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# Medication Reconciliation in the Elderly

Munjanja Yvonne Litell
*Walden University*

# Walden University

College of Health Sciences

This is to certify that the doctoral study by

Munjanja Litell

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee
Dr. Janice Long, Committee Chairperson, Nursing Faculty
Dr. Nancy Hadley, Committee Member, Nursing Faculty
Dr. Mark Wells, University Reviewer, Nursing Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

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2018

Abstract

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Munjanja Yvonne Litell


MS, Walden University, 2016

MBA, Marymount University, 2006

BSN, Maryland University, 2001


Project Submitted in Fulfillment

of the Requirements for the Degree of

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Abstract

Medication therapy is the most prevalent and critical intervention of health delivery and the source of most errors in healthcare. Medication errors and associated adverse drug events (ADE) have serious health and economic ramifications, and in elderly patients ADE are the leading cause of morbidity and mortality. Medication reconciliation is the process of evaluating current medication treatment to manage the risk and optimize the outcomes of medication treatment by detecting, solving, and preventing ADEs. This education project answered the question whether education provided to long term care staff would improve knowledge of medication reconciliation and be retained over time. The education program was developed through results of a literature search to identify evidence-based standards for medication reconciliation. The guiding theory for program was Kurt Lewin's theory of planned change. The test was developed on the medication reconciliation content and arrangements made for each of the 30 participants who were RNs, LPNs, and CMAs to take the test before and after the education program and again at 30 and 45 days. Results showed statistically significant improvement ($p < 0.05$) with knowledge of medication reconciliation retained at 30- and 45-days post intervention. Positive social change is possible as nurses and CMAs in the long-term care facility use the knowledge of medication reconciliation to improve patient medication safety for the long-term care residences in the facility. Through appropriate reconciliation, medication errors and ADEs can be reduced or prevented and patient outcomes improved.

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      I thank my husband for all his assistance and support during this long academic journey.  I had clean clothes and food ready even when I had barely spent 30 minutes at home.  Brian has been my rock during my times of high stress.  I thank him for just being there because I am aware that there are times that I have not been fun to be around.  I thank my friend Janet who has travelled this journey in the past and has given encouragement when I thought I could not do this.  I would also like to take a moment and thank the faculty at the for the instruction and guidance given during this journey.  I now look forward to the end.

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**Introduction**

Medication therapy is the most prevalent and critical intervention of health

delivery and the source of most errors in healthcare (Vogelsmeier, Pepper, & Oderda,

2013). Medication errors and associated adverse drug events (ADE) have serious

economic ramifications, and in elderly patients, they are the leading cause of morbidity

and mortality. Approximately 175,000 people 75 years and older are seen in emergency

departments for adverse medication reactions each year (American Society of Aging

[ASA], 2012). The risks for adverse reactions are increased particularly in the elderly as

they transition from one care setting to another. The risk for adverse medication

reactions is further increased due to poor communication and inadvertent information

loss as the transitions occur (Alessandro, Garattini, & Manmucci, 2011). The Office of

the Inspector General reported that among Medicare beneficiaries in Part A with a

subacute care stay of less than 35 days, 22% of these patients experienced a medication

adverse event and 11% experienced temporary medication adverse events which resulted

in hospitalization in 2014 (Brandt & Zarowitz, 2015). The proposed intervention aimed

at improving patient safety which is in alignment with Joint Commission and the Institute

of Medicine (The Joint Commission [TJC], 2002; IOM, 2000). Walden's social change

mission includes four key goals, which are leveraging Walden's research capabilities,

strengthening the impact of Walden's curricula to educate agents of social change, raising

social change consciousness, and continuing to improve ongoing social change support,

engaging current students, faculty, alumni, and community partners (Walden University,

2017).  This intervention was intended to enhance medication reconciliation protocol through education for the nursing staff in long-term care facilities, and it may reduce medication adverse effects, thus supporting all four goals of Walden's social change mission, TJC, and IOM patient safety goals.

**Problem Statement**

Transitions from one care setting to another, such as admission to the hospital and discharge to skilled nursing facilities may lead to medication errors due to poor communication and inadvertent information loss (Kwan, Lo, Sampson, & Shojania, 2013).  Unintentional omissions and erroneous transcriptions of patient medication profiles during hospital admissions and discharges to home or subacute facilities result in medication adverse effects and rehospitalization (Kwan et al., 2013; van Sluisveld, Zegers, Natsch, & Wollersheim, 2012).  Some of the medication omissions are intentional, such as those seen in discontinued antihypertensive medications for patients admitted for septic shock; in septic shock, blood pressure is already too low, so administering antihypertensive medications would exacerbate the patients' condition. However, other omissions are unintentional, resulting in inaccurate and incomplete medications and doses (Kwan et al., 2013).  Medication errors are among the major healthcare concerns that lead to patient harm and most commonly occur due to incomplete overview of medications by the receiving medical staff or incomplete preparation of medication lists by the transferring medical staff.  These events typically occur during patient referral or transition from one care setting to another (van Sluisveld

et al., 2012). This same problem occurs in the clinical setting where this project took place and is the primary rationale for this Doctor of Nursing Practice (DNP) project.

**Nursing Practice Problem**

Ensuring safe use of medications is of great importance to all health systems as medication therapy is one of the most prevalent interventions in medicine (Lehnbom, Stewart, Mania, & Westbrook, 2014). Medication errors are considered the single most preventable cause of harm in hospitals, skilled facilities, long-term care facilities, and in community settings (i.e., not in a medical care facility), yet medication errors occur frequently in all these settings (Lehnborn et al., 2014). Medication errors have the potential to result in serious harm and even death (Kwan et al., 2014). Injuries that result from medications are referred to as ADEs and it is estimated that 25% of all ADEs are caused by medication errors (Kwan et al., 2014). Medication errors are common and can result in actual harm to patients (Kwan et al., 2014). Medication reconciliation is defined as a process of obtaining a complete and accurate list of current patient medications and comparing this list with medication orders at each point of care transition to identify and rectify discrepancies to prevent patient harm (Lehnbom et al., 2014). Medication review is defined as the process of evaluating current medication treatment to manage the risk and optimize the outcomes of medication treatment by detecting, solving, and preventing medication-related problems (Lehnborn et al., 2014).

**Relevance of the Need to Address the Problem**

The ASA (2012) estimated that 175,000 people 75 years and older are seen in emergency departments for medication adverse reactions each year. Many chronic

diseases of the elderly usually include treatment protocols that require the use of multiple medications (Kwan et al., 2013). Chronic diseases and comorbidities also frequently require patients to make use of multiple healthcare settings for treatments and tests, which involve transitions through a variety of care facilities. Such regular movement among multiple healthcare facilities further places the patients at risk for ADEs (Kwan et al., 2013). Medication reconciliation and medication review processes that are mandated by healthcare-accrediting bodies enhance identification and correction of unintentional medication discrepancies during transitions of care (Kwan et al., 2013; Lehnbom et al., 2014).

### Significance of the Doctoral Project to the Nursing Field

The role of the DNP-prepared nurse in healthcare is to provide leadership through development of knowledge, interpretation of scientific evidence, and improvement of competencies beyond basic practice of professional nursing (Stevens, 2013). Between 2015 and 2017, I worked in a continuing care retirement community, and on a daily basis we dealt with patients who experienced medication adverse effects, particularly during transitions between care settings. According to Bishop et al (2015), patients are at risk for medication discrepancies any time they experience a transition of care, which includes admission to the hospital, transfer between units, and discharge from the hospital. Medication reconciliation is the logical initial step in preventing discrepancies (Bishop et al., 2015). Additionally, this evidence-based practice (EBP) will hardwire current knowledge into common care decisions to improve care processes and patient outcomes (Stevens, 2013).

**Purpose**

According to Liu & Garwood (2015), current hospital discharges to subacute rehabilitation facilities do not include a telephone call to conduct medication reconciliation with the receiving healthcare facility, yet the staff at the receiving facility are responsible for managing patient medications. Rehabilitation facilities rely on the discharge summary for medication reconciliation, and as such, these discharges are at high risk for medication adverse effects resulting from transcription and omission errors. Studies estimate that approximately one out of five of patients experience adverse medication reactions during the initial 14 days post discharge and that more than half of these events are preventable (Liu & Garwood, 2015; Kwan et al., 2013; Lehnborn et al., 2014). This project implemented an evidence-based medication reconciliation education program for a local nursing home to minimize preventable medication adverse effects among the elderly residents that reside in the nursing home. The goal of this project was to ensure patient safety, improve patient outcomes, and decrease rehospitalizations due to avoidable medication adverse effects.

The guiding practice-focused questions for this doctoral project were: Does implementing an evidence-based medication reconciliation education program for nursing home nurses increase their knowledge of the process of medication reconciliation? Is the knowledge from a medication reconciliation education program retained at 30 and 45 days post education? Nursing understanding regarding this topic was tested in staff nurses at a long-term care facility prior to receiving a medication reconciliation education training program and again at 30 and 60 days after the training.

Medication management is an important and complex process that requires multidisciplinary participation from clinicians such as physicians, nurses, and pharmacists to minimize errors and promote positive patient outcomes (Vogelsmeier et al., 2013). Each such medical care professional has an independent, joint, and overlapping responsibility in medication management (Vogelsmeier et al., 2013). Providing a structured medication reconciliation process is mandated by all accrediting bodies in healthcare. In 2005, TJC added medication reconciliation as a national patient safety goal (NPSG) across the entire care continuum (Bamsteiner, 2008). While medication reconciliation appears to be a straightforward concept, many healthcare organizations struggle with implementation and attribute the challenges to fragmented inter-organization systems and complex transfer processes (Vogelsmeier et al., 2015). This project has the potential to assist the nurses at this nursing home to recognize that medication reconciliation is a vital process with a significant impact on medication management and patient safety.

Patients with accurate medication profiles achieved through medication reconciliation protocols experience fewer ADEs; however, managing medication reconciliation is a complex and challenging process whenever patients transition between caregivers (Grimes, Fitzsimons, Galvin, & Delaney, 2013). Common challenges for the medical staff include inadequate patient confidentiality management, legal issues over technology user rights, integration of information into staff workflow, and information flow accessibility (Grimes et al., 2013). Evidence for this project will be obtained through literature review and syntheses. Primary and secondary sources of literature

include CINAHL & MEDLINE Simultaneous search and Cochrane Databases of Systematic Reviews. Other sources include the Institute for Healthcare Improvement (IHI) and the Agency for Healthcare Research and Quality (AHRQ).

The initial step was to meet with the nursing home leadership and attempt to identify weaknesses in the medication reconciliation process that were causing medication adverse effects and subsequent rehospitalizations in the project site facility. The second step was to conduct a thorough literature review and formulate a decision matrix used to identify best practices for implementing a medication reconciliation protocol. Once this was accomplished, the next step required a second meeting with the nursing home leadership to discuss evidence-based findings and obtain their input for educational recommendations to ensure that they were in alignment with the organization's mission. The next step was to combine the results of the literature search and nursing home recommendations to create the educational material. The nursing home's staff education manual was used in the development of the medication reconciliation guide used at the nursing home. Once all the educational material was completed and approved, a date and time for the presentation was set. Medication intervention programs are most successful for organizations that include medication reconciliation education for all disciplines during the onboarding process and regularly throughout the year (Barnsteiner, 2008). The goal of this project was to ensure patient safety and improve patient outcomes through increased knowledge on medication reconciliation among nurses.

The AHRQ defined medication reconciliation as "a process of avoiding such inadvertent inconsistencies in medication use across transitions in care by reviewing the patient's complete medication regimen at the time of admission, transfer and discharge and comparing it with the regimen being considered for the new setting of care" (AHRQ, 2018, para. 1). This project attempted a review of literature and translation of evidence into practice to reduce medication adverse effects and reduce rehospitalizations for elderly patients residing at this nursing facility. It was anticipated that once the project was implemented, nurses at this nursing home would show increased knowledge and adherence to medication reconciliation processes. A pre- and post-educational test given to nurses should demonstrate increased knowledge regarding importance of medication reconciliation in managing medication reconciliation.

## Significance

The stakeholders in this project included the Director of Nursing, Director of Staff Development, providers, pharmacy, nurses, and patients. This project had the potential to improve the quality of care rendered at this facility and thus improve the facility's rating on the Centers for Medicare and Medicaid Services (CMS) public website which rates quality of care based on patient outcomes. Additionally, successful implementation had the potential to influence this facility's Medicare reimbursement when the new Skilled Nursing Facility Value Based Purchasing Program becomes fully implemented in 2019. Excessive numbers of medication reconciliation errors that result in rehospitalizations will reduce the Medicare funding to the facility once this program is fully implemented.

Medication reconciliation is a vital tool for finding and correcting discrepancies, minimizing the risk of adverse drug events, improving patient safety, and reducing rehospitalizations (Mendes et al., 2016). Through this project, the Director of Staff Development was able to increase nursing knowledge and achieve increased patient safety. This nursing home currently has a 23.6% rehospitalization rate. Medicare has reported that the state average rehospitalization rate is 20.1%, while the national average is 21.1% (Medicare, 2018). This project had the potential to reduce their rehospitalization rates through accurate medication reconciliation.

The American Association of Colleges of Nursing (AACN, 1999) defined nursing scholarship as any activities that systematically advance the teaching, research, and practice of nursing through rigorous inquiry significant to the profession, particularly such activities that can be documented, replicated, and peer-reviewed. The term scholarship of practice in this context includes development of clinical knowledge, professional development, application of technical or research skills, and caregiving services (AACN, 1999). Translation of the medication reconciliation evidence into a medication reconciliation staff development process enhances medication reconciliation competency in nurses beyond basic nursing practice and as a result promotes positive social change. This enhancement will be in alignment with the IOM and TJC's patient safety goals.

The teaching tools that developed in this project have the potential of replication in other nursing homes. Currently, many rehabilitation facilities rely on discharge summaries for medication reconciliation because hospital discharges to these facilities

frequently do not include a medication reconciliation telephone call (Liu & Garwood, 2015). As such, this project would be transferable to other skilled nursing and long-term care facilities because their medication reconciliation processes currently stem from the same practice process. This project enhanced medication reconciliation protocol adherence through education of the nursing staff at a senior care facility, and it may reduce medication adverse effects, thus supporting the goals of Walden's social change mission, TJC, and provide greater compliance with IOM's patient safety guidelines.

**Summary**

The goal of this project was to create an evidence-based medication reconciliation staff development process to ensure patient safety, improve patient outcomes, and decrease rehospitalizations due to avoidable medication adverse effects. The project included specific staff education on medication reconciliation to improve awareness of both the importance of performing proper medication reconciliation procedures, and the impact such procedures can have in terms of improved patient outcomes. Successful implementation of similar staff education in other facilities has required major changes to organizational culture in order to transition from a culture of blame in which individual staff members bear the burden of blame when ADEs occur, to an objective response to errors (Al-Nawafleh et al., 2016). This project was intended to provide education that removes blame and instead allows long-term care facility staff to improve overall patient care and reduce the rate at which patients are rehospitalized.

Section 2: Background and Context

**Introduction**

Medication errors are the single most preventable cause of harm in hospitals, skilled facilities, long-term care facilities, and in community settings, yet these errors occur frequently in all these settings (Lehnborn et al., 2014). Medication errors can potentially result in serious harm and even death (Kwan et al., 2014). Medication errors which result in injuries to the patient are ADEs (Lehnborn et al, 2014; Kwan et al., 2014). The guiding practice-focused questions for this doctoral project were: Does implementing an evidence-based medication reconciliation education program for nursing home nurses increase their knowledge of the process of medication reconciliation? Is the knowledge from a medication reconciliation education program retained at 30 and 45 days post education? The purpose of this project was to research and implement an educational program for the nurses at a specific long-term care facility to educate them about the need for medication reconciliation and how to implement this in their daily practice.

This section provides the background and context of the project that will address the problem, guiding question, and purpose of the project. The next section provides a discussion of the conceptual theory that underlies this project and how that theory specifically pertains to the project itself. That discussion also includes a synthesis of writings on that theory, including its applicability to nursing practice, and definitions of key terms relevant to this project. Following this is the relevance of this project to nursing practice and an overview of the literature relevant to the problem, as well as a summary of the current state of the practice and strategies that other facilities have used

to address the problem. This discussion also involves how the current project advances nursing practice. Following that is a discussion of the local background and context and a summary of the local evidence of the problem, as well as the institutional context in which the project was conducted and state and federal contexts applicable to this project. Following this is the role of the nursing staff participating in the project, including an explanation of why this group was chosen, including specification of any researcher biases. Finally, this section concludes with a brief summary of key points presented in this section.

## Concepts, Models, and Theories

The guiding theory for this project was Kurt Lewin's theory of planned change (LTPC). This project attempted to change medication reconciliation processes in long-term care facilities in an effort to promote patient safety. LTPC stipulated that for change to occur in any individual, group, or organization, both the driving and restraining forces for that change must be identified and the potency of those forces must be determined in order to understand why individuals, groups, and organizations act the way they do (Shirey, 2013). In other words, an understanding of those driving and restraining forces is essential in order to correctly predict or understand changes, including whether the changes were successful or not successful. If the driving force promoting the change is stronger than the restraining force, the change will be successfully accomplished. If the restraining force is stronger than the driving force for the change, however, the change will not succeed.

In LTPC theory, the initiates of change are those individuals who promote or attempt to initiate a change in themselves, in a group, or in an organization. The LTPC framework includes three stages of unfreezing, moving, and refreezing. Unfreezing involves the initiates getting ready for the change, including recognition of the problem, identifying the need for change, and mobilizing the team for change (Shirey, 2013). Moving is the second stage in LTPC, which includes evaluation of processes, creation of a detailed plan of action, and engaging the team to try out new processes (Shirey, 2013). Refreezing is the third stage in which the change stabilizes so that it becomes embedded into the existing systems (Shirey, 2013).

LTPC was a particularly appropriate conceptual model for this project since the goal of the project was institute an organizational change in how nurses in this nursing home perform medication reconciliation functions. In the context of this project, the unfreezing stage occurred during the planning and early part of the educational program presented by making the participants aware that there was a problem in the organization's medication reconciliation processes. As defined earlier, this unfreezing prepared the participants for making a change in their medication reconciliation procedures. The moving phase of the project consisted of providing training to the nurses on proper evidence-based medication reconciliation procedures as a means of enhancing medication profile accuracy and promoting patient safety. The refreezing phase of the project occurred in the post-training phase when the participating nurses practiced their new medication reconciliation skills and made the new processes habitual in their practices.

This was measured via post-training follow-up tests immediately after the training, and at intervals of 30 days and 45 days post-training.

## Synthesis of Previous Literature

Batras, Duff, and Smith (2016) argued that LTPC can best be understood when his three-step model of change is taken in the context of other work, specifically Lewin's field theory. According to Batras et al. (2016), Lewin argued that any individual's actions are the result of the group environment of that individual or the individual's field. In this context, the field consisted of environmental factors that include organizational structure, management, other personnel, policies, or any other factor that influences what the individual does. LTPC recognized that for change to be permanent, appropriate conditions that motivate and encourage the change must occur (Batras et al., 2016). Rogers (2003) posited that any new ideas communicated within an organization created uncertainty. The appropriate strategy to accomplish those changes required individuals involved to pay attention to each step in a predefined sequence within that organization in order to ensure that a change does not fail before it can disseminate throughout the organization. Argyris and Schön (1996) argued that for learning to take place, there had to be a unified message in which actions match words. Schein (2010) argued that for change to be embedded in an organization, it needed to become part of the culture of that organization, as indicated by the culture's values, beliefs, and behaviors that support that change. LTPC carried the assumption that change had to be prepared rather than rashly imposed; Rogers similarly argued that paying attention to each individual task in a desired change was required to ensure that the change would not fail. Argyris and Schön

(1996) stated that change needed consistency and unity in action and words, policies, and behaviors. Schein (1999) noted that change had to become a fundamental element of the organization's culture for it to truly flourish.

**Definition of Terms**

In the context of this project, the following terms have the specific meanings presented here:

*Educational program:* In the context of this project, the educational program was the training presentation that nurse participants described in Section 3 of this report attended to achieve competency in evidence-based medication reconciliation processes.

*Elder patients:* Patient residents in long-term care facilities.

*Medication reconciliation:* As defined by the CMS (2014), medication reconciliation refers to a process in which healthcare providers list all medications that a patient takes from all sources including prescribed, illicit, and over-the-counter medications, including specifics of dosage, how often, and the means of ingesting it. A list provided by the patient is then cross-referenced against similar lists from doctors, hospitals, and all other medical providers to ensure accuracy and completeness.

*Moving:* Moving is the second stage of Lewin's change theory; it refers to encouraging individuals to make specific changes to their behaviors in order to achieve improved workflow and/or productivity. In the context of this project, moving refers to the educational presentation that helped nurses to achieve proficiency regarding evidence-based medication reconciliation processes.

*Nurse participants:* Those nurses who attended the educational program presented on evidence-based medication reconciliation processes at the nursing home.

*Refreezing:* Refreezing is the final stage in LTPC; it refers to the process of reestablishing new habits and making them part of the regular work flow process. In the context of the current project, refreezing refers to confirming that the nurses actually incorporated the medication reconciliation processes learned in the educational presentation and into their daily practice.

*Unfreezing:* Unfreezing is the first stage in LTPC; it refers to identifying the need to change their processes and/or workflow to improve their work accomplishments. In the context of this project, unfreezing refers to working with the nurse managers at the target nursing home to explain the purpose of the project, gain their support for achieving evidence-based medication reconciliation processes, and motivate the nurses at the facility to attend the educational presentation.

## Relevance to Nursing Practice

### Historical Context of the Broader Problem

One out of four elderly patient hospital admissions is the direct result of an ADE, and are associated with prolonged hospitalizations, complications, and patient mortality (Ramjaun et al., 2015). The term medication reconciliation was coined in 2005 in the NPSG number 8 issued by TJC (Almanasreh, Moles, & Chen, 2016). Medication errors are frequently the cause of ADEs in hospitals and other healthcare facilities. Avoiding medication errors drives much of the impetus requiring medication reconciliation in healthcare. TJC, the IHI, and the World Health Organization (WHO) have all stated that

medication reconciliation is an important part of quality healthcare (Almanasreh et al.,

2016).  TJC removed medication reconciliation processes from accreditation decisions

for hospitals in 2009 because many hospitals found it difficult to implement medication

reconciliation in a systematic way (Almanasreh et al., 2016).  Despite this challenge, TJC

reintroduced medication reconciliation processes in the 2011 NPSG reflecting the

significance of medication reconciliation to patient safety (Almanasreh et al., 2016).  The

risk of medication errors increased during patient transitions from one healthcare setting

or facility to another, such as when moving from home to hospital, from hospital to

rehabilitation facility, from rehabilitation facility to home, and so on (Almanasreh et al.,

2016).

**Current State of the Nursing Practice**

Medication reconciliation is an ongoing health care concern throughout the world

that must be addressed in order to improve patient outcomes and promote patient safety.

Zimmerman, Salgado, and Dixon (2017) noted that medication reconciliation should not

only be about creating a truly accurate list of what medications a patient takes, but instead

should move beyond a simple list and constitute a full-out medication review.

Medication reconciliation must include critical examination of each medication to ensure

that it is necessary, at the right dosage to meet the patients health management, and that

there are no interactions with other medications on the profile that might preclude its safe

use.

Despite the difficulties of implementing a proper and effective medication

reconciliation program, one internal medicine unit in Paris, France was able to decrease

discrepancies between a patient's usual treatment and the medications prescribed when entering the unit from 4.3% to 0.9% over a 6-month period (Andreoli et al., 2014). In achieving this, the healthcare workers realized that medication histories provided by patients are often either incomplete or incorrect or both. The study by Andreoli et al. (2014) found that including pharmacists in the medication reconciliation process achieved accurate medication profiles and enabled them to decrease medication errors.

**Previously Used Strategies to Address the Problem**

Marien, Krug, and Spinewine (2017) reviewed the use of electronic tools to support medication reconciliation. In a systematic review, Marien et al. (2017) identified 11 tools presented in 18 different reports and identified 7 that fully implemented a true medication reconciliation process that was utilized in regular daily practice. Keys to successful implementation of these tools were endorsement by in-house quality improvement leaders, highly integrated care systems, experience with technology on the part of users, and an organizational culture that promoted quality healthcare and patient safety (Marien et al., 2017). Hron et al. (2015) adopted an electronic medication reconciliation tool for admissions at a hospital, and found that the number of medication errors and associated ADEs decreased by more than half.

Ramjaun et al. (2015) studied educational strategies used in training medical and nursing students on medication reconciliation issues and found that educational programs had varying degrees of success. They attributed the variations to students frequently having poor attitudes on medication reconciliation, environments not always being conducive to learning about the problem, and constantly changing work shifts tending to

insulate students from accepting the problem as being "their" problem.  Success was noted in educational approaches that involved the students in the development of appropriate patient safety concerns and those that made the medication reconciliation tools more user friendly (Ramjaun et al., 2015).

Other successful approaches have included establishing an interdisciplinary team that focused on both quality care improvement and patient safety (Ruiz-Millo, Climente-Martí, Galbis-Bernácer & Navarro-Sanz, 2017).  The team approach placed pharmacists as the lead professionals conducting a pharmacoptherapy follow-up program, and the result was the prevention or resolution of 92.5% of ADEs and 91.7% of therapeutic failures (Ruiz-Millo et al., 2017).

The literature shows that nurses are at the front lines in terms of medication reconciliation in many contexts.  Vogelsmeier (2014) investigated medication reconciliation in the context of nursing home leaders.  This qualitative study identified three key themes.  First, nurses in these contexts believed that the physicians attending the resident patients relied on nurses to know what medications the patient needed and why that medication was needed because the physicians generally did not know anything about the patient's healthcare needs prior to their transition to the nursing home (Vogelsmeier, 2014).  A second theme was the need for nursing home nurses to take an active role in seeking out the necessary medication and health history information, with some nurses spending a lot of time trying to understand the patient's needs while others tended to assume that the physician's orders were generally correct (Vogelsmeier, 2014).  The third theme was the importance of the nurses role in identifying medication

discrepancies, red-flag orders, such as psychoactive medications with no end date, and the reality that varying levels of nursing staff experience and training meant that there were varying abilities to notice potentially dangerous discrepancies (Vogelsmeier, 2014). Nurses can often make the difference in medication reconciliation efforts. One nurse-practitioner-led reconciliation effort in a rural hospital setting reduced unintentional medication discrepancies in transitions from hospital to home from 5.09 per patient to 0.30 over a 12-week period (Young, Barnason, Hayes, & Do, 2015).

**How the DNP Project Fills a Gap**

The brief summary of problem history and current practice makes clear that nurses are at the forefront of medication reconciliation, and that this is an issue of patient safety and quality healthcare. While some studies identify nurse-led initiatives to have tremendous potential in reducing medication discrepancies, other studies stress the importance of multidisciplinary approaches with strong pharmacist's leadership as key to improving medication reconciliation processes (Young et al, 2015; Ruiz-Millo et al., 2017; Ramjaun et al., 2015). Other studies relied more on technological approaches to enable healthcare organizations to achieve competency in medication reconciliation (Hron et al., 2015; Ramjaun et al., 2015).

The project took the issue and attempted to solve it by combining the knowledge obtained from the literature review and creating an educational program that can be utilized by the registered nurses, the licensed practical nurse, and the medicine aide to identify medication discrepancies and seek correction accordingly to ensure patient safety and prevent ADEs. While this was a nurse led project, all efforts were made to include

all the stakeholders such as the physicians, the pharmacists, and patients making this program a team effort with a common goal.

## Local Background and Context

The site chosen for the project was a small rehabilitation and long-term care facility located in the northeast region. This nursing home maintains a patient load of only 100 residents, with a relatively high nurse-to-patient ratio. This nonprofit facility has a five-star quality rating from Medicare. The same nursing home compare website states that this facility has received no fines from the federal government over the care of their resident patients, nor has Medicare denied any payments to this facility in the past three years. Despite better than average staffing and much better than average outcomes for its residents, this facility has a higher than average re-hospitalization rate after nursing home admission. Medication errors occur frequently in hospitals and long-term care facilities (Lehnborn et al., 2014). Evidence indicates that 25% of all ADEs result from medication errors, and as many as 11% to 59% of these errors result in actual harm to the patient (Kwan et al., 2014). Thus, medication reconciliation may be an important area for improvement at this facility.

### State and Federal Contexts Applicable to the Project

It is estimated that approximately 175,000 people 75 years and older are seen in the emergency department for medication adverse reactions and this is the most common reason for re-hospitalization in the elderly (ASA, 2012). Hospital readmissions have been identified by theCMS as major contributors to unsustainable levels of health care spending (Shull, Braitman, Stites, DeLuca, & Hauser, 2018). In 2010 the Medicare

Payment Advisory council estimated that 18% of Medicare patients discharged from the

hospital were readmitted to the hospital within 30 days and these admissions, which

could have been avoided, had an associated cost of $17 billion (Shull et al., 2018).  In

October 2012, CMS introduced penalties of 1% across all diagnosis related groups when

readmission exceed permitted thresholds (Shull et al., 2018).  Medication errors are

among the leading cause of readmission, as such, reducing medication errors and ADE is

a priority for many healthcare organizations as they strive to meet CMS reimbursement

thresholds (Shull et al., 2018). While no single intervention implemented alone has

regularly been associated with reduced risk in 30-day re-hospitalization, bundled

interventions with emphasis on medication reconciliation processes and patient education

have proven effective in reducing 30-day re-hospitalizations (Shull et al., 2018).  As

such, this program has potentially improved the 30-day re-hospitalizations at this nursing

facility and enable it to retain its bottom line while improving patient outcomes and

patient safety.

**Role of the DNP Student**

The role of the DNP prepared nurse in healthcare is to provide leadership through

development of knowledge by interpretation of scientific evidence and improvement of

competences beyond basic practice of professional nursing (Stevens, 2013).  Between

2015 to 2017, I worked in a continuing care retirement community, and on a daily basis

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transitions between care settings.  According to Bishop et al. (2015), patients are at risk

for medication discrepancies any time they experience a transition of care, which

includes admission to the hospital, transfer between units, and discharge from the hospital. Medication reconciliation is the logical initial step in preventing discrepancies (Bishop et al., 2015). This implemented evidence-based medication reconciliation education program for nurses in long term and subacute settings is in alignment with doctoral level practice as it promotes patient safety and enhances patient outcomes. Additionally, this EBP hardwired current knowledge into common care decisions to improve care processes and patient outcomes (Stevens, 2013). The project site has extremely high quality of care ratings both within the state and compared to nursing homes nationwide. Despite the high quality care, the facility also has higher than average hospital re-admission rates for those who are at the facility for short-term rehabilitation. It was because of those hospital re-admission rates that this facility was chosen as the venue for this project.

The project site was set in a highly competitive community with more than 10 nursing homes with an average national rating of 3.5. The opportunity to work with a team that has managed to achieve high ratings in most care aspects was a challenge that I gave my best and was able to make a difference for both the residents and clinicians. Medication reconciliation is a problem that strikes many aspects of the healthcare system, as such being able to complete this doctoral project at this site was a great honor, as it provided an opportunity to work with a team of clinicians that are committed to providing quality care.

My biases in this project stem from my belief that the facility and the facility's caregivers are not only highly trained but also highly motivated to do their best for their

patients. Thus, the expectation was that at the end of this project, the number of ADEs and hospital readmissions will decline, thus improving overall patient outcomes and promoting patient safety.

**Role Of The Project Team**

The project team in this project consisted of five other persons representing each discipline that participated in medication administration in addition to the DNP student. The team included the DON at the facility, the staff development director at the facility, one registered nurse (RN) at the facility, one licensed practical nurse (LPN) at the facility, and a certified medicine aide (CMA) at the facility.

The role of the DON at the facility was one of enabler. Her part in the program primarily was to provide authorization to conduct the educational presentation on-site, to assure staff personnel that the presentation was sanctioned, and to clear the way for nurses to participate in the training program. The role of the staff development director was to assist with defining the content of the educational program to ensure that it met the facility's standards and that nothing contained in the program in any way contravenes facility policy. Also, this individual was an experienced presenter, who was able to assist with the presentation materials and offered suggestions on how to tailor the presentation for the site. The LPN and RN both had the same roles in the project and that was to provide an understanding of the current medication reconciliation processes and to identify any challenges in practices. The CMA was able to shed light on medication administration practices, to include how they identified new orders and discontinued medications as their only role is the actual administration of medications. The team was

very helpful in the needs assessment and identification of challenges and desired changes to improve the medication reconciliation process. Project information was shared with the five team members in face-to-face meetings to enhance the communication and develop teamwork. It was not possible for all team members to get together every time, but the goal was to ensure that all team members were kept informed of all meetings even when their personal schedule prohibits attendance.

Once the project was completed, a wrap-up meeting allowed everyone to share their lessons learned and the project outcomes were disseminated to the stakeholders. This interaction provided an opportunity for me to learn what worked well and what did not, giving me a chance to develop my leadership skills through honest feedback. The wrap-up meeting took place 90 days after the presentation of educational program. However, before the wrap-up meeting, informal team meetings were held approximately every month to discuss general issues about the project.

## Summary

This section presented the learning theory that was the basis of the proposed project and identified other organizational change theories that provided context for the project. A brief review of the history of the medication reconciliation problem and an overview of previous attempts to solve it in various contexts followed, which identified a gap in the literature that the project filled. A discussion of the local evidence of the problem and the specific context where the project was conducted was also covered. Some key terms were defined, followed by the role of the DNP student and the project

team on this project.  Section 3 provides an overview of the specifics of the project's

methodology.

Section 3: Collection and Analysis of Evidence

**Introduction**

The purpose of this project was to research and implement an educational program for the nurses at a specific long-term care facility to educate them about the need for medication reconciliation and how to implement such a program in their daily practice. The context for this project was to promote knowledge and improve medication reconciliation practices at a skilled nursing center. The ultimate purpose of the project was to decrease hospital readmissions, improve patient outcomes, and promote patient safety.

This section describes the plan to accomplish the project goal and addresses how the practice-focused questions applied to the local problem and how the purpose of the project aligns to those questions. Next, the sources of evidence for the project are described, along with an explanation for how they relate to the purpose of the project. This section also addresses data collection and analysis methods that were employed to answer the project question. This section also includes a description of exactly how this evidence was collected, who the participants were, what procedures were used to collect the evidence, and what protections were used to ensure that the project was completed in an ethically sensitive manner. The final major portion of this section describes how the data was recorded, organized, and analyzed to determine the results of the project. This part also discusses the integrity of the analysis process, handling process for outlier and other data anomalies, and analysis techniques used to process the data. This section concludes with a brief summary of this project's methodology.

**Practice-Focused Questions**

The guiding practice-focused questions for this doctoral project were: Does implementing an evidence-based medication reconciliation education program for nursing home nurses increase knowledge of the process of medication reconciliation? Is the knowledge from a medication reconciliation education program retained at 30 and 45 days post education? The background issue for this project involved hospital readmission rates of residents of a northeast long-term care facility. These patients too often require readmission to the hospital because of medication errors. Reducing such errors through consistent medication reconciliation programs implemented at the nursing home should reduce the number of hospital readmissions for these patients.

Implicit in these guiding research questions and the approach that this project took to answering these questions was a set of three assumptions about the issue. These three assumptions were:

1. An educational presentation on medication reconciliation would improve the participating nurses' knowledge about why medical reconciliation is important and how to do it.

2. Increased knowledge about the importance of medication reconciliation and how to do it will lead participating nurses to alter the way they handle medications in their daily practices.

3. The knowledge gained from an educational presentation about medication reconciliation will persist at least 30 and up to 45 days after the presentation ends.

**Sources of Evidence**

There were two key sources of evidence used for this project. The first source was medical literature on medication reconciliation programs and the processes of implementing successful programs that address the problem of ADEs due to medication reconciliation issues. Some of the literature on this topic is summarized in Section 2. The experiences of other researchers who have addressed this issue provided a fruitful basis to design a useful and effective educational program for the context of this project. The second source of evidence comes is the project itself. This project generated data that supported or refuted the proposed questions and directly addressed the three assumptions.

This was an educational project that reviewed literature. The project used quantitative data collection methods through knowledge tests taken before and immediately after the educational presentations, then again at 30 and 45 days after. These tests allowed measurement of how well the presentation provided new knowledge to the nurse participants, and how well that knowledge was retained in the long term. Copies of the educational PowerPoint presentation and the tests appear in Appendix A and Appendix B of this report, respectively.

**Participants**

The participants in this study consisted of nurses who work at the specified target facility. To gain acceptance by the nursing staff of the educational presentation, the first step in recruiting these participants was to gain the support for the project from the nurse manager for this long-term care facility. This support enabled issuing direct invitations to

all nurses and caregivers who handle medications. It was necessary to schedule the presentation multiple times to accommodate various shift schedules. The assistance of the nurse manager in making the schedule of presentations was vital to the success of this project. According to Hodges and Videto (2011), including all stakeholders in the project implementation planning is a key to the success of projects that require changes to work flow and procedures.

A pre-presentation test was given to all RNs, LPNs, and CMAs in the facility. All tests were number coded for identification. This was done to promote participation without concern for test scores to affect participants' job evaluations. The educational presentation was presented multiple times at different hours over a period of two weeks to accommodate the different shifts at the nursing home. A total of 30 participants, consisting of seven RNs, seven RN/BSNs, 12 LPNs, and four CMAs attended the sessions. This enabled the sessions to stay intimate enough so that the nurses could ask questions and keep the atmosphere in the presentations relaxed and friendly. The RNs, RN/BSNs, and LPNs are responsible for medication reconciliation processes at this facility; however, the CMAs participate in medication administration and thus were included in this training. It is important to note that while CMAs are not responsible for medication reconciliation processes, it is imperative that they are given the skills to identify new medications and discontinued medications from a medication profile as well as be able to identify changes in patient status after medication administration. They require these skills to feel free to report changes to the RN or LPN without fear of reprimand.

**Procedure**

I obtained a signed site agreement with the facility giving permission for the project to be completed at the site. I informed all nurse participants of the purpose of the project, how it would be conducted, and their right to withdraw from the project at any time. Signed consent forms were obtained prior to the educational sessions.

The times, dates, and locations of the educational presentations were decided and announced following facility procedure for staff development notification policy. A one-hour time slot was set aside for each presentation. Scheduling as many presentations as possible during different shifts promoted participation.

While these schedule details were being established, the actual educational presentation was assembled. The actual presentation took approximately 30 minutes, allowing plenty of time for question and answer sessions and other activities. The program encouraged participant learning via role play and small group problem-solving. Participants also had the opportunity to consider how they would incorporate medication reconciliation in their daily practice, while group brainstorming sessions helped solve possible problems that might arise as that implementation process is carried out.

In addition to the actual educational presentation, a brief pre-test/post-test survey tested the degree of knowledge participants had on medication reconciliation before the presentation began, and then a similar test determined how that knowledge increased as a result of the educational presentation. The tests were scored on a range from 0 to 10, with one point assigned to each correct multiple choice question from the ten-question

quiz.  All 30 participants completed the entire intervention and took all four of the quizzes, from pre-test through the 45-day post-test.

With the assistance of the nurse manager, two additional visits to the facility helped determine the success of this project.  One visit occurred approximately 30 days after the educational presentations.  The second and final visit for this project occurred approximately 45 days after the educational presentations.  This visit again offered suggestions and assistance to the nurse participants, but also included a brief follow-up test to see how much information about medication reconciliation was retained after 45 days, and how effectively they were able to implement medication reconciliation into their daily practices.

**Protections**

Approval from Walden University Institutional Review Board (IRB) was obtained before the start of any data collection process for this project.  The approval of the IRB ensured that the details of the project implementation plan were scrutinized for ethical treatment of all parties participating in this project.  The scrutiny included concern for security and privacy of the data collected, secure storage of the data at all times, and that participants had the right to leave the study at any time, that they understood the purpose of the study and how it was conducted, and that they knew how to contact the researcher in the event they had questions at any time.

The operation of this project ensured the ethical protection of the participating nurses.  With only 30 nurses and the need for follow-up data to measure the effectiveness of this educational intervention, the nurses were issued an identifier number for the four

tests (i.e., pre-test, immediate post-test, 30-day post-test and 45-day post-test). However, that information was translated immediately after each test to an arbitrary coding system and the cross-reference from actual number to code name was kept separate, in a password-protected file and maintained only on the researcher's private computer. The data used for analysis was maintained in a separate file using code names only. Under no circumstances did any personnel at the nursing home, including the nurse manager or any other executive of the facility, know how well or poorly any individual nurse scored on any of the tests  Additionally, no facility identifying information was included in any of the study information. All data remained under the personal control of the researcher. Three years after this project report has been approved by Walden University, all data pertaining to this project will be destroyed by the researcher.

## Analysis and Synthesis

### Data Collection and Analysis Procedures

The blinded test data were analyzed using appropriate statistical techniques to determine if the overall result of the project was a success. The software analysis tool used was SPSS, a well recognized statistical software analysis package. With a total participant pool of 30 nurse and four numerical data points, statistical analysis primarily consisted of descriptive statistics, a series of paired-sample t-test analyses, and a one-way ANOVA to determine whether data sets were statistically different. Post-hoc statistical tests were completed to determine the specific group pairings that have statistically significant differences.

**Insuring Integrity of the Evidence**

The integrity of the evidence in this project came from triangulation of the data. This refers to the process of obtaining multiple sets of data that cross-reference other data. In this project the data included pre- and post-test scores of the participants, and the 30-day and 45-day post-tests. Those data sources provided good cross-reference to confirm whether the intervention successfully expanded the knowledge of the participants regarding how and why medication reconciliation is done.

**Analysis of the Data**

Statistical test for the data collected consisted of a series of t-tests to determine whether the variations in test scores had statistical significance. Since the data collected was in the form of pre-test/post-tests of the same sample, the appropriate form of t-test was a paired sample t-test process. In these tests, the criterion for statistical significance appears when the tests result in a $p$ value or significance value that is less than or equal to 0.05. When the $p$ value is at that level or smaller, it implies that the differences in mean scores between the two pairs is statistically significant and not the result of random change in sampling, such that if the same combination of tests were given to other members of the population a similar difference in mean scores would result. In addition, the Bonferroni post-hoc comparison conducted multiple comparisons at the same time, while controlling to ensure that conducting multiple testing did not artificially inflate the statistical significance. Just as pulling a single card from a deck of cards has a 1 in 52 odds of pulling an Ace of Hearts, if the card pulled is discarded, the chance of pulling the Ace of Hearts as the second card is only 1 in 51, and so on. Bonferroni post-hoc adjusts

to keep the statistical significance level appropriate when multiple analyses are run.

Once the data was analyzed, the results of that analysis were applied back to the overall assumptions that arose from the guiding research question of this project. Thus the project determined the degree to which the nurses retained the information presented to them on medication reconciliation, and their acceptance of the importance of that process. The analysis results also cast understanding on each of the assumptions stated earlier to determine the validity of those assumptions. Once those results were determined, the project provided answers to the guiding research questions that reflect the overall results of this project.

## Summary

This section described the sequential explanatory project design method as well as the three specific assumptions that emerged from the guiding research question. The sources of evidence for this project were the quantitative test scores from a test/re-test modality. The project intervention process was described along with the participants in the project, the specific procedures used to gather evidence, and the protections that ensured the privacy of the participants and the security of the data collected. Finally, this section described how the data was analyzed, factors that assured the integrity of the data and the results from this project, and how the collected data reflect back on the hypotheses and research question to directly address the problem identified in the beginning of this project. Section 4 describes the findings of this study along with the implications of those findings for the research questions posed.

Section 4: Findings and Recommendations

**Introduction**

The population of individuals over the age of 65 is the fastest growing patient population in most healthcare settings, due to chronic diseases and comorbidities that are associated with aging (Alessandro et al., 2011).  Medication errors are one of the most common reasons for elderly hospital readmission and these errors are often attributed to medication discrepancies at care transition.  The goal of this project was to answer the question of whether implementation of an evidence-based medication reconciliation employee education program at a nursing home would reduce medication adverse effects and hospital readmissions among nursing home residents.  This intervention had the goal of improving patient safety, one which is in alignment with TJC and the IOM.

This study took an intervention-based approach.  After making arrangements with a local nursing home and the administration of that facility, the nursing staff took a 10-question quiz that assessed their knowledge of the importance and the procedures involved in medication reconciliation.  The staff members then participated in an educational presentation on medication reconciliation.  They were again tested on their knowledge of medication reconciliation three times after that educational intervention: immediately upon completing the education program, again at 30 days after, and finally at approximately 45 days after completing the educational program.  The delayed tests were designed to determine how much the individuals retained the educational material presented during the interventions.

The quantitative approach was used in this study to describe the variables, by examining relations of the variables to evaluate interactions of the variables. Analysis of the data collected was conducted using IBM's SPSS statistical analysis software. The primary analysis included the scores from the 30 participants on four separate tests (pretest, immediate postintervention test, 30-day postintervention test, and 45-day postintervention test). The primary statistical test used, in addition to descriptive statistics, was the t-test. The t-test assesses the difference in means between two groups of data (Grove et al., 2013). It also determined whether the difference between the two groups of data was due to random chance or a reliable measure. For example, a t-test comparing the test result score differences between the pretest and the immediate postintervention results can indicate whether the score differences are statistically significant. This implies that the intervention had an immediate effect on the knowledge of the participants. T-test results with a $p$ value of 0.05 or less are considered statistically significant. Because the measurements used the same sample measured on four different occasions in a test/retest mode rather than using different groups of people for each test, the specific type of t-test used was the paired sample t-test. In addition, it was useful to determine if the test scores from the different professional groups (RN, RN/BSN, LPN, and CMA) were also significantly different. To accomplish this, one-way ANOVA analysis tested whether significant differences existed between groups, and a series of post-hoc tests were done to determine which specific groups, if any, differed in meaningful ways.

**Results and Implications**

Parametric statistical techniques generally are useful in situations where three specific assumptions are met: the sample must be drawn from a population in which the variance can be calculated and has a normal distribution, the level of measurement has an interval or ratio that is close to a normal distribution, and the data can be treated as data collected randomly from a sample (Grove et al., 2013.) This section presents the findings from this study and the implications of those findings. This section briefly describes the results from the test, both in aggregate and by role (i.e., RN, RN/BSN, etc.).  Once the findings have been described, this section then discusses the implication of these findings.

**Result from the Statistical Tests**

The categories of RN and RN BSN both scored better than other groups on all four quiz offerings.  Table 1 provides an overview summary of the average scores of each professional group on the four test situations.

Table 1

*Mean Scores by Professional Group*

|  | N | Pre-Test M (SD) | Post-Test M (SD) | 30-Day Post M (SD) | 45-Day Post M (SD) |
|---|---|---|---|---|---|
| RN | 7 | 5.86 (2.11) | 9.43 (.78) | 8.71 (1.50) | 7.14 (2.19) |
| RN BSN | 7 | 5.50 (2.39) | 9.50 (1.07) | 8.50 (1.31) | 7.75 (1.58) |
| LPN | 12 | 3.18 (1.32) | 7.55 (1.70) | 7.18 (1.17) | 4.91 (.94) |
| CMA | 4 | 2.50 (1.00) | 7.25 (.50) | 6.75 (.96) | 5.00 (1.41) |
| All Groups | 30 | 4.33 (2.21) | 8.47 (1.57) | 7.83 (1.44) | 6.20 (1.96) |

Collective analysis of all the groups showed that the post scores where significantly higher than the pre-test score: t(29) = -12.35, p <. 001.  The post score is

also higher than the 30 day post test score: t(29) = 2.10, p < .05.  Finally the post test is

also higher than the 45 day post test: t(29) = 7.3, p <. 001 (see Table 2).

Table 2

*Paired-Samples Statistics, All Participants*

|  |  | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pair 1 | Pre-test score | 4.33 | 30 | 2.218 | .405 |
|  | Post-test score | 8.47 | 30 | 1.570 | .287 |
| Pair 2 | Post-test score | 8.47 | 30 | 1.570 | .287 |
|  | 30 day Post-test score | 7.83 | 30 | 1.440 | .263 |
| Pair 3 | Post-test score | 8.47 | 30 | 1.570 | .287 |
|  | 45 day Post-test score | 6.20 | 30 | 1.955 | .357 |

In addition to analyzing the data in aggregate, the data was also disaggregated by

the professional role of the participants, i.e., whether an RN, an RN BSN, a LPN, or a

CMA.  The previous pattern continues when the groups are disaggregated.  The post-test

remains significantly higher than the pre-test, the 30 post-test and the 45 day post-test as

seen in Table 3.

Table 3

*Paired-Sample Statistics, by Professional Level*

| Nursing Role | | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|---|
| Registered Nurse (RN) | Pair 1 | Pre-test score | 5.86 | 7 | 2.116 | .800 |
| | | Post-test score | 9.43 | 7 | .787 | .297 |
| | Pair 2 | Post-test score | 9.43 | 7 | .787 | .297 |
| | | 30 day Post-test score | 8.71 | 7 | 1.496 | .565 |
| | Pair 3 | Post-test score | 9.43 | 7 | .787 | .297 |
| | | 45 day Post-test score | 7.14 | 7 | 2.193 | .829 |
| Registered Nurse (BSN) | Pair 1 | Pre-test score | 5.50 | 8 | 2.390 | .845 |
| | | Post-test score | 9.50 | 8 | 1.069 | .378 |
| | | Post-test score | 9.50 | 8 | 1.069 | .378 |

*(table continues)*

| | | | | | | |
|---|---|---|---|---|---|---|
| | Pair 2 | Post-test score | 9.50 | 8 | 1.069 | .378 |
| | | 30 day Post-test score | 8.50 | 8 | 1.309 | .463 |
| | Pair 3 | Post-test score | 9.50 | 8 | 1.069 | .378 |
| | | 45 day Post-test score | 7.75 | 8 | 1.581 | .559 |
| Licensed Practical Nurse (LPN) | Pair 1 | Pre-test score | 3.18 | 11 | 1.328 | .400 |
| | | Post-test score | 7.55 | 11 | 1.695 | .511 |
| | Pair 2 | Post-test score | 7.55 | 11 | 1.695 | .511 |
| | | 30 day Post-test score | 7.18 | 11 | 1.168 | .352 |
| | Pair 3 | Post-test score | 7.55 | 11 | 1.695 | .511 |
| | | 45 day Post-test score | 4.91 | 11 | .944 | .285 |
| Certified Medicine Aid (CMA) | Pair 1 | Pre-test score | 2.50 | 4 | 1.000 | .500 |
| | | Post-test score | 7.25 | 4 | .500 | .250 |
| | Pair 2 | Post-test score | 7.25 | 4 | .500 | .250 |
| | | 30 day Post-test score | 6.75 | 4 | .957 | .479 |
| | Pair 3 | Post-test score | 7.25 | 4 | .500 | .250 |
| | | 45 day Post-test score | 5.00 | 4 | 1.41 | .707 |

When combined into an aggregate group including all 30 participants the differences were statistically significant. However, when split out into the individual

professional group, only BSN nurses replicated the previous pattern, where the differences between pre-test, post test, 30 day-post test and 45 day post were significant. Comparing RN and LPN the difference between the post-test score and the 30 day post score was not significant. For CMA only the pre-test and the post-test score was significantly different. There was no significant difference between the 30 day and 45 day post-test scores (Table 4).

Table 4.

*Paired-Sample T-Test Results, by Professional Level*

| Nursing Role | | | Paired Differences | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | Mean | Std. Dev. | Std. Error Mean | t | df | Sig. (2-tailed) |
| Registered Nurse (RN) | Pair 1 | Pre-test score - Post-test score | -3.57 | 1.72 | 0.65 | -5.5 | 6 | .002 |
| | Pair 2 | Post-test score - 30 day Post-test score | 0.71 | 1.8 | 0.68 | 1.05 | 6 | 0.33 |
| | Pair 3 | Post-test score - 45 day Post-test score | 2.29 | 2.3 | 0.87 | 2.64 | 6 | 0.04 |
| Registered Nurse (BSN) | Pair 1 | Pre-test score - Post-test score | -4 | 1.93 | 0.68 | -5.87 | 7 | .001 |
| | Pair 2 | Post-test score - 30 day Post-test score | 1.000 | .926 | .327 | 3.06 | 7 | .018 |
| | Pair 3 | Post-test score - 45 day Post-test score | 1.75 | 1.39 | 0.49 | 3.56 | 7 | .009 |
| Licensed Practical Nurse (LPN) | Pair 1 | Pre-test score - Post-test score | -4.36 | 2.11 | 0.64 | -6.86 | 10 | .000 |
| | Pair 2 | Post-test score - 30 day Post-test score | 0.36 | 2.16 | 0.65 | 0.56 | 10 | 0.59 |
| | Pair 3 | Post-test score - 45 day Post-test score | 2.64 | 1.69 | 0.51 | 5.18 | 10 | .000 |

*(table continues)*

| Nursing Role | | | Mean | Std. Dev. | Std. Error Mean | t | df | Sig. (2-tailed) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Certified Medicine Aid (CMA) | Pair 1 | Pre-test score - Post-test score | -4.75 | 1.26 | 0.63 | -7.55 | 3 | .005 |
| | Pair 2 | Post-test score - 30 day Post-test score | .500 | 1.29 | 0.65 | 0.78 | 3 | 0.5 |
| | Pair 3 | Post-test score - 45 day Post-test score | 2.25 | 1.89 | 0.95 | -0.76 | 5.26 | 2.38 |

In the ANOVA analysis, shown in Table 5, the ANOVA test results for the four professional levels are provided to identify any statistically significant difference between the scores of each professional group. There is a significant difference between groups.

Table 5.

*ANOVA on Test Scores, by Professional Groups*

| PRE-TEST | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 55.173 | 3 | 18.391 | 5.465 | .005 |
| Within Groups | 87.494 | 26 | 3.365 | | |
| Total | 142.667 | 29 | | | |
| **IMMEDIATE POST-TEST** | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 30.275 | 3 | 10.092 | 6.370 | .002 |
| Within Groups | 41.192 | 26 | 1.584 | | |
| Total | 71.467 | 29 | | | |
| **30-DAY POST- TEST** | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 18.352 | 3 | 6.117 | 3.804 | .022 |
| Within Groups | 41.815 | 26 | 1.608 | | |
| Total | 60.167 | 29 | | | |

*(table continues)*

| **45-DAY POST- TEST** | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 49.534 | 3 | 16.511 | 7.007 | .001 |
| Within Groups | 61.266 | 26 | 2.356 | | |
| Total | 110.800 | 29 | | | |

Once ANOVA determined that statistically significant differences existed between the professional groups, additional post-hoc testing was conducted to determine

which sets of scores had a statistically significant difference. Scheffe's post-hoc method was chosen to compare multiple groups since more than two groups existed in the data set. The Scheffe and Bonferroni post-hoc tests were run on the pre-test scores to determine if there existed a significant difference in pre-test results among the various professional levels. There was statistical significance between the RN and the LPN ($p = 0.047$). As with the Scheffe test, the Bonferroni post-hoc test, (somewhat less conservative than the Scheffe post-hoc test), resulted in statistically significant differences between the RN and LPN groups ($p=0.034$). Additionally, there were statistically significant differences between the RN and CMA groups ($p = 0.043$). For the immediate post-test scores, the Scheffe post-hoc tests identified statistically significant differences between the RN and LPN groups ($p=0.040$); between RN BSN and LPN groups ($p=0.024$), while the Bonferroni test added RN BSN and LPN groups ($p=0.015$) and between the RN BSN and CMA group ($p=0.043$). For the 30-day post-test scores, neither the Scheffe nor the Bonferroni post-hoc tests identified any statistically significant differences between any combination of the four professional groups. For the 45-day post-test scores, the Scheffe post-hoc test identified statistically significant differences between the scores for RN and LPN groups ($p=0.006$) and between RN BSN and LPN groups ($p=0.048$). The Bonferroni post-hoc test agreed that those were statistically significant and added statistically significance differences for the RN BSN and the CMA group ($p=0.042$).

In summary, the results from the ANOVA tests determined that significant differences existed between the four professional groups in this study, negating a null

hypothesis that no such difference existed.  The post-hoc tests determined that the major

difference is between the LPN and the RN and the RN and the CMA.  Pre-test scores for

the RN group were significantly different from the scores of the LPN group.  A less

conservative post-hoc test identified statistical differences between the RN and the CMA

group as well.  Post-hoc checks of the immediate post-test scores found that RNs and RN

BSNs had statistically different results from LPNs, with the less conservative post-hoc

test identifying statistically significant differences between RN BSNs and CMAs also.

Post-hoc checks of the 30-day post-test scores found no statistically significant

differences among any groups.  Finally, post-hoc checks of the 45-day post-test scores

found statistically significant differences between the scores for RN and LPN groups and

between RN BSN and LPN groups, with the less conservative test identifying statistically

significant differences also between the RN BSN and CMA groups.

**Implications of the Findings**

The data suggests that the intervention has immediate impact but does not hold

sustained effects.  The pre-test and post-test scores from the aggregate of the participants

indicated that, the educational intervention significantly improved the participant's

knowledge on medication reconciliation.  The mean score of the whole group

approximately doubled, from 4.33 to 8.47 immediately after the study intervention

program.  With that said, the group mean score dropped 30 days after the intervention,

losing about 15% of the gain in average score in the first 30 days.  By 45 days after the

intervention, participants' mean scores had lost nearly half of the gain in scores after the

intervention.  The analysis of the different professional groups and their test results

identified that the different groups did have statistically significant differences with RNs and RN BSNs primarily exhibiting the greatest differences with the LPN and CMA groups.

As was shown in Table 1, comparing pre-test scores to the final post-test scores from 45 days after intervention, while RNs and RN BSNs increased their pre-test scores by about 1.3 to 1.9 points respectively between the first and last test dates, the LPNs increased their scores by 2.1 points on average, and the CMAs increased their scores by 2.3 points on average over those same dates. Thus, one implication is that including LPNs and CMAs in such professional development programs was worthwhile. In addition, LPNs and CMAs retained more of the intervention information than the RNs and RN BSNs.

The implications of these results are that providing specific professional development programs, such as the intervention on medication reconciliation, can improve nurse understanding of the topic covered. With that said, however, unless the education is reinforced with ongoing clinical practice of the knowledge gained, the educational aspects can decline in as little as four to six weeks after the professional development effort.

This study posed the question of whether implementation of an evidence-based medication reconciliation employee education program at a nursing home had the potential to reduce medication adverse effects and hospital readmissions in the nursing home residents. The results of this study demonstrated that educational interventions indeed can improve the knowledge of nurses ranging from CMAs to RN BSNs regarding

medication reconciliation and the importance of carefully implementing a precise program for medication reconciliation. Such medication reconciliation programs can reduce the number of medication errors that happen when the care for elderly patients transfers between caregivers, particularly when transferring between health care settings.

## Recommendations

This study demonstrated that providing medication reconciliation professional development training can improve the understanding that healthcare workers in long-term care facilities have about that subject. Furthermore, the evidence indicates that the training program should include more than just RNs and RN BSNs. Other healthcare workers, particularly LPNs and CMAs, can benefit from such training even when their job responsibilities do not directly put them in control of medications for the patients they care for. Such training may make CMAs and LPNs more aware of potential conflicts or problems with the medication regimens of patients so they can alert RNs on staff and avoid problems.

A further recommendation is that such professional development training be incorporated as a regular part of staff development. This study showed that RNs lost nearly two-thirds of the knowledge gained within 45 days of the training. All other professional groups lost about half of their knowledge gained in that same time frame. This was attributed to the fact that the BSN nurses at this facility are in leadership roles and do not participate in the everyday medication management processes. Thus, professional development training needs to be either reiterated or explicitly incorporated

into the daily practice of the facility in order to reinforce and embed the knowledge into the facilities.

Also, while this study addressed specifically medication reconciliation, the specifics of the study can be extended to other issues relevant to the facility professionals. The intervention provided in this study was a peer-developed educational program. This implies that assigning facility personnel to research and develop similar training programs on topics of interest to facility operations can be a cost-effective mechanism for ongoing development of personnel skill sets.

### Strengths and Limitations of the Project

The key strength of this study was that it addressed a topic of medical importance to long-term care facilities as a way of improving overall patient care. The importance of reducing medication errors aligns with goals of the Institute of Medicine and the Joint Commission. This provides better care and better patient outcomes for vulnerable elderly patients. Another strength of the intervention was that it was low-cost to implement, an important factor for the facility that was the site of this study.

One limitation of this study was that it was a small pilot-type study, with only 30 total participants and involving only a single test site. To improve this in future research, it would be preferable to include multiple similar long-term care facilities, and to expand the total number of participants to provide a broader representation. In addition, this study provided all participants with a single intervention. A more expansive study could test multiple types of educational interventions ranging from simply providing some participants with written material to study, to providing another group of participants

with a more intensive training session, such as that used in this study.  Such an approach would help determine the degree of intensity of training interventions that are most useful in improving overall staff knowledge of the topic studied.

Another limitation of this study is that the participants attended the intervention presentations at the end of their work shifts, and the presentations were repeated several times to enable as many staff members as possible to attend.  This also meant, however, that the participants often attended when they were very tired, something that was particularly noticeable with those participants working the third shift (overnight) duty. They attended the intervention program early in the morning after a long night's shift. This could have been alleviated if all participants attended the interventions when they were awake and alert.  Due to the participants' work schedules and the need to have minimal impact on their work performance, this schedule would not have been easily changed from the schedule used.

The study also included only a short-term follow-up of a maximum of 45 days post-intervention to determine how much knowledge the participants retained.  A longer-term study could determine better how the knowledge learned was incorporated into daily practice, something that was too challenging to determine in the short 45-day period of this study.  In addition, a longer term study could include multiple presentations to determine if repeating similar presentations on a single topic resulted in better long-term retention of the information presented.

Section 5: Dissemination Plan

This section reviews the plans to disseminate the results of this study to appropriate professional venues.  In addition, the section includes a self-reflective analysis of the experience of conducting this study as part of my educational goals. Finally, the section ends with a short summary of this project, presenting a brief recap of the goal of this project, how it was conducted, and the results of the study.

**Dissemination Plan**

This study addressed the issue of whether presenting an educational intervention program on medication reconciliation to healthcare workers in a long-term care facility would enhance nursing knowledge and understanding of the importance of medication reconciliation and appropriate procedures to carry out such a program in practice.  Given the vulnerability of elderly patients in the long-term care facility, this problem was deemed to be of significance and importance to the facility that participated in the study. Held et al. (2016) said that dissemination strategies are enhanced when how-to materials, tailored toolkits, and training kits are included in the disseminated materials.  With that assumption in mind, the leadership of the site facility will receive a written executive summary of the results of this study as well as the teaching materials used for inclusion into their annual competency program.

The study addresses a problem that any healthcare organization that works with elderly patients may experience, and as such, dissemination of the finding in *the Journal of Geriatric Nursing* would be suitable and would reach appropriate audiences. Additional peer-reviewed journals would include *the Journal of Professional Nursing* and

*the Journal of Nursing Quality.*  Online dissemination would have potential for reaching a large group of nurses.

The most important audiences for this report are the DONs for long-term care facilities and hospitals that regularly transfer elderly patients to or from such facilities. Such directors have the authority to define and implement medication reconciliation programs and enforce the use of such practices within the facility.  In addition, however, all nursing staff and CMAs working in long-term care facilities could be useful audiences for this study as a means of understanding how important medication reconciliation is.

**Analysis of Self**

This project gave me an opportunity to work with a team of very talented people and I learned a lot from them.  I am very grateful for the opportunity.  I have a very strong passion for medication reconciliation, and as such I am pleased to have been able to implement this project at the center.  It is my goal to continue working on medication reconciliation processes to further improve this most common medical intervention that also appears to remain a source of medical errors.  As described earlier, from 2015 to 2017, I worked in a continuing care retirement community.  On a daily basis, we dealt with patients who experienced medication adverse effects, particularly during transitions between care settings.  According to Bishop et al. (2015), patients are at risk for medication discrepancies any time they experience a transition of care, which includes admission to the hospital, transfer between units, and discharge from the hospital back to a long-term care facility.  Medication reconciliation is the logical initial step in preventing medication errors and discrepancies (Bishop et al., 2015).  Implementing an

evidence-based medication reconciliation education program for nurses in long -term and

subacute settings is in alignment with doctoral level practice as it promotes patient safety

and enhances patient outcomes.  Working with the team at the project site gave me a lot

of insight into the workings of a skilled nursing facility, particularly regarding managing

a lean budget.  The DON at this facility made the process look very easy, yet a close look

showed the evident challenges she was facing were very apparent.  On a daily basis, the

facility had to ensure that no nurse works a minute of overtime which required the

implementation of the project to take place during normal shift hours.  This had the

potential to be burdensome with caregivers already busy with their normal work tasks.

As a result, the educational program had to be kept short enough and interesting enough

to keep the attention of overworked, and potentially overtired staff members.

In addition, one of the first tasks I undertook for this project to conduct research

on medication reconciliation and the evidence-based approaches that have been used to

addressed the problem.  The process strengthened my research skills, thus honing the

skills required for performing and doing in-depth research in contemporary journals.

That literature review gave me the conceptual framework I used to define this study.

Once I determined what type of project I wanted to do, I was placed in the position of

trying to arrange the details of how this project would be handled.  This involved a series

of negotiations with the project site facility to gain approval from the administration there

to conduct this study.  I also had to coordinate closely with the DON to coordinate

presenting the intervention programs.  In order to have as many staff members attend as

possible, I presented the information multiple times to allow individual participants to

attend, no matter what shifts they worked. This organization and preparation required that I interact and negotiate with multiple administrators at the site facility and convince those administrators of the value of the project. In addition, I had to manage the deadlines of the project to ensure all necessary materials and equipment were available for the intervention. Acting as the project manager for this study provided me with the opportunity to work on scheduling, negotiating, and promoting the project for stakeholders at the site facility.

All of these opportunities provided me with real life experience looking beyond my personal practice to conduct an activity that gave me direct experience as a nurse leader, project manager, and researcher. This will serve me in good stead as I work toward my ultimate professional goal of growing as a nurse leader with the responsibility of interpreting knowledge into practice. Completing the project also improved my statistical analysis skills. When I took the statistics class, I did not know where I was going to use those skills. This project not only improved my statistical analysis skills, but also taught me how to use SPSS, a software program I learned earlier in the DNP program. Today when I read research papers, I understand the statistical graphs included in the research. Statistical analysis was the most challenging aspect of this project. Patience and flexibility are two virtues that were greatly improved during this study. Two days into project implementation, I found out that the facility did not have a payroll budget for staff education. More than twice, scheduled educational had to be cancelled after already scheduled due to shift schedule changes at the facility or employees scheduled to participate who had already worked overtime or were covering for other

employees who were absent that day. The original plan was to have the posttests after 30 and 60 days and include a short qualitative interview segment. The posttests were changed to 30 and 45 days and the qualitative interviews were eliminated. These changes were made because the SDD who was supposed to conduct the qualitative interviews and assist with the posttests married before project completion and was unavailable. The key insight gained in of all this was that project implementation does not go 100% as planned and that communication, organization, and flexibility are the keys to success.

**Summary**

Medication management and safety is a worldwide recognized health issue. A lot of advances have been made in improving medication reconciliation processes, yet medication errors remain common occurrences during transition through the continuum of care (Wilson et al., 2013). As nurse leaders, we have the responsibility of developing collaborative medication reconciliation processes for providers and services to enhance communication. This study investigated the effectiveness of an educational professional development intervention on knowledge of medication reconciliation among nurses in a skilled long-term care facility. The 30 participants, a mixture of RNs, RN/BSNs, LPNs, and CMAs took a knowledge pretest, then participated in a one-hour educational presentation about medication reconciliation. The participants took quizzes on the information three times: immediately after the intervention, again about 30 days after the intervention, and finally at 45 days after the intervention. Statistical analysis demonstrated that the changes in the participants' scores were statistically significant. Paired-sample t-tests also found that the changes in scores between each administration

of the tests were statistically significant. After 45 days, RN/BSNs, LPNs, and CMAs
retained more of the knowledge presented in the intervention than RNs, who lost
approximately two-thirds of the knowledge learned within 45 days. The other three
participant groups retained about half of the knowledge learned after 45 days. This study
was a small pilot study using a single study site and a small group of participants. The
study demonstrated that professional development educational programs have the
potential to improve the skill sets of healthcare workers.

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Appendix A: Educational PowerPoint Presentation

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## Medication-Related Problems

| Untreated indication | Improper drug selection | Sub-therapeutic dose |
| Failure to receive a needed medication | Overdosage | Adverse drug reactions |
| Drug interactions (drug, food, lab) | Medication use without indication | Medication non-adherence |

## What Significance Does It Have?

- Continuing care facilities can experience patients with ADEs on a daily or near-daily basis.
- Patients are at risk for medication discrepancies with all transitions between care settings.
- Implementing an evidence-based medication reconciliation practice is a logical step to prevent these errors.

(Bishop et al., 2005)

## Who Does It Affect?

- Patients admitted to the hospital or other care facility
- Patients with complex pharmacological treatment regimens
- Patients undergoing high-risk treatments
- THE ELDERLY

## Key Term You Should Know

- Medication reconciliation
  - a process in which healthcare providers list all medications that a patient takes from all sources, including specifics of dosage, how often, and the means of ingesting it. A list provided by the patient is then cross-checked against similar lists from doctors, hospitals, and all other medical providers to ensure accuracy and completeness (CMS.gov, 2014).

## Why Is It Relevant?

- Medication errors:
  - Are the single most preventable cause of harm in
    - Hospitals
    - Long term care facilities
    - The community
  - Can result in serious harm or even death

## Who Is Involved in a Medication Reconciliation?

- Patients and their families
- Physicians
- Nurses
- Pharmacists

## Current Practices

- Medication reconciliation is an ongoing global healthcare concern that directly impacts patient safety.
- Medication reconciliation WORKS to reduce medication errors.

## Joint Commission Rationale

- Many people take multiple medications, making managing those medications complex and an important safety issue.
- The National Patient Safety Goal focuses on risk points in medication reconciliation.
- By establishing specific measures of performance, medication errors and ADEs can be limited.

## State and Federal Contexts

- The primary reason for re-hospitalization of the elderly is ADE reactions.
- As many as 18% of Medicare patients discharged from the hospital are re-admitted within 30 days.

## Overview of the Joint Commission Process

- Get information about current medications.
- Define medication information to be collected in critical, subacute, long-term and outpatient settings
- Compare patient's admission medications and those prescribed in the admitting setting.
- Provide patient/family with discharge information about medications.
- Explain to patient/family the importance of medication compliance.

## The Joint Commission National Patient Safety Goals

- The Joint Commission established National Patient Safety Goals for Hospitals, effective January 1, 2015.
    - Medication reconciliation was reiterated as a key goal for 2018 (Joint Commission, 2018).
    - The hospital guidelines for medication reconciliation went into effect January 1, 2015.

**The Joint Commission**

## What Information Should be Collected?

- The medication list should include all of:
    - Name of the medication (Generic? Brand name?)
    - Medication dosage
    - Frequency of taking medication
    - Route of administration
    - Purpose of the medication

### Step 1 of Medication Reconciliation
#### Elements of Performance (EP)

* Obtain information on the medications the patient is currently taking when he or she is admitted to the hospital or is seen in an outpatient setting. This information is documented in a list or other format that is useful to those who manage medications.
* Note 1: Current medications include those taken at scheduled times and those taken on an as-needed basis.

### Step 3 of Medication Reconciliation
#### Elements of Performance (EP)

* Compare the medication information the patient brought to the hospital with the medications ordered for the patient by the hospital in order to identify and resolve discrepancies.
* Note: Discrepancies include omissions, duplications, contraindications, unclear information, and changes. A qualified individual, identified by the hospital, does the comparison. (See also HR.01.06.01, EP 1)

### Step 1 of Medication Reconciliation
#### Elements of Performance (EP)

* Note 2: It is often difficult to obtain complete information on current medications from a patient. A good faith effort to obtain this information from the patient and/or other sources will be considered as meeting the intent of the EP.



### Step 2 of Medication Reconciliation
#### Elements of Performance (EP)

* Define the types of medication information to be collected in non-24-hour settings and different patient circumstances.
* Note 1: Examples of non-24-hour settings include the emergency department, primary care, outpatient radiology, ambulatory surgery, and diagnostic settings.
* Note 2: Examples of medication information that may be collected include name, dose, route, frequency, and purpose.

### Step 4 of Medication Reconciliation
#### Elements of Performance (EP)

* Provide the patient (or family as needed) with written information on the medications the patient should be taking when he or she is discharged from the hospital or at the end of an outpatient encounter (for example, name, dose, route, frequency, purpose).
* Note: When the only additional medications prescribed are for a short duration, the medication information the hospital provides may include only those medications.

## Step 5 of Medication Reconciliation Elements of Performance (EP)

- Explain the importance of managing medication information to the patient when he or she is discharged from the hospital or at the end of an outpatient encounter.

## What Have We Learned?

- Medication reconciliation has been shown to reduce ADEs and re-hospitalization of elderly patients and thus improve patient care.

## Step 5 of Medication Reconciliation Elements of Performance (EP)

- Note: Examples include instructing the patient to give a list to his or her primary care physician; to update the information when medications are discontinued, doses are changed, or new medications (including over-the-counter products) are added; and to carry medication information at all times in the event of emergency situations.

## Questions?

## What Have We Learned?

- Medication errors are a major cause for concern, particularly for the elderly and those on complex medication regimens.
- Medication reconciliation should be performed whenever there is any transition in care.
- Medication reconciliation includes checking for completeness, accuracy, duplications, and omissions.

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Appendix B: Pre- and Post-Intervention Quiz with Answer Key

Medication Reconciliation Quiz

1. What is medication reconciliation?
   a. Comparing what the patient says they take with what other sources say were prescribed.
   b. Finding omissions in patient-provided medication lists.
   c. Telling patients what medications they need to take after discharge from the hospital.
   d. Finding duplications in medication lists from patients and from caregivers.
   e. All of the above.
2. Medication errors are most likely to strike (select one or more):
   a. Young children under the age of 6
   b. Working adults
   c. The elderly
   d. Patients taking many medications
   e. Adults who take only over-the-counter medications
3. If medication reconciliation is not performed (select one or more):
   a. Elderly patients are more likely to require hospitalization due to adverse drug events (ADEs).
   b. Elderly patients will experience very little harm.
   c. Elderly patients may receive over-doses or under-doses of clinically important medications.
   d. Elderly patients can save substantially on their prescription drug costs.
   e. Elderly patients will be able to avoid extra doctor's visits.
4. Most adverse events after hospital discharge of elderly patients are due to:
   a. Medical mismanagement of their clinical conditions.
   b. New infections.
   c. Pneumonia.
   d. Related to medications.
   e. Falls.
5. Medication reconciliation can avoid problems such as (select one or more):
   a. Duplicate medications
   b. Failure to receive a clinically necessary medication
   c. Interactions with drugs.
   d. Use of generic medications
   e. Overdosing or underdosing.
6. Medication reconciliation is important because
   a. It is the single most preventable cause of harm in healthcare facilities.
   b. It is something that the President of the U.S. ordered to be done.
   c. It is required by the American Nurses Association as part of appropriate geriatric practice.
   d. It is legally mandated by the FDA.
   e. It is not important.
7. The Joint Commission medication reconciliation process includes the following steps:
   a. Get information about current medications from patient, family, or proxy, plus physicians, nurses, etc.

    b. Collect key information about medications including name of medication, dosage, frequency of dose, route of delivery, and purpose of the medication.

    c. Compare the information provided by the patient (and/or family, proxy) with information from medical sources to create a complete list with no discrepancies.

    d. Provide written information about medications, including all details of name, dosage, frequency, how to take it, and purpose with every transition of care.

    e. All of the above.

8. Medication errors of elderly patients:

    a. Are rare—Medicare patients had errors in their medication records only about 1% of the time.

    b. Are unusual—about 5% of Medicare patients have medications errors in care transitions.

    c. Are extremely common—90% of elderly patients have medication errors in care transitions.

    d. Are frequent— somewhere between 10% and 60% of Medicare patients admitted to hospital have medication errors.

    e. Almost never happen.

9. Medication errors are important because (select one or more):

    a. They compromise patient care and increase adverse patient outcomes.

    b. They cost Medicare/Medicaid $17 billion a year.

    c. Centers for Medicare and Medicaid (CMS) penalizes hospitals when elderly patients are re-admitted due to medication errors.

    d. Many people, particularly the elderly, take many medications and have complex medication regimens.

    e. Patients have to pay extra for medication reconciliation.

10. Select the statements that are CORRECT (Select one or more):

    a. Medication errors are preventable sources of harm done to patients in healthcare facilities.

    b. The only risky time for medication errors is when patients in a long-term care facility transition to the hospital.

    c. Medication reconciliation is a process performed by patients and families, physicians, hospitalists, and pharmacists only.

    d. There is little evidence that medication reconciliation is an effective way to reduce adverse drug events.

    e. All the above are false.

ANSWER KEY:

1. E

2. C, D

3. A, C

4. D

5. A, B, C, E

6. A.

7. E.

8. D.

9. A, B, C, D.

10. A