkes, G., Nunney, I., and Lindquist, S.</td>
<td>“Negative attitudes” between nurses, Pharmacists, and physicians negatively impacts patient medication management. Interprofessional learning can help foster positive attitudes, collaboration, and therefore improve patient medication management.</td>
<td>First year nursing, pharmacy, and medical students were assessed before and after a seven-week interprofessional learning experience. The students completed the Attitudes to Health Professionals Questionnaire (20 item survey)</td>
<td>325 nursing, Pharmacy, and medical students from 2008-2009 “cohort”</td>
<td>Increased “perception of caring” based upon the post interprofessional learning opportunity assessment scores</td>
<td>All students perceived the professions of nursing, Pharmacy, and physicians to be “more caring” after the interprofessional learning, all students viewed their own profession to be “more caring”, nursing students showed the greatest improvement in relation to the pharmacy students, pharmacy received the most “benefit”</td>
</tr>
<tr>
<td>Development of an instrument to measure collaboration and</td>
<td>Baggs, J.G.</td>
<td>Does satisfaction of nurses improve when working as a</td>
<td>Descriptive study</td>
<td>6 month study, located in an ICU, 68 RN’s in sample</td>
<td>Developed survey tool, level of collaboration</td>
<td>ICU nurses who practice collaboratively are</td>
</tr>
<tr>
<td>TITLE OF ARTICLE</td>
<td>AUTHOR(S)</td>
<td>RESEARCH QUESTION OR AIM OF THE ARTICLE</td>
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<tr>
<td>Reducing errors through discharge medication reconciliation by pharmacy services.</td>
<td>Bishop, M., Cohen, B., Billings, L. and Thomas, E.</td>
<td>Discrepancies in admission and discharge medications lead to adverse drug events and readmissions.</td>
<td>Prospective observational study over 7 months</td>
<td>104 patient charts</td>
<td>Multidisciplinary review and pharmacy involvement in medrec reduces discrepancies</td>
<td>Patients with 8 or more medications at higher risk for discrepancies, every 2/5 patients had a discrepancy.</td>
</tr>
<tr>
<td>Medication reconciliation accuracy and patient understanding of intended medication changes on hospital discharge</td>
<td>Ziaeian, B., Araujo, K., Van Ness, P. and Herwitz, L.</td>
<td>To determine prevalence of medication reconciliation errors and patient misunderstanding of discharge medications.</td>
<td>Prospective cohort study</td>
<td>377 patients in the study, over the age of 64, hospital inpatients admitted with CHF, ACS, or PN, post discharge interview</td>
<td>1. Medication reconciliation accuracy 2. Patient understanding</td>
<td>24.2% of patients experienced a medication reconciliation error (provider error) and patients had no understanding of 62% of new medications.</td>
</tr>
<tr>
<td>Patient and provider-identified factors contributing to surgical patient readmission to the hospital</td>
<td>Sutherland, T., David-Kasdan, J., Beloff, J. and Mueller,</td>
<td>Understand preventable surgical patient readmission to the hospital, 1</td>
<td>Data analysis – IRB approval, patient records</td>
<td>48 colorectal surgery patients who were readmitted within 30</td>
<td>1. Self-management instruction 2. Medication management 3. Continuity of care.</td>
<td>Medication management identified as cause in 35% of...</td>
</tr>
<tr>
<td><strong>INTERPROFESSIONAL APPROACH TO MEDICATION</strong></td>
<td><strong>Readmission after colorectal surgery</strong></td>
<td><strong>or every 7 within 30 days of discharge</strong></td>
<td><strong>days of discharge</strong></td>
<td><strong>Monitoring and symptom management after discharge</strong></td>
<td><strong>Readmission decision-making</strong></td>
<td><strong>Social and community support system</strong></td>
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<tr>
<td><strong>Beers criteria for potentially inappropriate medication use in older adults</strong></td>
<td>Berryman, S., Jennings, J., Ragsdale, S., Lofton, T., Huff, D., and Rooker, J.</td>
<td>Recognition of drugs most often implicated in reactions by nurses will reduce adverse drug events</td>
<td>Education</td>
<td>N/A</td>
<td>Training to utilize the Beers Criteria for nurses to recognize high risk drugs</td>
<td>“Nurses can decrease the risk of adverse drug problems with medication review and prompt interventions”</td>
</tr>
<tr>
<td><strong>Polypharmacy and potentially inappropriate prescription s identified by Beers and STOPP criteria in co-morbid older patients at hospital discharge</strong></td>
<td>Hudhra, K., García-Caballo, M., Casado-Fernandez, E., Jucja, B., Shabani, D., Bueno-Cavanillas, A.</td>
<td>Analyze clinical implications (including readmission) of polypharmacy and potentially inappropriate prescriptions (PIP), more than 6 medications in older patients</td>
<td>Observational cross-sectional study</td>
<td>644 “older” patients – 64+, discharged from the San Cecilio University Hospital, Granada from 1 July 2011 to 30 June 2012. Random sample of 8154 discharged older patients (15%)</td>
<td>Number of drugs prescribed</td>
<td>Potentially inappropriate prescriptions</td>
</tr>
<tr>
<td><strong>30-Day potentially avoidable</strong></td>
<td>Dalleur, O., Beeler, P.,</td>
<td>To analyze the patterns of</td>
<td>Observational study</td>
<td>Random sample of 534</td>
<td>Identify interventions that might</td>
<td>Adverse drug events accounted</td>
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<tr>
<td>Topic</td>
<td>Authors</td>
<td>N/A</td>
<td>Study Type</td>
<td>Result</td>
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<tr>
<td>Potentially preventable medication-related hospitalizations: A clinical pharmacist approach to assessment, categorization, and quality improvement</td>
<td>Pellegrin, K., Lee, E., Uyeno, R., Aysen, C., &amp; Goo, R.</td>
<td>N/A</td>
<td>Retrospective review</td>
<td>Describe a quality improvement process to identify medication related potentially avoidable readmissions</td>
<td></td>
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<tr>
<td>Implementing and evaluation of a collaborative clinical pharmacist's medications</td>
<td>Khalil, V., deClifford, J.M., Lam, S. Subramanian, S.</td>
<td>Prospective parallel study</td>
<td>110 hospital inpatients between 54 to 71 years old</td>
<td>Errors and severity of errors found on Pharmacist review after 24 hours</td>
<td></td>
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</tr>
<tr>
<td>Designing and evaluating an effective theory-based continuing interprofessional education program to improve sepsis care by enhancing healthcare team collaboration</td>
<td>Owen, J., Brashers, V., Littlewood, K. Wright, E., Childress, R., and Thomas, S.</td>
<td>N/A</td>
<td>32 participated in activities – reflective participation</td>
<td>Discuss theories Social identity theory applies to interprofessional learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission due to adverse drug events</td>
<td>Schnipper, J., &amp; Donze', J</td>
<td>Potentially avoidable readmissions</td>
<td>Potentially avoidable readmissions from 10,275 discharges</td>
<td>Address potentially avoidable readmissions – patient monitoring and prescription errors for 13% of readmissions</td>
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<tr>
<td>Potentially preventable medication-related hospitalizations</td>
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<tr>
<td><strong>Pharmacist-managed inpatient discharge medication reconciliation: A combined onsite and telepharmacy model</strong></td>
<td><strong>Keeyes, C., Kalejaiye, B., Skinner, M., Eimen, M., Neuf, J., Sibury, G., Buster, N., and Vincent, J.</strong></td>
<td><strong>Evaluation of a quality improvement project</strong></td>
<td><strong>New process – accurate medication lists completed by Pharmacists and Telehealth pharmacists (for afterhours), process evaluation</strong></td>
<td><strong>Problems found in three categories: unreconciled medication orders (31%), order clarification (25%), and duplicate orders (12%).</strong></td>
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<tr>
<td><strong>Implementation of a pharmacist resident medication reconciliation program</strong></td>
<td><strong>Rabi, S. and Dahdal, W.</strong></td>
<td><strong>Case study</strong></td>
<td><strong>Case study, retrospective review</strong></td>
<td><strong>Improper documentation of allergies or medications = 46.4% not starting a previous medication 35.7%</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>ASHP Statement on the Pharmacist’s role in medication reconciliation</strong></td>
<td><strong>Thomas, M.</strong></td>
<td><strong>Nationally recognized expert opinion based on evidence</strong></td>
<td><strong>Joint Commission, Institute of Medicine</strong></td>
<td><strong>Pharmacists uniquely qualified to lead interdisciplinary teams</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Adverse Drug Events</strong></td>
<td><strong>Kanaan, A. et. al.</strong></td>
<td><strong>2012 Beers Criteria for Potentially</strong></td>
<td><strong>1,000 hospital discharges</strong></td>
<td><strong>242 adverse drug events occurred</strong></td>
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</table>
After Hospital Discharge in Older Adults: Types, Severity, and Involvement of Beers Criteria Medications

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<thead>
<tr>
<th>After Hospital Discharge in Older Adults: Types, Severity, and Involvement of Beers Criteria Medications</th>
<th>Inappropriate Medication Use in Older Adults, medication reconciliation by Pharmacists using criteria to predict high risk for readmission</th>
<th>, aged 65 plus inpatients discharged to home</th>
<th>45 days of discharge, predictability, severity, effect on the patient</th>
<th>after hospital discharge, 18.7% of discharges had an adverse event, more than half occurred within 14 days of discharge, 35% of adverse drug reactions deemed preventable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice, Y., Barnes, C., Rastogi, R., Hillstrom, T., &amp; Steinkeler, C.</td>
<td>Evaluate the process improvement bundle implemented across Kaiser</td>
<td>Process improvement</td>
<td>7 years evaluated</td>
<td>Readmissions over time</td>
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<td>7 years evaluated</td>
<td>Readmissions over time</td>
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<td>Tackling 30-day, all-cause readmissions with a patient-centered transitional care bundle.</td>
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<td>Sutherland, T., David-Kasdan, J., Beloff, J., Mueller, A., Whang, E.</td>
<td>Examine surgical readmissions</td>
<td>Data analysis</td>
<td>465 bowel surgery patients</td>
<td>Identify contributing factors for readmission</td>
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<td>Identify contributing factors for readmission</td>
</tr>
<tr>
<td>Patient and provider-identified factors contributing to surgical readmission after</td>
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<td>Patient and provider-identified factors contributing to surgical readmission after</td>
</tr>
</tbody>
</table>

Rice, Y., Barnes, C., Rastogi, R., Hillstrom, T., & Steinkeler, C. Evaluate the process improvement bundle implemented across Kaiser 7 years evaluated Readmissions over time reduced readmission s, increased patient satisfaction, reduced time to the first post discharge follow-up appointment, and reduced errors on discharge medication lists

Sutherland, T., David-Kasdan, J., Beloff, J., Mueller, A., Whang, E. Examine surgical readmissions Data analysis 465 bowel surgery patients Identify contributing factors for readmission 35% of surgical readmission s were medication related
<table>
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<tbody>
<tr>
<td>Successful participaton of patients in interprofessional team meetings: A qualitative study.</td>
<td>Bleday, R., &amp; Urman, R.</td>
<td>To gain more insight into how healthcare professionals experience and organize patient participation in the team meetings</td>
<td>Qualitative observational study</td>
<td>8 meetings, 8 healthcare professionals, 11 patients or families</td>
<td>Identify key themes</td>
<td>Patient participation during team meetings was appreciated by professionals and patients.</td>
</tr>
</tbody>
</table>
Appendix B Theoretical Model: Transitions Theory

NATURE OF TRANSITIONS

TYPES
Developmental
Situational
Health/Illness
Organizational

PATTERNS
Single
Multiple
Sequential
Simultaneous
Related
Unrelated

PROPERTIES
Awareness
Engagement
Change & difference
Transition time span
Critical points & events

TRANSITION CONDITIONS: FACILITATORS AND INHIBITORS

PERSONAL
Meanings
Cultural beliefs & attitudes
Socioeconomic status
Preparation & knowledge

COMMUNITY ↔ SOCIETY

PATTERNS OF RESPONSE

PROCESS INDICATORS
Feeling connected
Interacting
Location & being situated
Developing confidence & coping

OUTCOMES
Mastery
Fluid integrative identities

NURSING THERAPEUTICS/INTERVENTION
Appendix C Social Identity theory

- Personal Identity
- Social Identity
- Social Categorisation
- Distinct Social Groups
  - In-Group "we" (Intergroup comparisons/"stereotypes")
  - Out-Group "they"
### Appendix D Logic Model

<table>
<thead>
<tr>
<th>Step 5</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 2a</th>
<th>Step 2b</th>
<th>Step 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>What we invest: resources and contributions</td>
<td>What we do</td>
<td>What we accomplish or produce from the activities</td>
<td>Who we reach with our activities</td>
<td>The expected changes attainable during the DNP Scholarly Project timeline</td>
<td>The expected changes attainable 6 months - 2 years after the DNP Project is implemented</td>
</tr>
</tbody>
</table>

- **The human, financial, organizational, and community resources available to direct toward the project activities.**
  - The processes, tools, events, technology, and actions that are intended to bring about changes
  - Direct products and services generated from program activities
  - Intended targets of the program services and activities
  - Specific changes in program. SMART. **Label as Process Outcome (PO) or Change Outcome (CO)**
  - Specific changes in status, condition, or well-being. Consider: health impacts, economic impacts, environmental impacts, societal impacts.

- **DNP Project Manager time**
  - DNP Project Manager met with Chief of Staff and presented the improvement project.
  - DNP Project Manager

- **Physician meeting time**
  - Physician support for the DNP Project
  - Physician ad hoc membership on the interprofessional team, shared
  - Physician Leadership Team – Chief of Staff, Chief Medical Officer, Department Chairs

- **Supplies and presentation materials**
  - Hospitalist physicians perceived more support by hospital Administration as demonstrated by 10% improvement in the administration of medication.

- **Administration**
  - All staff had a 50% improvement in level of satisfaction and confidence in the medication.
  - Administration received 33% fewer physician complaints regarding medication reconciliation errors and patient outcomes after discharge. There are three full time hospitalists, goal is to reduce by 1/3. (CO)
<table>
<thead>
<tr>
<th>Engagement Survey costs and analysis</th>
<th>developed communication plan and materials. DNP Project Manager attended Medical Executive Committee to present project and results. Physician member(s) invited to the interprofessional team. Physicians to direct concerns about medication reconciliation to the interprofessional team members for tracking. Selection of the evidence-based satisfaction and confidence tool is completed. Baseline satisfaction and confidence levels with the current medication expertise and provided an avenue for physician concerns about medication reconciliation. Physicians participated with the interprofessional team, improved relationships Improved employee engagement and job satisfaction as part of the change process. Improved confidence in the medication reconciliation process. Physicians more confident in the medication reconciliation process and believe that patient care is safer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Manager resources (policy database)</td>
<td>Surgeons Primary Care – Patient Centered Medical Homes Medical Staff Interprofessional Team members Families Pharmacy Staff</td>
</tr>
<tr>
<td>Labor Data analysis time and labor</td>
<td>reconciliati on process by August 2020 75% of interprofessional team members feel more involved with the interdisciplinary care team and had less anxiety about medication reconciliation as measured by the evidence-based tool. (CO) Specific question on the annual Physician Engagement Survey. (CO) The interprofessional team involved with this improvement had increased overall job satisfaction and perceived more involvement in the mission of the organization as documented in the hospital employee engagement survey. (CO)</td>
</tr>
</tbody>
</table>
reconciliation process were established. Satisfaction and confidence levels were measured at the completion of the project to demonstrate improvement.

<table>
<thead>
<tr>
<th>DNP Project Manager time</th>
<th>Interprofessional team member time and labor</th>
<th>Education materials – paper, email resources</th>
<th>Staff member education paid hours – labor cost</th>
<th>Conference room resources</th>
<th>Education Coordinator time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interprofessional team developed education materials for the new process. Educated 100% of the RN staff on Medical Surgical Department about the new process for medication reconciliation. Educated 100% of the Intensive Care Unit RN staff about the new process for medication reconciliation.</td>
<td>Increased confidence in the patient’s understanding of their medication at the time of discharge demonstrated on the post implementation survey Improved perception of patient safety Improved interprofessional relationships in the hospital</td>
<td>Bedside Nurses Pharmacy staff members</td>
<td>OUTCOME 2 75% of identified patients received the medication reconciliation interventions by the interprofessional team by August 2020. (PO) Successfully implemented process improvement for medication reconciliation and discharge education that is applied to 90% of aged 65 plus hospital inpatients (CO)</td>
<td>Successfully implemented process improvement for medication reconciliation and discharge education that is applied to 100% of all hospital inpatients and 100% of all nurses verbalize awareness and understanding of the process (CO)</td>
<td></td>
</tr>
<tr>
<td><strong>DNP Project Manager time</strong></td>
<td><strong>Labor for the team</strong></td>
<td><strong>Discharge education materials cost and potential EMR increased costs</strong></td>
<td><strong>Computer software support / IT</strong></td>
<td><strong>Care Managers Labor</strong></td>
<td><strong>Patient Experience Manager assistance hours for HCAHPS</strong></td>
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<tr>
<td>The interprofessional team is established prior to the project implementation in order to establish baseline data.</td>
<td>Two questions were added to the current discharge phone call process to establish baseline data.</td>
<td>Patient Experience survey data is readily available and was reviewed with the interprofessional team.</td>
<td>Improved patient understanding</td>
<td>Improved patient outcomes</td>
<td>Improved patient confidence in the patient discharge education process and it’s effectiveness</td>
</tr>
<tr>
<td>Improved patient understanding</td>
<td>Improved patient outcomes</td>
<td>Hospital cost savings / decrease in penalties value-based purchasing</td>
<td>Improved community reputation</td>
<td>Teamwork between the professions – Nursing, Pharmacy, physicians</td>
<td>Improved staff confidence in the patient discharge education process and it’s effectiveness</td>
</tr>
<tr>
<td>Outcome 3</td>
<td>Discharge calls</td>
<td>Community members</td>
<td>Interprofessional Team Members</td>
<td>Hospital leadership</td>
<td>Patients and their families</td>
</tr>
<tr>
<td>Patients will report a 25% increase in the level of satisfaction with education about their new medications by August 2020</td>
<td>Patients and their families</td>
<td>Physicians</td>
<td>Care Managers – Discharge calls</td>
<td>Community members</td>
<td>Interprofessional Team Members</td>
</tr>
<tr>
<td>Patients will better understand their discharge medications as evidenced by improved HCAHPS scores. HCAHPS Top Box score for medication communication question and understanding of discharge education material improved by 25% in the first three months following the project implementation. HCAHPS mean score for these same questions improved by 10%. 50% fewer issues found during discharge phone calls when documented by Case Management. HCAHPS performance is evaluated on a monthly basis and reported to the Centers for Medicare and Medicaid Services where it can be viewed by consumers on the website <a href="http://www.hospitalcompare.hhs.gov">www.hospitalcompare.hhs.gov</a> (CO)</td>
<td>Patients in Gillette, Wyoming have a better discharge experience and increased understanding of their medications when receiving instruction from a Pharmacist or interprofessional team member demonstrated through improved annual rolling calendar HCAHPS performance. (CO)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DNP Project Manager</td>
<td>Time</td>
<td>Labor costs</td>
<td>Research time</td>
<td>Quality department labor</td>
<td>Office supplies and materials</td>
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<td><strong>Section of risk stratification tool is completed.</strong></td>
<td><strong>Better understanding and evidence based identification of patients in highest need of assistance.</strong></td>
<td><strong>Staffing efficiency due to the most appropriate resources being assigned to the correct patient at the correct time.</strong></td>
<td><strong>Evidence based and repeatable risk stratification tool was developed.</strong></td>
<td><strong>Patients</strong></td>
<td><strong>Outcome 4</strong></td>
</tr>
<tr>
<td><strong>Families</strong></td>
<td><strong>Interprofessional team</strong></td>
<td><strong>Developed the tool and implemented risk stratification of patients, based upon the 2019 Beers Criteria, and applied the tool to 75% of the population by August 2020. (PO)</strong></td>
<td><strong>Leadership of the hospital</strong></td>
<td><strong>Interprofessional team, utilizing risk stratification tool, identified high risk patients and intervened on their behalf, reducing the readmission in this population by 10%. The team referred these high-risk patients to the Transition Care Manager for continued navigation across hospital service lines. (CO)</strong></td>
<td><strong>Improved care across the continuum of services in the organization.</strong></td>
</tr>
<tr>
<td><strong>Physicians</strong></td>
<td><strong>Interprofessional Team Members</strong></td>
<td><strong>Outcome 5</strong></td>
<td><strong>Interprofessional team will identify and reduce overall medication related errors by 20% by</strong></td>
<td><strong>The improved medication reconciliation process and identification of polypharmacy patients at higher risk for error or adverse drug event, improved the identification of medication errors</strong></td>
<td><strong>Patient outcomes were improved through the reduction of hospital readmission due to adverse</strong></td>
</tr>
<tr>
<td><strong>Leadership of the hospital</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>The DNP Project Manager reviewed and presented to the team hospital quality data regarding</strong></td>
<td><strong>Policy and procedure developed</strong></td>
<td><strong>Teamwork improved / interprofessional relationship improved</strong></td>
<td><strong>Patients</strong></td>
<td><strong>Outcome 5</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Families</strong></td>
<td><strong>Interprofessional team</strong></td>
<td><strong>Developed the tool and implemented risk stratification of patients, based upon the 2019 Beers Criteria, and applied the tool to 75% of the population by August 2020. (PO)</strong></td>
<td><strong>Leadership of the hospital</strong></td>
<td><strong>Interprofessional team, utilizing risk stratification tool, identified high risk patients and intervened on their behalf, reducing the readmission in this population by 10%. The team referred these high-risk patients to the Transition Care Manager for continued navigation across hospital service lines. (CO)</strong></td>
<td><strong>Improved care across the continuum of services in the organization.</strong></td>
</tr>
<tr>
<td><strong>Physicians</strong></td>
<td><strong>Interprofessional Team Members</strong></td>
<td><strong>Outcome 5</strong></td>
<td><strong>Interprofessional team will identify and reduce overall medication related errors by 20% by</strong></td>
<td><strong>The improved medication reconciliation process and identification of polypharmacy patients at higher risk for error or adverse drug event, improved the identification of medication errors</strong></td>
<td><strong>Patient outcomes were improved through the reduction of hospital readmission due to adverse</strong></td>
</tr>
<tr>
<td>Quality department labor</td>
<td>adverse drug events. The interprofessional team developed selection criteria for polypharmacy patients. Medication reconciliation process improvements improved error rates.</td>
<td>Increased interdisciplinary knowledge base, especially about medications. Quantity of patient prescription was reduced. Error identification at the point of care and early in the hospital stay. Patient confidence levels in the care improved.</td>
<td>Interprofessional Team Members Leadership</td>
<td>August 2020 (CO): Outcome 6 Patients (age 65+) who were prescribed 8 or more medications tracked and total quantity of medications prescribed reduced by 2 by August 2020. (PO)</td>
<td>during the hospitalization period by 30%. (PO)</td>
</tr>
<tr>
<td>Office supplies and materials</td>
<td>DNP Project Manager partners with the Quality Department. DNP Project Manager obtains approval for Quality Department resources to assist with the development of “quality Dashboards and other reporting materials were presented to all levels of the organization and will continue beyond the end of the project implementation. Awareness of the problem</td>
<td>Quality staff Interdisciplinary team Physicians Leadership Hospital Governing Board</td>
<td>Outcome 7 Established a quality oversight and quality monitoring strategy by October 2020: Quality Committee of the Board every 6 months.</td>
<td>Adverse drug events were decreased by were reduced by 30%. (CO) Hospital readmissions were reduced by 10% by reducing readmissions related to adverse drug events. (CO) Annual quality oversight and monitoring program with specific data and tools established with a specific reporting structure.</td>
<td>Reduced readmission resulted in a lower cost of care in the Medicare aged target population. Medicare Cost per Beneficiary spending was reduced by 5% (CO)</td>
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<tr>
<td>Policy Manager resources (policy database)</td>
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<tr>
<td>Physician support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNP Project Manager</td>
<td>Labor costs</td>
<td>Quality department labor</td>
<td>Office supplies and materials</td>
<td>Time</td>
<td>Board of Directors time and agenda items</td>
</tr>
</tbody>
</table>
### DNP Project Manager labor

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
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<tbody>
<tr>
<td>Educate staff</td>
<td>Trained and oriented staff capable of executing the goals</td>
</tr>
<tr>
<td>All staff</td>
<td></td>
</tr>
<tr>
<td>DNP Project Manager</td>
<td></td>
</tr>
<tr>
<td>Outcome 8:</td>
<td>All staff will have completed the training and orientation by June 2020</td>
</tr>
</tbody>
</table>

Interprofessional team collaboration improved the staff satisfaction level with the process.

Interprofessional team collaboration improved patient outcomes through sharing of expertise.
Memorandum of Understanding

Between

Misty Robertson, Doctor of Nursing Practice (DNP) student
Boise State University

and

Campbell County Health

This Memorandum of Understanding (MOU) outlines the terms and understanding between Misty Robertson, a DNP student at Boise State University (“Student”), and the Campbell County Hospital District (Campbell County Health, "CCH"), to use an interprofessional team with Nursing, Pharmacy, and Physician support, to improve the current medication reconciliation process and patient discharge education quality, reducing readmissions due to adverse drug events as the DNP project’s long term outcome.

Background

Medicare-aged hospital inpatients, are more likely to suffer readmissions to the hospital within thirty days due to preventable adverse drug reactions that are created when communication is poor at discharge, patients fail to understand the discharge instructions related to their medications, or have been prescribed ten or more medications causing patients to be at higher risk for readmission. Hospitals are penalized for readmission rates as part of value-based purchasing, in addition to the negative implications readmissions may have for patient experience, community perceptions, staff satisfaction, and physician engagement.

At Campbell County Memorial Hospital, the current medication reconciliation processes are problematic because they rely solely on the Registered Nurses to perform all medication reconciliation and discharge education functions, lacking the expertise and comradery of an interprofessional team.
Purpose

To create an interprofessional team at CCH to include Nursing, Pharmacy, and physician support, that will improve the medication reconciliation process and discharge education quality in order to reduce preventable adverse medication events that ultimately lead to hospital readmission within thirty days. The team will develop a risk stratification tool to identify patients at the highest risk for these adverse events. The team will focus on Medicare aged hospital inpatients located in the Medical Surgical Department and Intensive Care Unit during the project implementation time frame.

Intended Project Outcomes

- Long term outcome — reduce hospital readmission rates by decreasing readmissions related to adverse drug events
- Improve the (Press Ganey) patient experience with discharge education and medication understanding
- Improve staff and physician satisfaction and confidence in the medication reconciliation process
- Reduce errors in medication prescribing, understanding, duplication, and quantity of prescriptions while patients rea in the hospital

Duration

The interprofessional team will be established in January and February of 2020 and will begin to establish introductory data requirements, evaluate the current policies and procedures, and develop the risk stratification tool. The project implementation in which results are measured for improvements created will begin in June of 2020 and lasts approximately two months. The project will be completed upon successful project presentation and graduation of the DNP Project Manager in May of 2021. The duration of the project may be extended by mutual agreement of the parties.

Reporting

The DNP Scholarly Project will include a final report, an abstract, an oral presentation of the report and potential publication in May 2021. The DNP student will submit a Final Project Report for publication in ScholarWorks in May 2021. ScholarWorks is a collection of services designed to capture and showcase all scholarly output by the Boise State University community, including doctoral dissertations and doctoral project reports.

Student will comply with all laws governing patient privacy, including but not limited to HIPAA. No personal identifiers will be included, and all data will be reported in aggregate form. Student welcomes any comments or suggestions from Campbell County Health, but reserves the right to
publish findings and analysis according to professional standards and principles of academic freedom. For any work of a scholarly nature, the author agrees to follow the organization(s) preferences in how it is to be named (or not) in the work. The Student is free to publish, present, or use any results arising out of this Study for her own instructional, research, or publication objectives, provided that such publication does not disclose any of CCH's Proprietary Information.

The student will be referenced in any reports or publications by general location and type of agency and not specifically by name.

Duty to update regarding safety information.

Student will promptly notify the CCH of any situation which would adversely affect the health or safety of any patient.

Governing Law.
This Agreement shall be governed by and construed in accordance with the laws of the State of Wyoming. Each of the Parties hereto agrees to venue in and submits to the exclusive jurisdiction of the state and/or federal courts located within the State of Wyoming for any suit, hearing or other legal proceeding of every nature, kind and description whatsoever in the event of any dispute or controversy arising hereunder or relating hereto, or in the event any ruling, finding or other legal determination is required or desired hereunder.

In Witness Whereof, the parties have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

Misty Robertson, Doctor of Nursing Practice program student at Boise State University
MistyRobertson@u.boisestate.edu
208-761-1990 0
Appendix F: Timeline

**Project: Development of an interprofessional team with Pharmacy to improve medication reconciliation processes and thus reduce readmissions related to adverse drug events.**

Misty Robertson DNP Project Manager

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLANNING</strong></td>
<td></td>
</tr>
<tr>
<td>Determine final project scope – team development or patient outcomes</td>
<td>5/20</td>
</tr>
<tr>
<td>Identify outcomes desired</td>
<td>5/20</td>
</tr>
<tr>
<td>Establish team and develop in advance of implementation – after project approval</td>
<td>6/20</td>
</tr>
<tr>
<td>Establish in advance data collection for baseline</td>
<td>6/20</td>
</tr>
<tr>
<td><strong>IMPLEMENTATION</strong></td>
<td></td>
</tr>
<tr>
<td>Team will begin the process improvement</td>
<td>6-20</td>
</tr>
<tr>
<td>Early warning system developed and implemented</td>
<td>9-20</td>
</tr>
<tr>
<td>Medication reconciliation process with team</td>
<td>20</td>
</tr>
</tbody>
</table>
### DATA COLLECTION

<table>
<thead>
<tr>
<th>Outcomes #1 through Outcome #8</th>
<th>6--20</th>
<th>9--20</th>
</tr>
</thead>
</table>

### DATA ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>9-20</th>
<th>12-20</th>
</tr>
</thead>
</table>

### DISSEMINATION

<table>
<thead>
<tr>
<th>Graduate Student Showcase</th>
<th>1/20 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Report</td>
<td>3/20 21</td>
</tr>
</tbody>
</table>
Appendix G: Intervention algorithm
INTERPROFESSIONAL APPROACH TO MEDICATION

Interventions algorithm

Interprofessional team formed

approval to implement project

Initial meeting includes education and pre implementation survey of satisfaction and engagement

survey of satisfaction and engagement done by technology or paper in the presence of the DNP project manager

First 2 - 4 weeks interprofessional team develops project materials - policies and procedures, communication strategy, risk stratification tool...

Stakeholder education at staff meetings

Go Live!!!!

Implementation 4-8 weeks - interprofessional team is collecting data, performing interventions, measuring outcomes

Final project meeting - interprofessional team will complete post survey of satisfaction

survey of satisfaction and engagement done by technology or paper in the presence of the DNP project manager

completion of implementation phase - stakeholders will complete the post survey of satisfaction and engagement

Reporting of results
Appendix H CSACD Tool

Collaboration and Satisfaction about Care Decisions (CSACD)

Please respond to the following questions by circling your response. These questions are related to physician-nurse collaboration during patient care decision making. Please circle the number that best represents your judgment about the decision. All surveys are confidential.

1. Team members plan together to make decisions about care for the patients on this floor.

   1  2  3  4  5  6  7

   Strongly disagree  Strongly agree

2. Open communication among team members about patient care decisions takes place.

   1  2  3  4  5  6  7

   Strongly disagree  Strongly agree

3. Decision-making responsibilities for patients are shared among team members.

   1  2  3  4  5  6  7

   Strongly disagree  Strongly agree

4. Team members cooperate in making decisions about patient care.

   1  2  3  4  5  6  7

   Strongly disagree  Strongly agree

5. In making decisions, all team members concerns about patients’ needs are considered.

   1  2  3  4  5  6  7

   Strongly disagree  Strongly agree

6. Decision-making for patients is coordinated among team members.

   1  2  3  4  5  6  7
Strongly disagree                      Strongly agree

7. How much collaboration among team members occurs when making patient care decisions?

1  2  3  4  5  6  7
No Collaboration                          Complete Collaboration

8. How satisfied are you with the way decisions are made for patients, that is with the decision-making process, not necessarily with the decision itself?

1  2  3  4  5  6  7
Not Satisfied                             Very Satisfied

9. How satisfied are you with the decisions made for patients?

1  2  3  4  5  6  7
Not Satisfied                             Very Satisfied
Appendix I Permission to use CCACD

Judith Baggs
to me

Dear Ms. Robertson,

You are welcome to use the instrument.

I have attached two versions of it, a list of related references, and the original psychometric article.

I have five requests:

1. If you want to make any changes in the instrument, please send me a copy of your proposed revisions before using it

2. If you publish, cite my work appropriately

3. If you publish, do not publish the instrument so that I can maintain copyright and continue to share

4. If you publish, please send me the citation so that I may add it to my reference list

5. Let me know what you find out.

Best wishes,
Judith Baggs

Judith Gedney Baggs, PhD, RN
Professor Emerita
Oregon Health & Science University
University of Rochester
Deputy Editor-in-Chief, The Journal of Interprofessional Care
503-430-7969
baggsj@ohsu.edu
Appendix J: Outcomes Evaluation Table
### OUTCOME 1

**The healthcare team stakeholders in the medication reconciliation process and discharge education had a 50% improvement in level of confidence by August 2020.**

#### Instrument

Collaboration and Satisfaction About Care Decisions Tool (CSACD) developed by Judith G. Baggs 1994, Likert survey with nine questions, can be used with permission. Emailed @contact on 2-9-2020 and permission to use received with 5 requests to honor, but free of charge.

This is a quantitative data collection tool. All stakeholders will be surveyed pre and post utilizing the CSACD Likert scale. The Likert scale will measure the level of confidence and satisfaction in the medication reconciliation interprofessional process.

The instrument will be delivered to the stakeholders just prior to implementation to measure baseline level of confidence in medication reconciliation at the hospital and the ability to have accurate reconciliation for patients.

The instrument will be delivered to the stakeholders post project implementation to compare the level of confidence and engagement.

#### Data

The CSACD instrument has 9 questions on a seven-point scale and measures both collaboration and satisfaction. Data will be collected by technology or paper at the meeting in the presence of the DNP project manager to have participation in the small sample.

#### Analysis Goal

1. To understand the level of confidence and engagement in the improved medication reconciliation process.
2. To understand if the stakeholders believe that the process identifies potential medication errors and prevents them from reaching patients.
3. To determine if the stakeholders find value in the interprofessional team model.
4. To understand if the stakeholders believe the patient understanding of discharge instructions regarding medications has improved.
5. To reduce the quantity of complaints received from the physicians by 33%.
Aggregate data will be reported from the raw data collected by the survey in order to protect the confidentiality of the participants.

The tool cannot be published without permission per the author’s request. It is copywrite.

### OUTCOME 2

75% of identified patients received the medication reconciliation interventions by the interprofessional team by August 2020

**Instrument**

Medication Reconciliation checklist will include “yes or no” question

Nominal level data will result from the dichotomous item used, yes or no, did the patient receive medication reconciliation interventions by the interprofessional team, etc. The data will be reported as a percentage of the time that the desired outcome occurred.

This data currently resides within the hospitals electronic medical record, Meditech. The data source will be the medication reconciliation record. Review can be completed retrospectively and concurrently to collect each element.

**Data**

A percentage of patients who received medication reconciliation interventions by the interprofessional team versus the percentage of patients who did not provides a relative frequency that the desired outcome occurred.

The Project Manager will collect nominal data regarding the percent of patients receiving the interventions

1. To determine the frequency that the interprofessional team is completing medication reconciliation interventions on the target population.

2. Long term, to determine if the target population that had medication reconciliation by the interprofessional team had a lower rate of readmissions to the hospital within 30 days.

3. The Project Manager will evaluate the nominal data, either yes the patient received the intervention or no, the medication reconciliation was completed by the RN alone.

### Outcome 3

Patients will report a 25% increase in satisfaction with the education process regarding new medications during

**Instrument**

Semi structured interviews, a qualitative data collection method will be used for this outcome. Structured interviews will be completed during Discharge phone calls with specific questions added

1. To understand how patients perceive the discharge education process related to
**Outcome 4**
The interprofessional team developed the tool and implemented risk stratification using the tool, based upon the 2012 Beers Criteria, and applied the tool to 75% of the patients by August 2020.

**Instrument**
MedRec checklist will be utilized to determine if the tool was applied to 75% of patients.

Yes or no was the tool developed based on the Beers Criteria.

**Data**
Nominal level data, what percentage of the time did the team apply the risk stratification tool.

| 1. Do patients that were risk stratified as higher risk receive medication reconciliation by the team pharmacist. |
| 2. Does risk stratification assist in the identification of errors. |

**Outcome 5**
The interprofessional team will identify and reduce overall medication related

**Instrument**
A checklist will be utilized to track the target population and the errors that are identified. Potential error categories will be identified by the Interprofessional Team Pharmacist.

| 3. Does the improved medication reconciliation process identify errors in prescribing, duplication, |
| 4. Did the patient satisfaction improve in the discharge / medication understanding domain? |
| 5. How many patients believed there were problems at home even after the improvement process? |
| 6. Did the patient satisfaction improve in the discharge / medication understanding domain? |

**Data**
Data collected from the Discharge Phone calls will be categorized into groups of similar patient responses such as:

1. Patient did or did not understand medications
2. Patients did or did not have problems at home with their medications.
3. Trend any other similar comments found in the notes.

**Outcome 4**

**discharge phone calls by August 2020.**

by the interprofessional team members. New questions to be asked of discharged patients:

1. Did you understand the medications you were prescribed when you left the hospital?
2. Did you have any problems taking your medications at home?

**Data**

medication instructions.

2. Is it beneficial to the patient when the interprofessional team conducts the discharge education or has developed the material?
3. How many patients believed there were problems at home even after the improvement process?
4. Did the patient satisfaction improve in the discharge / medication understanding domain?
### Outcome 6
**Reduced the total quantity of prescriptions by at least 2 in patients receiving 8 or more prescriptions by August 2020.**

<table>
<thead>
<tr>
<th><strong>Data</strong></th>
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</thead>
<tbody>
<tr>
<td>This will be nominal level data. Was the number of prescriptions reduced by 20%, yes or no, as compared to the number of prescriptions previously noted before the intervention. Actual number of prescriptions data will be included pre and post implementation, as well as the percentage of compliance with the outcome goals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Instrument</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A checklist will be used to determine if patients had 8 or more medications at discharge and compare to the quantity of medications prescribed at discharge.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Data</strong></th>
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</thead>
<tbody>
<tr>
<td>This will be nominal level data. Was the number of medications reduced and in what percentage of the patients.</td>
</tr>
</tbody>
</table>

1. Does the improved medication reconciliation process reduce the quantity of medications in polypharmacy patients?

### Outcome 7
**Established a quality oversight and quality monitoring strategy by September 2020.**

<table>
<thead>
<tr>
<th><strong>Instrument</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A “dashboard” or “stoplight report” is commonly used for monitoring different outcomes and visibly indicating whether they were met, partially met, or not met by colors red, yellow, green like a stoplight. Something like a “visual checklist”. DNP checklist will include yes or no, was this established.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Data</strong></th>
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</thead>
<tbody>
<tr>
<td>Data is as described in all of the outcomes listed. Yes or no, was the outcome goal met. Capture existing nominal data to ensure that the project has a case for performance improvement as well as baseline data to compare for the long-term outcomes.</td>
</tr>
</tbody>
</table>

1. Develop one central data / results location that is easily understandable to lay people
2. Determine if basic project “to do” items were executed
| Outcome 8                                                                 | Instrument                      | 1. Did the staff have an understanding of the project?  
| All staff and stakeholders will have completed the training by June 2020. | Attendance log                  | 2. Did the stakeholders understand why this project was important?  
|                                                                     | Data                             |  
|                                                                     | Nominal level data, percent completed the required training |  

Appendix K Instruments: Survey instrument

Stakeholder survey of satisfaction and confidence with the medication reconciliation process, pre and post

Misty Robertson DNP student, Boise State University

Date Completed______________ Pre Survey_______ Post Survey________

DEMOGRAPHICS

Profession____________________________________________________________

Member of the interprofessional team? ________________________________

Collaboration and Satisfaction about Care Decisions (CSACD)

Please respond to the following questions by circling your response. These questions are related to physician-nurse collaboration during patient care decision making. Please circle the number that best represents your judgment about the decision. All surveys are confidential.

1. Nurses and physicians plan together to make decisions about care for the patients on this floor.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree

2. Open communication between physicians and nurses about patient care decisions takes place.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree

3. Decision-making responsibilities for patients are shared between nurses and physicians.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree

4. Physicians and nurses cooperate in making decisions about patient care.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree

5. In making decisions, both nursing and medical concerns about patients’ needs are considered.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree

6. Decision-making for patients is coordinated between physicians and nurses.
   1                2               3                  4                  5                   6                   7
   Strongly disagree                                                                                       Strongly agree
7. How much collaboration between nurses and physicians occurs when making patient care decisions?

1                2               3                  4                  5                   6                   7
No Collaboration                          Complete Collaboration

8. How satisfied are you with the way decisions are made for patients by physicians and nurses on this floor, that is with the decision-making process, not necessarily with the decisions themselves?

1                2               3                  4                  5                   6                   7
Strongly disagree                          Strongly agree

9. How satisfied are you with the decisions made for patients on this floor?

1                2               3                  4                  5                   6                   7
Strongly disagree                          Strongly agree

Thank you for your participation in this DNP project! Results will be kept anonymous and for the purposes of measuring a performance improvement project.
## Appendix L: MedRec Checklist

**Medication Reconciliation Checklist**

DNP Student: Misty Robertson, Boise State University

<table>
<thead>
<tr>
<th>Patient initials</th>
<th>Date</th>
<th>Age</th>
<th>Unit</th>
<th># Rx Admission</th>
<th># Rx D/C</th>
<th># errors</th>
<th>Who completed MedRec?</th>
<th>Team Yes / No</th>
<th>Correction made?</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
### Appendix M: Errors Audit Checklist

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Dosage error</th>
<th>Possible interaction</th>
<th>Prescribing error</th>
<th>High-risk drugs</th>
<th>Administration error</th>
<th>Duplication</th>
<th>Missed drug / Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
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<td>Patient initials</td>
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<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
<td></td>
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<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
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</tr>
<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
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</tr>
<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
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</tr>
<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Patient initials</td>
<td>Date</td>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix N: Discharge Phone Call Log

<table>
<thead>
<tr>
<th>Patient Initials</th>
<th>Date</th>
<th>Age</th>
<th>Did you understand the medications you were prescribed when you left the hospital?</th>
<th>Did you have any problems taking your medications at home?</th>
<th>Other Medication concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Misty Robertson, DNP student, Boise State University
### Table 1 (continued from page 3)

<table>
<thead>
<tr>
<th>Organ System/Therapeutic Category</th>
<th>Drug(s)</th>
<th>Quality of Evidence (QE) &amp; Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonbenzodiazepine hypnotics</td>
<td>Lorazepam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Alprazolam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Gabapentin, pregabalin</td>
<td>Gabapentin, pregabalin</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Venlafaxine</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antipsychotics, first (conventional and second (atypical) generation)</td>
<td></td>
<td>QE = Moderate; SR = Strong</td>
</tr>
<tr>
<td>Lithium</td>
<td>Lithium</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Diazepam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>Methohexital</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Levetiracetam, lacosamide</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antipsychotics, atypical</td>
<td>Olanzapine, quetiapine</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Clopidogrel, diltiazem, enalapril, losartan</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antiplatelet agents</td>
<td>Clopidogrel, diltiazem, enalapril, losartan</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Enalapril, losartan, erlotinib, ezetimibe, imatinib, itraconazole, low-dose aspirin</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
</tbody>
</table>

**TABLE 1 (continued from page 3)**

<table>
<thead>
<tr>
<th>Organ System/Therapeutic Category</th>
<th>Drug(s)</th>
<th>Quality of Evidence (QE) &amp; Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonbenzodiazepine hypnotics</td>
<td>Laiatripam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Nonbenzodiazepine hypnotics</td>
<td>Zolpidem</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Estazolam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Midazolam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Ramelapam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antipsychotics, atypical</td>
<td>Clozapine, olanzapine, quetiapine</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Lamotrigine, levetiracetam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Valproate</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Carbamazepine, gabapentin</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Topiramate</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Enalapril, losartan, ramipril, simvastatin</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, dabigatran, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Apixaban, dabigatran, edoxaban, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
</tbody>
</table>

**TABLE 1 (continued from page 4)**

<table>
<thead>
<tr>
<th>Organ System/Therapeutic Category</th>
<th>Drug(s)</th>
<th>Quality of Evidence (QE) &amp; Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonbenzodiazepine hypnotics</td>
<td>Lorazepam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Nonbenzodiazepine hypnotics</td>
<td>Alprazolam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Diazepam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Venlafaxine</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antipsychotics, first (conventional and second (atypical) generation)</td>
<td></td>
<td>QE = Moderate; SR = Strong</td>
</tr>
<tr>
<td>Lithium</td>
<td>Lithium</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Diazepam</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>Methohexital</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Levetiracetam, lacosamide</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antipsychotics, atypical</td>
<td>Olanzapine, quetiapine</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Clopidogrel, diltiazem, enalapril, losartan</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>Warfarin, rivaroxaban</td>
<td>QE = High; SR = Strong</td>
</tr>
</tbody>
</table>

**Footnote:**
- QE: Quality of Evidence
- SR: Strength of Recommendation

---

**PAGE 4** Copyright © 2012 by the American Geriatrics Society
### Table 1: Criteria for Potentially Inappropriate Medication Use in Older Adults

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Therapeutic Category/Drug(s)</th>
<th>Recommendation</th>
<th>Effect on Quality of Evidence (QE)</th>
<th>Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory</td>
<td>Anticholinergic agents</td>
<td>Avoid</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>Non-steroidal anti-inflammatory drugs (NSAIDs)</td>
<td>Avoid if not contraindicated</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Criteria for Potentially Inappropriate Medication Use in Older Adults Due to Drug-Drug Interactions or Drug-Disease Interactions That May Exacerbate the Disease or Syndrome

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Drug(s)</th>
<th>Recommendation</th>
<th>Effect on Quality of Evidence (QE)</th>
<th>Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory</td>
<td>Acetylcholinesterase inhibitors (AChEIs)</td>
<td>Avoid</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>Antihypertensives</td>
<td>Avoid if not contraindicated</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: Criteria for Potentially Inappropriate Medication Use in Older Adults Due to Drug-Disease Interactions or Drug-Disease Interactions That May Exacerbate the Disease or Syndrome

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Drug(s)</th>
<th>Recommendation</th>
<th>Effect on Quality of Evidence (QE)</th>
<th>Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory</td>
<td>Anticholinergic agents</td>
<td>Avoid</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>Non-steroidal anti-inflammatory drugs (NSAIDs)</td>
<td>Avoid if not contraindicated</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4: Criteria for Potentially Inappropriate Medication Use in Older Adults Due to Drug-Drug Interactions or Drug-Disease Interactions That May Exacerbate the Disease or Syndrome

<table>
<thead>
<tr>
<th>Organ System</th>
<th>Drug(s)</th>
<th>Recommendation</th>
<th>Effect on Quality of Evidence (QE)</th>
<th>Strength of Recommendation (SR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory</td>
<td>Anticholinergic agents</td>
<td>Avoid</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>Non-steroidal anti-inflammatory drugs (NSAIDs)</td>
<td>Avoid if not contraindicated</td>
<td>QE = Moderate, SR = Strong</td>
<td></td>
</tr>
</tbody>
</table>
# Appendix P: Project Expense Report

| Personnel | RN wages - MedSurg Care Managers | Team representatives, education hours - estimate 1 hour education, 4 hours per week for 4 RN | Variable | 160 | $ 40.00 | $ 6,400.00 |
| Personnel | Pharmacist wages | Team representatives, education hours - estimated weekly meetings and education time | Variable | 20 | $ 70.00 | $ 1,400.00 |
| Personnel | DNP Project Manager | Project implementation hours - estimate 10 hours per week, Education time 10 hours | Variable | 90 | $ 90.00 | $ 8,100.00 |
| Personnel | Physician Champion | Team representatives, education hours, Medical Staff Meetings | Variable | 16 | $ 250.00 | $ 4,000.00 |
| Personnel | IT support hours | Discharge Instructions - adding survey questions, Surveys | Fixed | 2 | $ 50.00 | $ 100.00 |
| Personnel | Quality Analysts | Organizational dashboards | Fixed | 2 | $ 40.00 | $ 80.00 |
| Personnel | Administrative support wages | Administrative Assistant to the CNO | Variable | 10 | $ 25.00 | $ 250.00 |

## Material & Supplies

| Material & Supplies | Paper, printing, ink, pens, survey materials | Office supplies | Fixed | 1 | $ 100.00 | $ 100.00 |
| Patient Education materials | Discharge Education Materials - paper, EMR adjustment costs - IT | Paper / pamphlets for some patients, electronic discharge instructions, printing of these discharge instructions | Fixed | 1 | $ 500.00 | $ 500.00 |
| Meeting Room space | Team Meeting space - donation in kind value | Room charge for team meetings donation in kind value, weekly meetings | Fixed | 8 | $ 150.00 | $ 1,200.00 |

## Miscellaneous

| Community | Public Health | DNP Project Manager and public health officials. Meetings to establish relationship, share data, monitor readmissions long term | Fixed | 2 | $ 100.00 | $ 200.00 |
| Board | Board Meeting / Education | Education to the Board, presentation of data by the DNP Project Manager | Fixed | 1 | $ 100.00 | $ 100.00 |
| Committee Meetings | Quality Committee, Nurse Quality Committee data presentation | Present data, trend future performance - DNP Project Manager | Fixed | 2 | $ 100.00 | $ 200.00 |
### Appendix Q 2 – 3 Year Budget Plan

(Misty Robertson) 2-3 Year Budget

<table>
<thead>
<tr>
<th>Expense Category</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel - RN wages - MedSurg, Care Managers</td>
<td>$ 6,400.00</td>
<td>$ 25,708.80</td>
<td>$ 52,915.20</td>
<td>Pilot 4 RN's spending 1 hour per week on interprofessional team, Year 2 expand to additional patients by 50% more, added 4 RN's for three hours per week, Year 3, expanded to 100% of patients on MedSurg and ICU, added 4 RN's 6 hours per week average, plus 3% salary increase per year, estimate rate @ $40.00 Year 1</td>
</tr>
<tr>
<td>Personnel - Pharmacist</td>
<td>$1,400.00</td>
<td>$22,495.20</td>
<td>$42,442.40</td>
<td>Pilot is 1 Pharmacist attending 1 hour weekly team meeting, 1 hour of prep, 30 minutes of patient rounding, $70 per hour cost, Year 1 expand to 1 Pharmacist for three hours of meeting time, 2 hours prep, 1 hour patient rounding = 6 hrs for 52 weeks, Year 2 expand to 1 Pharmacist for 6 hours of meeting time, three hours to prep, 2 hours of patient rounding = 11 hours for 52 weeks, 3% annual wage increase expected</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------</td>
<td>------------</td>
<td>------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Personnel - DNP Project Manager</td>
<td>$8,100.00</td>
<td>$4,680.00</td>
<td>-</td>
<td>DNP Project Manager pilot estimate was 90 hours, this time will decrease as the project becomes sustainable over Year 2 and 3, Year 2 estimate 1 hour per week to monitor, Year 3 transfer to another leader for long term</td>
</tr>
<tr>
<td>Personnel</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Physician Champion</td>
<td>$4,000.00</td>
<td>$3,000.00</td>
<td>$3,000.00</td>
<td></td>
</tr>
<tr>
<td>Physician Champion Pilot attends weekly meetings when possible at average rate of $250 / hour, Year 2 and Year 3, meet monthly for one hour due to cost and time constraints, reviews data and provides medical direction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT support hours</td>
<td>$100.00</td>
<td>$1,200.00</td>
<td>$1,800.00</td>
<td></td>
</tr>
<tr>
<td>Estimate the need for consistent small amount of IT personnel support to maintain staff access to various medical records and troubleshoot problems, Estimate approx 2 hours per month Year 1 and 3 hours per month Year 2 with more personnel involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Analysts</td>
<td>$80.00</td>
<td>$960.00</td>
<td>$1,440.00</td>
<td></td>
</tr>
<tr>
<td>Quality analysts same as IT estimate for dashboard maintenance and reporting of results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative support wages</td>
<td>$250.00</td>
<td>$1,300.00</td>
<td>$1,339.00</td>
<td></td>
</tr>
<tr>
<td>Estimated approx 1 hour per week to support, may decrease as the role transitions to a department $25 / hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material &amp; Supplies</td>
<td>$100.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Patient Education materials</td>
<td>$ 500.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meeting Room space</td>
<td>$ 1,200.00</td>
<td>$ 23,400.00</td>
<td>$ 46,800.00</td>
<td></td>
</tr>
<tr>
<td>Meeting room space estimate $150 per meeting - team meetings listed above, 3 per week Year 2, 6 per week Year 3, due to high cost would try to find cheaper alternate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous - support and educational meetings in the community</td>
<td>$ 500.00</td>
<td>$ 500.00</td>
<td>$ 500.00</td>
<td></td>
</tr>
<tr>
<td>Estimate Miscellaneous to remain about the same - community support meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix R: Project Statement of Operations
## Statement of Operations

### Operating Income

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell County Memorial Hospital - payroll, employees and Physician</td>
<td>Personnel costs are a donation in kind by Campbell County Memorial Hospital - salaried and hourly employees, including the DNP Project Manager, and Hospitalist Physician - ROI is the potential improvement to the organization from this DNP Project</td>
<td>$20,330.00</td>
</tr>
<tr>
<td>Campbell County Memorial Hospital - Department of Nursing Services</td>
<td>Material and Supplies - Donation in kind from the DNS Department for quality improvement purposes</td>
<td>$100.00</td>
</tr>
<tr>
<td>Campbell County Memorial Hospital - MedSurg Department</td>
<td>Patient Education Materials - discharge instructions and medication information - donation in kind for quality improvement purposes</td>
<td>$500.00</td>
</tr>
<tr>
<td>Campbell County Memorial Hospital Administration</td>
<td>Meeting Room space - donation in kind for team meetings - cost to rent similar space</td>
<td>$1,200.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell County Memorial Hospital - Department of Nursing Services</td>
<td>Miscellaneous - DNP Project Manager time and materials to market and support the project in community forums - donation in kind</td>
<td>$500.00</td>
</tr>
</tbody>
</table>

### Expenses Total

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel - RN wages - MedSurg, Care Managers</td>
<td>$6,400.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - Pharmacist wages</td>
<td>$1,400.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - DNP Project Manager</td>
<td>$8,100.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - Physician Champion</td>
<td>$4,000.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - IT support hours</td>
<td>$100.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - Quality Analysts</td>
<td>$80.00</td>
<td></td>
</tr>
<tr>
<td>Personnel - Administrative support wages</td>
<td>$250.00</td>
<td></td>
</tr>
<tr>
<td>Material &amp; Supplies</td>
<td>$100.00</td>
<td></td>
</tr>
<tr>
<td>Patient Education materials</td>
<td>$500.00</td>
<td></td>
</tr>
<tr>
<td>Meeting Room space</td>
<td>$1,200.00</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous - support and educational meetings in the community</td>
<td>$500.00</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Operations based upon Year 1 Implementation
Date: May 27, 2020

To: Cara Gallegos  
cc: Misty Robertson

From: Social & Behavioral Insitutional Review Board (SB-IRB)  
c/o Office of Research Compliance (ORC)

Subject: SB-IRB Notification of Approval - Original - 186-SB20-088  
Interprofessional approach to medication reconciliation in the hospitalized Medicare patient

The Boise State University IRB has approved your protocol submission. Your protocol is in compliance with this institution’s Federal Wide Assurance (#0000097) and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Protocol Number: 186-SB20-088  
Expires: 5/26/2021

Received: 5/12/2020  
Review: Expedited

Approved: 5/27/2020  
Category: 5, 7

Your approved protocol is effective until 5/26/2021. To remain open, your protocol must be renewed on an annual basis and cannot be renewed beyond 5/26/2023. For the activities to continue beyond 5/26/2023, a new protocol application must be submitted.

ORC will notify you of the protocol’s upcoming expiration roughly 30 days prior to 5/26/2021. You, as the PI, have the primary responsibility to ensure any forms are submitted in a timely manner for the approved activities to continue. If the protocol is not renewed before 5/26/2021, the protocol will be closed. If you wish to continue the activities after the protocol is closed, you must submit a new protocol application for SB-IRB review and approval.

You must notify the SB-IRB of any changes to your approved protocol and the committee must review and approve these changes prior to their commencement. You should also notify the committee if your activities are complete or discontinued.

Current forms are available on the ORC website at http://goo.gl/D2FYTV
Please direct any questions or concerns to ORC at 426-5401 or humansubjects@boisestate.edu.

Thank you and good luck with your research.
Appendix U: IRB Mod #1 Approval #186-SB20-088

Date: June 15, 2020  
To: Cara Gallegos  cc: Misty Robertson  
From: Social & Behavioral Insitutional Review Board (SB-IRB)  
c/o Office of Research Compliance (ORC)  
Subject: SB-IRB Notification of Approval - Modification - 186-SB20-088  
Interprofessional approach to medication reconciliation in the hospitalized Medicare patient

The Boise State University IRB has approved your proposed modifications to your protocol application. Your protocol is still in compliance with this institution’s Federal Wide Assurance (#0000097) and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Protocol Number: 186-SB20-088  
Received: 6/10/2020  
Review: Expedited

Expires: 5/26/2021  
Approved: 6/15/2020

This approval does not extend or change your protocol's current expiration date noted above.

You must notify the SB-IRB of any additional changes to your approved protocol using the Biosafety Protocol Update form. The SB-IRB must review and approve the modifications before they can begin.

All forms are available on the ORC website at http://goo.gl/D2FYTV

Please direct any questions or concerns to ORC at 426-5401 or humansubjects@boisestate.edu.

Thank you and good luck with your research.
## Appendix V: Early warning system, Screening in Meditech

<table>
<thead>
<tr>
<th>Takes 8 or more medications</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient taking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Anticholinergics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Benzodiazepines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NSAIDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ None of these</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Anticholinergics such as Dimenhydrinate or Diphenhydramine
Benzodiazepines such as Lorazepam, Alprazolam, or Diazepam
NSAIDS such as Aspirin, Ibuprofen, Naproxen, Meloxicam, or Etodolac

<table>
<thead>
<tr>
<th>Pharmacy consult indicated</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Pt is &gt;64, taking more than 8 meds, and one of the three categories, order a Pharmacy Consult. If unable to accurately confirm medications, put in Nursing Communication Order to complete when able.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix W: Pharmacy consult order, in EMR

<table>
<thead>
<tr>
<th>Type</th>
<th>Suggestions</th>
<th>Action</th>
<th>Trigger</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>Consult to Pharmacy</td>
<td>Order Now</td>
<td>Pharmacy consult indicated</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Triggered By**

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Answer</th>
<th>Reason</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy consult indicated</td>
<td>Yes</td>
<td>Equal to Yes</td>
<td>General Questions</td>
</tr>
</tbody>
</table>

**Select Action**

- Do Not Order or Remind Again
- Order Now
- Queue for Order
- Undecided (Remind Again)
## Appendix X: Discharge questions in the EMR for patients in the project population

### Interventions
- Patient Call Back (MS and ICU)

### Assessments
- **Patient Call Back Questionnaire**
  - **Attempts**
    - New Callback Attempts
    - Add a Callback Attempts
  - **Call Back Questions**
    - Hello, this is ______, you were discharged from CCH. I am calling to check in with you and see how you are feeling after your stay with us.
    - **Do you have 5 minutes to visit with me?**
    - **Are you currently experiencing any unresolved symptoms related to your hospital stay?**
    - **When you returned home, did you notice any needs that were not met?**
    - **Did you receive instructions about disease and symptom management?**
      - During your hospital stay and at discharge
      - Only at discharge
      - Do not remember
    - **Did you receive instructions about what symptoms or concerns to call and report to your doctor?**
      - During your hospital stay and at discharge
      - Only at discharge
      - Do not remember
    - **Were you able to fill your prescription medications? If not, why?**
    - **Are you able to take your medications as prescribed?**
    - **Did we schedule a follow-up visit with your healthcare provider?**
    - **Are you able/planning to see your healthcare provider as scheduled?**

### Call Notes/Comments

### Closing

Thank you for choosing Campbell County Health. In about a week, you will receive a survey letter from Press Ganey. We would really appreciate you taking time to complete the survey. Your response is very important to us, as it helps us to know what we did well and how we can improve the care we provide.

Nurse concerns that may lead to re-admission (refer to Care Managers)

---

Reported to Care Managers
- **Yes**
- **No**
- Comment:
  - Use group email address for the "Care Managers"
Appendix Y: Pre-improvement Survey Response Rate per CSACD Question

Pre-improvement Survey Response per Question
Collaboration and Satisfaction about Care Decisions (CSACD)

- Satisfaction with decisions
- Satisfaction with the way decisions are made
- How much collaboration?
- Decision making for patients is coordinated
- Consider both nursing and medical concerns
- Physicians / nurses cooperate
- Shared decision making responsibilities
- Open communication between nurses / physicians
- Nurses / physicians plan together

Number of Responses for each Rating 1 Strongly Agree to 7 Strongly Disagree
Appendix Z: CSACD Survey Comparison of Mean Score Pre and Post

CSACD Survey
Comparison Of Mean Score - Pre and Post
Where 1 = Strongly Disagree and 7 = Strongly Agree

- Satisfaction with decisions
- Satisfaction with the way decisions are made
- How much collaboration?
- Decision making for patients is coordinated
- Consider both nursing and medical concerns
- Physicians / nurses cooperate
- Shared decision making responsibilities
- Open communication between nurses / physicians
- Nurses / physicians plan together

Post Mean Performance
Pre Mean Performance
Appendix AA: Discharge phone call questions – results UPDATED

Discharge phone call questions: Able to take meds as prescribed?

- Yes: 51
- No: 4

Discharge phone call questions: Someone explain meds in the hospital?

- Yes: 50
- No: 4
Discharge phone call questions: Understand meds you were prescribed?

- Yes: 48
- No: 7
Appendix BB: Discharge call back questions – comments in categories UPDATED

![Bar chart showing comment categories and their number of comments](chart.png)
Appendix CC: Medication Errors Audit – types of medication issues UPDATED

![Bar chart showing types of medication issues and their occurrences](chart.png)

- Missed drug / Rx: 2 occurrences
- Duplication: 4 occurrences
- Administration error: 1 occurrence
- High risk drugs: 1 occurrence
- Prescribing error: 1 occurrence
- Possible interaction: 1 occurrence
- Dosage Error: 3 occurrences

Number of occurrences of the issue
### Appendix DD: Table of reductions of prescriptions from admission to discharge - UPDATED

**July 2020**

<table>
<thead>
<tr>
<th>Totals</th>
<th># Rx Admission</th>
<th># Rx D/C</th>
<th># D/C Meds (Short term)</th>
<th>Adjusted #Rx D/C</th>
<th>% Change from Admit to Discharge</th>
<th>% Change from Admit to Discharge (Short Term Meds Excluded)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>248</td>
<td>257</td>
<td>24</td>
<td>236</td>
<td>3.63%</td>
<td>-4.84%</td>
</tr>
</tbody>
</table>

**August 2020**

<table>
<thead>
<tr>
<th>Totals</th>
<th># Rx Admission</th>
<th># Rx D/C</th>
<th># D/C Meds (Short term)</th>
<th>Adjusted #Rx D/C</th>
<th>% Change from Admit to Discharge</th>
<th>% Change from Admit to Discharge (Short Term Meds Excluded)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>154</td>
<td>166</td>
<td>36</td>
<td>130</td>
<td>7.79%</td>
<td>-15.58%</td>
</tr>
</tbody>
</table>