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Using a Beers Criteria-Based Eductaional Intervention to Increase Practitioners' Knowledge and Confidence of Potentially Inappropriate Medications with Older Adults

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Using a Beers Criteria-Based Educational Intervention to Increase Practitioners' Knowledge and

Confidence of Potentially Inappropriate Medication with Older Adults

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Abstract

Identification of potentially inappropriate medications for adults 65 years and older is important to prevent adverse drug events, falls, delirium, and gastrointestinal bleeding. The aim of this project was to implement an evidence-based educational intervention designed for practitioners that increases knowledge and confidence about the *2012 American Geriatrics Society (AGS) Beers Criteria for Potentially Inappropriate Medications (PIM) use in older adults*, Centers for Medicare and Medicaid (CMS) high-risk medications, and prescribing alternatives. The study used a pre- and posttest design to measure knowledge of PIMs and prescribing alternatives, confidence level in identifying PIMs, provider engagement, and patient engagement. The evidence-based education intervention improved practitioners' knowledge and confidence. Additionally, the number of PIMs filled decreased 36% after the intervention. The findings indicate that the evidence-based educational intervention using *2012 AGS Beers Criteria for PIM use in older adults* can improve practitioners' knowledge and confidence to identify PIMs, CMS high-risk medications, and prescribing alternatives and further promote patient safety by preventing adverse drug events, falls, delirium, and gastrointestinal bleeding.

Keywords: Adverse drug events, Beers, Beers Criteria, good palliative geriatric practice, inappropriate medications, inappropriate prescribing, Medication Appropriateness Index, nursing, pharmacist, potentially inappropriate medications, prescribing patterns, PRISCUS, screening tools, STOPP/START

Problem Identification and Evidence

Adults 65 years and older have a history of being prescribed potentially inappropriate medications (PIM). These medications contribute to adverse drug events (ADE), falls, delirium, and gastrointestinal bleeding. Practitioners are in a position to identify PIMs and either prescribe alternatives or monitor closely to prevent complications and improve patient outcomes.

Background and Significance

Adults 65 and older are at increased risk for complications of drug therapy and are vulnerable to medication prescribing patterns of poor quality because of age-related changes, comorbidities, polypharmacy, and medication interactions (Roth, Weinberger, & Campbell, 2009). These complications include mortality and morbidity, ADE, dementia, and falls. Appropriate prescribing patterns, according to the recommendation of the Institute of Medicine (IOM, 2001), improvement of care, satisfies the following domains: (a) safe care with patients experiencing fewer ADEs, (b) effective care when the standard of care delivery is evidence-based, and (c) patient-centered care when the care involves the patient as an informed consumer (Joshi & Berwick, 2008).

For over 20 years, PIM usage in adults 65 and older has been researched in more than 500 studies in long-term care settings, outpatient settings, and inpatient settings. The results indicate an association between certain medications and poor patient outcomes such as delirium, falls, gastrointestinal bleeding (American Geriatrics Society [AGS], 2012).

Roth et al. (2009) discuss the estimated expenditure of $177 billion annually associated with medication-related mortality and morbidity. Medication-related problems are not only costly and commonly lead to poor outcomes, but they are also preventable. Gurwitz et al. (2000) found 51% of the ADEs were judged to be preventable in nursing homes. In 2005, Gurwitz et al.

(2005) found 42% of ADEs in long-term care were preventable. In addition, recommendations for the healthcare team to be aware of PIM and to utilize guidelines when prescribing medications are key to quality care for older adults (Resnick & Fick, 2012). Yet, medications that are inappropriate for older adults continue to be prescribed and continue to contribute to poor outcomes.

In 2012, an expert panel of the AGS updated the Beers Criteria (BC) for PIM. To accomplish that goal, the AGS commissioned an interdisciplinary group of 11 experts in pharmacotherapy and geriatric care. This expert panel applied a "modified Delphi method to the systematic review" (AGS, 2012, p. 1) and graded the evidence on both ADEs and medications-related problems.

The final criteria include 43 medications or medication classes divided into three groups: (a) PIMs and classes to avoid, (b) PIMs and classes to avoid with certain diseases, and (c) syndromes and medications to be used with caution. The updated criteria include strength of evidence and application of the evidenced-based approach used by the IOM (AGS, 2012; Fick & Resnick, 2012; Fick & Semla, 2012; Martin, 2012; Resnick & Pacala, 2012). Dimitrow, Airaksinen, Kivela, Lyles, and Leikola (2011) discussed the advantages of using explicit criteria because explicit criteria's orientation is specific to medications and/or diseases. Therefore, explicit criteria is reproducible, applies to large samples, and has high reliability. Furthermore, to ensure validity, explicit criteria are revised, updated, and expanded as new information becomes available and outdated medications are unavailable. With the new 2012 revisions that are readily available to all clinicians, the issue of applicable validity is supported because of the recent revisions and new information (Dimitrow et al., 2011; Patterson, Hughes, Kerse, Cardwell, & Bradley, 2012).

Based on current best evidence, the panel of experts thoughtfully and carefully revised the BC, requested by the National Committee for Quality Assurance (NCQA; Marcum & Hanlon, 2012). The AGS BC (AGS, 2012) for PIM became a standard of practice for quality agencies such as NCQA, Pharmacy Quality Alliance, Centers for Medicare and Medicaid (CMS), and Healthcare Effectiveness Data and Information Set (HEDIS; Agency for Healthcare Research and Quality [AHRQ], 2012); Martin, 2012; Resnick & Pacala, 2012). These agencies have relied on the BC "when developing quality measures addressing the pharmacological care of older adults" (Resnick & Pacala, 2012, p. 12). Jano and Aparasu (2007) discussed that as early as 2006, HEDIS used the 2003 BC to identify a list of inappropriate medications that was one determinant of quality in managed health plans. The Medicare Part D policy incorporates the BC as an evaluation of a nursing home's adherence to regulations related to medications.

In January 2013, CMS published the revised *2014 Clinical Quality Measures Adult Recommended Core Measures* (CMS, 2013a, para. 1). Included in this document was the New CMS e-measures ID numbered 156v1 titled *Use of High Risk Medications* (CMS, 2013a, para. 3). This document describes the two rates that Medicare Advantage programs are required to report. One rate is the percentage of patients receiving at least one high-risk medication. The other rate is the percentage of patients being prescribed two different high-risk medications. In order to ensure patient safety and measure outcomes, this new CMS requirement for PIMS was begun (CMS, 2013b). In conjunction with the BC, the CMS recent requirement and list of high-risk medications should be incorporated into clinical practice.

Problem Statement

Adults, age 65 and older are at a higher risk of being prescribed PIMs as demonstrated by increased incidents of mortality and morbidity, adverse drug events, falls, delirium, and gastrointestinal bleeding related to inappropriate prescribing patterns, polypharmacy, and medications interactions given age-related changes and comorbidities.

Objective

The quality improvement project aim was to increase practitioners' knowledge and confidence to identify which medications are PIMs following a skill-training educational intervention that focused on an evidence-based assessment tool called the *2012 AGS Beers Criteria for PIM* use in older adults and a current revised CMS high-risk medications list.

Review of Literature

Methods

The literature review included two separate search strategies. For details please refer to Appendix A.

Critical Appraisal of Research

Prescribing patterns. Inappropriate medications for older adults living in a community setting have been linked to increased healthcare utilization, health complications, and hospitalization (Goulding, 2004). Two studies examined prescribing patterns in the outpatient setting using a retrospective study design. Curtis et al. (2004) studied a database sample of 765,423 participants who filed one or more prescription claims over a 1-year period. The outcome measure was to determine the number of medication(s) per claim, and which ones were deemed PIM for this population. Goulding (2004) examined a sample of 22,031 participants from a database called National Ambulatory Medical Care Survey (NAMCS) and National

Hospital Ambulatory Medical Care Survey (NHAMCS) that met inclusion criteria. Curtis et al.

(2004) identified that 21% of the participants had a PIM, and 4% had three or more PIMs

prescribed. Goulding (2004) identified that 7.8% of the participants per visit had PIMs.

Women's PIMs were greater than men's with an odds ratio [OR] =1.96, and women's odds of

inappropriate prescribing, compared to men increased per additional medication [OR = 0.66] for

2 medications, [OR = 3.08] for three medications, and [OR = 3.35] for four medications. The

level of evidence for both studies is IV B, and the author notes the studies are dated (Boswell &

Cannon, 2014; Roche, 2013).

Zhang, Baicker, and Newhouse (2010) reported correlations between geographic areas

and prescribing patterns of PIMs such as beneficiaries in southern regions that are 4 times more

likely to be taking high-risk drugs than beneficiaries in the northeast regions. These studies

showed that older adults, specifically women and residents in the southern United States of

America (USA) are at risk for being prescribed PIMs, thus leading to compromised health

outcomes and increased utilization of resources.

Adverse drug events. Two studies examined ADEs and the relationship of prescribing

patterns and monitoring medications (Gurwitz et al., 2005; Kanaan et al., 2013). Gurwitz et al.

(2005) studied a cohort with a prospective case controlled approach and found a higher rate of

preventable ADEs (42%). The study isolated several drug categories that placed patients at risk

but did not use a formal assessment tool. Kanaan et al. (2013) studied ADEs in relation to BC

PIM using a retrospective study design of 850 patients' electronic health records. The study

identified 75% of ADEs, with 16.5% of the ADEs involving medications included on the BC list.

The level of evidence for both studies is 4-C (Boswell & Cannon, 2014; Roche, 2013).

Screening tools. Three medication-screening tools were cited frequently in the literature: (a) BC created in 1991 by Dr. Mark Beers and most recently revised by the AGS in 2012 (AGS, 2012), (b) STOPP/START (SS) created by a consensus panel of 18 experts in Geriatric Pharmacotherapy in the United Kingdom and Ireland (Corsonello et al., 2012), and (c) Medication Appropriate Index (MAI) developed by Hanlon et al. in 1993 to determine the appropriateness of a medication for a given patient (Core, Farris, Olson, Wiens, & Dieleman, 2003). Although the MAI is considered time-consuming and subjective, it is the most comprehensive approach for medication appropriateness (Luo, Scullin, Mullan, Scott, & McElnay, 2012).

Findings show prescribing patterns are a concern among older adults, women, and patients in certain geographical areas. The BC has been tested outside the USA with mixed results when compared to the recently created STOPP/START (2008) criteria. Studies suggest the cause of the difference is the British formulary of medication in which many medications in the STOPP/START are not included in the American-created BC. Only one study examined the STOPP/START tool with an American population that was statistically significant only with the STOPP criteria. The BC, created in the USA, showed more sensitivity, specificity, and identification of PIM in the USA. The referenced research concluded BC is the first and most appropriate choice of assessment tools to identify PIMs and make necessary practice changes (Brahmbhatt, Palla, Kossifologos, Mitchell, & Lee, 2013; Dunn, Harrison, & Ripley, 2011; Gallagher, O'Connor, & O'Mahony, 2011; Gallagher & O'Mahony, 2008; Hamilton, Gallagher, Ryan, Byrne, & O'Mahony, 2011; Luo et al., 2012; Monroe, Carter, & Parish, 2011; Skaar & O'Connor, 2012; Vishwas, Harugeri, Parthasarathi, & Ramesh, 2012).

Beers Criteria in healthcare. Dr. Mark Beers created the *Beers Criteria for PIM* in 1991, and since that time the original BC and the three updates and revisions have been used to identify polypharmacy, potentially inappropriate medications resulted in increased costs, inappropriate prescribing, and poor health outcomes (Beers, 1997). One of the earliest studies, using the *1997 Beers Criteria,* showed a statistically significant decrease (p <.05) in the number of inappropriately prescribed medications upon admission compared with discharge. Brown and Earnhart (2004) conducted a retrospective case-design study with a cohort of 99 patients admitted to a unit in a large teaching hospital. Upon admission, the acute care elders (ACE) team evaluated each patient's medication according to the 1997 BC and initiated prescribing changes. The intervention group showed a statistically significant change from 10.1% to 2.02 % (p <0.05), with absolute risk reduction 8.08% (95% CI: 0.0785–0.0831) of the PIMs ordered.

Mattison, Afonso, Ngo, and Mukamal (2010), Tamura et al. (2011), and Zillich et al. (2008) conducted interventional studies using the 2003 BC tool and found a statistically significant (p <0.001; p <0.001; p <0.001, respectively) reduction in the number of high-risk medications prescribed post-intervention. (Zillich et al., 2008) and (Mattison, Afonso, Ngo, & Mukamal, 2010) examined two different types of warning messages that signaled the provider about PIMs ordered. This type of intervention decreased the number of high risk medications order, after the warning was sent to provider.   Each intervention reviewed medications according to the 2003 BC tool. These interventions are reproducible and generalizable, therefore suggest that utilizing the 2003 BC may result in cost savings and improved patient care quality.

According to the 2003 BC, identifying and preventing PIMs is important to improving health outcomes, decreasing incremental healthcare expenditures, and limiting waste of medical resources, which includes nursing time. Three different studies examined the macroeconomic

and secondary effects of limiting PIM. Kojima et al. (2012) examined the costs associated with PIMs and found an overall cost reduction of $30.71 healthcare dollars per patient per month (p <0.0001). Another study examined PIMs and adverse health outcomes in Georgia nursing homes by using a retrospective cohort design review of 1,117 patient medical records. When providers prescribed patients PIM, according to the 2003 BC, the patients had more than a twofold increase in the "likelihood of experiencing at least one adverse health outcome" (Perri et al., 2005, p. 405). Fu et al. (2007) found PIM utilization was a significant predictor (p <0.05) of higher healthcare expenditures. Although the study had certain limitations, such as PIM use not recorded with a specific date and unobserved covariates, the study suggests that if associated PIM use was lowered, then overall healthcare expenditures would be lower (Fu et al., 2007).

Beers Criteria in nursing. The literature suggests the emergency department (ED) is an important site that can provide case findings for older adults at risk for inappropriate medication prescription use (Hustey, Wallis, & Miller, 2007). According to Roberts, McKay, and Shaffer (2008), the percentage of older adults presenting in emergency departments (EDs) in the USA, has been increasing annually. ED nurses doing the initial medication assessment and reconciliation are able to intervene as the first line of defense in identifying PIM with older adults. This population historically presents at the ED with complications that are a result of comorbidities, seeing multiple healthcare providers, and accessing care in multiple settings. The ED provides an opportunity to apply the BC during an ED admission that includes a medication assessment and reconciliation. Razzi (2009) recommends the use of the BC as a measure of quality. Hustey et al. (2007) conducted a retrospective chart review of consecutive ED visits during a 2-week period in an urban teaching hospital of adults 65 and older who met the inclusion criteria. The sample included 352 eligible charts for review. The outcome

measurements include prevalence of PIM with current medication assessment, according to BC and prevalence of PIMs prescribed during ED visits. Secondary outcome measurements were most frequent PIMs. Study participants admitted through the ED had a mean of 8.4 currently prescribed medications, and 111 of the participants had at least 1 PIM (32%; 95% CI, 27–36). At the time of discharge from the ED, providers prescribed 101 participants a new prescription (52%; 95% CI, 45–59). Thirteen of the 101 participants received prescriptions that were PIMs (13%; 95% CI, 6–19). The results suggest a high prevalence of PIMs with older adults who presented to the ED and received a PIM prescription upon discharge (Hustey et al., 2007). Nursing and other healthcare professionals should target this specific intervention at reducing PIM in the ED by incorporating the revised *2012 AGS Beers Criteria for PIM for older adults* into practice.

Two nurse-led inter-professional studies used the updated BC 2003 to define PIM. Fick, Mion, Beers, and Waller (2008) conducted a retrospective cohort study using an administrative database by examining medication use with adults 65 years and older. They identified PIMs according to the BC and drug-related problems (DRP) using ICD-9 codes. Of the 17, 971 participants, 40% had a least one PIM prescribed and filled. Thirteen percent of the participants were prescribed and filled a prescription for two or more PIMs. The DRP prevalence with the 40% of the participants who had at least one PIM was 14.3% compared to the non-PIM participants 4.7%, which is statistically significant (p <.001).

Bilyeu, Gumm, Fitzgerald, Fox, and Selig (2011) initiated a nurse quality improvement intervention program for patients admitted to an inpatient unit. Before the intervention, researchers reviewed charts of 100 patients to identify medications prescribed to each patient. Each medication was compared to the BC, and PIMs were identified with special attention to

high severity-rating medications. The intervention, which lasted 2 months, was the implementation of an algorithm to guide the staff during medical assessment and medication reconciliation upon admission. As a result of the 2-month project, for the 46% of the PIMs identified in the cohort, providers chose to either discontinue the medication, or change the medication to a safer dose, or safer medication (Bilyeu et al., 2011). According to Bilyeu et al. (2011), the nurses' unexpected outcomes related to quality care issues. The nurses involved in the program reported increased confidence using the BC to identify PIMs, increased compliance with medication reconciliation, heightened awareness of PIMs and the relationship to ADEs, and a sense of empowerment to implement interventions that provide safer and higher quality outcomes for inpatients (Bilyeu et al., 2011).

Summary of Reviews

The recent 2012 BC is an evidence-based assessment tool applicable in multiple practice settings. Most recently, the AGS has shown leadership with these revisions and provided strong, graded evidence and importance of this valid, reliable, and explicit criteria (Dimitrow et al., 2011; Levy, Marcus, & Christen, 2010). Throughout the literature, there is evidence of the importance of identifying the PIMs using the BC and confirmation of the economic impact of decreasing healthcare costs while improving patient safety, quality, and outcomes. The BC has a demonstrated use in healthcare and specifically with nursing practice in select settings. However, a lack of knowledge, consistent use, and application of the BC in nursing practice still remains. It is recommended that nursing practice include using the BC as an assessment tool for PIM in all settings. By incorporating this evidence-based assessment tool, nursing practice will help improve patient safety.

Relevance to nursing clinical practice. Other healthcare disciplines use the BC successfully, and the literature suggests the intervention is effective. However, application in nursing clinical practice is insufficiently presented in the literature to determine the effectiveness of the intervention in nursing. Nurses are often the first healthcare professional encountered when older adults access healthcare. According to the nursing process, medication assessment, reconciliation, and detection of potential safety and quality complications are important steps in providing nursing care. Nurses are in a position to utilize the BC to identify and decrease PIMs by promoting safer strategies and alternatives (Bachyrycz, Dodd, & Priloutskaya, 2012; Berryman et al., 2012). By incorporating the application of the BC into nursing clinical practice, this intervention, if used properly, contributes to quality, safe, and patient-centered care delivery (Fick & Semla, 2012). If all nurses used the BC during the initial patient medication assessment, more PIMs would be identified, potentially leading to a decrease in prescribing PIMs. Addressing the nursing profession's role in this public health issue is an important step for ensuring the health and safety of older adults.

Theoretical Framework

Expected outcomes of the educational intervention were to improve patient outcomes related to inappropriate prescribing patterns and the interaction and relationship between internal and external factors. This project engaged Lewin's Model of Change. This model applies to practitioners and presents the opportunity to change prescribing patterns and monitor patient's responses to a medication regimen, thus improving patient outcomes (Kritsonis, 2005; Sutherland, 2013).

Lewin's Model of Change has three stages: unfreezing, moving and freezing, and refreezing. The theory suggests practitioners in a busy healthcare environment are subject to

forces that resist change and often push practitioners away from the desired direction. In order to initiate change, discussions started about the restraining or static forces that prevent change and focused on unfreezing those forces. Some restraining forces are staff resistance to changing prescribing patterns, lack of confidence with identifying medications on the BC and CMS high-risk medication, lack of skills to initiate discussions about PIMs, and time constraints. Bozak (2003) discussed that during the unfreezing the problem is identified. In this project, the unfreezing was identification of the population served by *MAX Healthcare* who are at risk for inappropriate prescribing and poor health outcomes. The moving and freezing stage was the educational intervention, which includes planning and implementing the proposed expectations of addressing PIMs within the patient population served. This stage required the movement of a behavior change to a new state of equilibrium, which often requires a new viewpoint of why the current status is not beneficial, or a new perspective of accomplishing desired patient outcomes. In the last stage, the refreezing occurred over time as employees adopted the new behaviors and integrated them into the expected outcomes. This step required reinforcement and possibly policy and procedure changes that integrated the proposed expectations (Kritsonis, 2005; Sutherland, 2013). During this stage, stabilization of a new practice and expected outcomes such as a decrease in the number of high-risk CMS medications prescribed and an increase in the number of patients who had their medication regimen assessed using the *2012 AGS Beers Criteria for PIM use in older adults* resulted (Bozak, 2003).

Lewin's Model of Change provides a theoretical framework for identifying methods to improve patient outcomes as related to inter-professional interactions and patient-practitioner interactions within a healthcare system. When confronted with a multitude of factors affecting poor patient outcomes related to PIMs, one can apply the behaviors and knowledge of Lewin's

Model of Change. This model explained and predicted the practitioner's healthcare environment

behaviors regarding medication adherence, inappropriate prescribing patterns, and the

relationship of complex nature of change (Appendix B).

The Project

Setting and Resources

The setting was a well-respected Medicare Advantage (MA) plan in southeast Louisiana.

For purposes of privacy, the company is referred to as *MAX Healthcare.* The mission of *MAX*

Healthcare is to provide high quality, cost-effective healthcare services to its enrollees.

Presently, over 57,000 Medicare beneficiaries in 23 parishes in the southeastern section of the

USA are members of this premier, healthcare delivery system (Medicare, n.d.; MAX, 2/7/14).

The MA plan utilizes the medical home model developed and researched by Reid et al.

(2010). This model has the capability to reduce cost and show improved healthcare outcomes

than traditional fee for service (FFS) models. Providers manage a group of patients within a

multidisciplinary team in both the outpatient and inpatient setting, which provides a more

individualized, patient-centered, and comprehensive plan of care. Because all members of the

team are involved in care delivery, knowledge and confidence in identifying PIMs with older

adults is an important competency skill. Presently, *MAX Healthcare* has six geographically

located markets, which are comprised of nurses, nurse practitioners, social workers, and

pharmacists serving 57,000 enrollees.

The educational intervention program was presented at the corporate office. This

intervention was delivered five times; once in a morning session comprised of pharmacists and

then one week later at four different sessions comprised of nurses, nurse practitioners and social

workers.. Refreshments were served, depending on the time of day.

Project participants. The project participants included 79 multidisciplinary practitioners, including nurses, nurse practitioners, social workers, and pharmacists. These practitioners coordinate care for patients in outpatient and inpatient settings in the six market care teams (MCT), are employed by *MAX Healthcare,* and are responsible for the coordination of patient care within the team model.

All nurses, nurse practitioners, pharmacists, and social workers in the six MCT were invited to the educational program. The time, date, and location of the meeting were determined by the Senior Vice-President of Health Services at *MAX Healthcare,* who also distributed notification of the meeting. Preregistration was encouraged.

Design

This project utilized a comparison of the single group using a pre- and posttest format design. The DNP candidate (DNPc) administered two pretests: (a) content evaluation questionnaire (Appendix C), (b) *My Confidence Ruler* (Appendix D) before conducting the educational intervention. After the educational intervention, the DNPc administered a case study, as a skill-building exercise (Appendix E). Then three posttests were administered: (a) content evaluation questionnaire (Appendix F), (b) *My Confidence Ruler* (Appendix G), and (c) process/program evaluation questionnaire (Appendix H).

Educational Intervention

The educational intervention included an evidence-based assessment tool called the *2012 AGS Beers Criteria for PIM* use in older adults (Zaccagnini & White, 2011) and CMS high-risk medications. This assessment tool is explicit criterion because it identifies medications to avoid and medication to use with caution and monitor carefully. By doing so, it reduces older adults' exposure to high-risk medications. Implicit criteria include possible drug duplication, drug-drug

interactions, and clinical judgment (AGS, 2012). The intention of the revised BC is to reduce

exposure to PIM by improving prescribing patterns, by educating providers on medication use,

by assessing patient outcomes, and by evaluating quality of "care, cost, and utilization data"

(AGS, 2012, p. 2). The BC should be used as a tool in conjunction with provider expertise,

patient condition, and best practices (Resnick & Fick, 2012).

The educational intervention was delivered in person and in a group setting, using both

interactive and active learning techniques. According to Ratanawongsa et al. (2008) and

Marinopoulos et al. (2007) effective continuous medical education (CME) is interactive, is in

person, uses multimedia, and includes multiple exposures to the education material. Evaluation

methods to determine if the learner has achieved the learning objectives should be appropriate to

the setting. Specific delivery of the educational intervention included a presentation using

PowerPoints, group discussions, and the case study outlined previously. For a detailed education

design form, refer to Appendix I.

The educational intervention used an approach that is collaborative and problem-solving,

by applying the theory and model of adults-learning-principles. In the 1970s, Malcolm Knowles

pioneered the theory and model of adult learning. The six principles stated that adults (a) are

"internally motivated and self-directed", (b) "bring life experiences and knowledge to learning

experiences", (c) "goal oriented", (d) "relevancy oriented", (e) "practical", (f) "like to be

respected" (Queensland Occupational Therapy Fieldwork Collaborative [QOTFC], 2007, para.

3). In order to apply the principles of respect, relevancy, and practicality, the educational

intervention was scheduled to accommodate staff schedules, and incorporated specific

information about CMS high-risk medication related to their MCT enrollees. The educational

intervention created opportunities for the participants to collaborate and to discuss their existing

knowledge base, clinical expertise, and clinical experience. After the educational intervention was presented, a skill-building case study was administered, which provided meaningful learning opportunity to link theory to practice to accomplish the application skill, thus increasing a practitioner's knowledge and confidence (Bates, 2009; QOTFC, 2007).

Expected Outcomes

Three expected outcomes for the project were the following: (a) increase in participants' knowledge about PIMs, high-risk CMS medications, quality agencies as they relate to *2012 AGS Beers Criteria for PIM use in older adults,* and provider and patient/caregiver outreach; (b) increase in participants' confidence in using the 2012 *AGS Beers Criteria for PIM use in older adults*; and (c) increase in participants' perceived satisfaction with the delivery of an educational intervention. By increasing participants' knowledge, the participants' confidence should increase when assessing medications using *2012 AGS Beers Criteria for PIM use in older adults.* In order to integrate it into practice, providers must have the knowledge and confidence to identify which medications are PIM for older adults and be able to offer alternatives or monitor PIMs appropriately.

To measure participants' knowledge, the content evaluation questionnaire (Appendices C and F) was used. The questionnaire included items to (a) identify two methods to engage and empower patient or caregiver, (b) identify two methods of provider approach and engagement, and (c) identify two quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adults* as a standard of practice. The expected outcome was that 80% of the participants would respond correctly to the posttest content evaluation questionnaire. Comparison between the pre- and posttests would have an expected increase of 20%.

One additional knowledge outcome measure specific to each MCT was for each participant to identify the top three CMS high-risk medications for their MCT, with rationale and potential alternatives. The goal was that 80% of the participants would respond correctly and be able to identify the top three CMS high-risk medications, with rationale and alternatives. By doing so, the participants' knowledge would have increased regarding the top three CMS high-risk medications and potential risk to their enrollees. Comparison between the pre- and posttest would have an expected increase of 20%.

The outcome of increasing knowledge and the application into practice were examined by asking all the participants to complete a skill-building case study. The expected outcome was that 90% of the participants would complete the case study using the *2012 AGS Beers Criteria for PIM use in older adults* and identify appropriate medications.

The outcome of increasing confidence was measured using *My Confidence Ruler*. After the educational intervention and completion of the skill-building case study, participants would show increased confidence. The expected outcome was that 80% of the participants would show an increase in confidence identifying PIMs using the *2012 AGS Beers Criteria for PIM use in older adults.* Comparison between the pre- and posttests had an expected increase of 20%.

Data from *MAX Healthcare* on PIMS were available in addition to the pre- and posttests. The expected outcome of this data analysis was that PIMs would decrease by 2% after the educational intervention. Data from the February and March of 2014 and 2015 were analyzed.

The final outcome of interest was the participants' perception of a process of the program implementation. A process/program evaluation questionnaire was done to evaluate the delivery of the program. According to Issel (2014) process/program evaluations are administered to determine if the program was implemented as planned. For details, please refer to Appendix H.

Data collected to examine the expected outcomes did not have identifiers. The information was examined and reported using percentages, comparing data before and after the educational intervention. The expected outcome from the pre- and posttests was that the percentage of correct responses would increase after the educational intervention. The expected outcome from *MAX Healthcare* data was that the percentages of PIMs would decrease within a 2-month time frame after the educational intervention.

Measurement

Knowledge was measured by two tools: the content evaluation questionnaire and the skill-building case study. The content evaluation questionnaire evaluated knowledge about the quality agencies, provider engagement, patient/caregiver engagement, and three high-risk CMS medications, rationale, and potential alternatives in the participant's own MCT. This content evaluation questionnaire was administered before and after the education intervention. The skill-building case study was administered once, after the educational intervention. This case study is about an older adult, age 65 years and older with comorbidities and multiple medications. Each participant was asked to assess the patient in the case study and identify medications according to the *2012 AGS Beers Criteria for PIM use in older adults.* Completion of the skill-building case study should have increased knowledge about the *2012 AGS Beers Criteria for PIM use in older adults* and its application in practice.

Participant confidence was measured by the pre- and posttest named *My Confidence Ruler.* This is a readiness-to-change assessment adopted from motivational strategies to facilitate adolescent change (Gold & Kokotailo, 2007). It evaluates where the learner is on the confidence scale and what needs to be done to facilitate the practice change. Data collection of the pretest

was completed before the educational intervention started, and the posttest data collection was done at the end of education intervention. Identifiers were not noted on the pretest or posttest.

Evaluation of the current data of ADEs and PIMs prescribed was for a specific time period before the educational intervention. The DNPc collected data on reported PIMs prescribed to patients within the patient population of the practitioners attending the educational intervention, 2 months before the intervention and 2 months afterward. This information was supplied by *MAX Healthcare* and did not have any identifiers.

Data Analysis

Data analysis included descriptive statistics (percent, %) for the skill-building case study (Goal 1), measuring *My Confidence Ruler* (Goal 2), knowledge variables from content evaluation questionnaire (Goals 3, 4, 5, and 6), and data from *MAX Healthcare* on PIMs for each MCT (Goal 7). Analysis included data from pre- and post-evaluation questionnaires, *My Confidence Ruler* pre- and posttests, data from *MAX Healthcare* on PIMs specific to each MCT, and the skill-building case study administered after the educational intervention.

Ethics and Human Subject Protection

Since the project outlined is a quality improvement initiative, the University did not require Institutional Review Board approval. Each individual participant's pre- and posttest results were anonymous, and the results were reflected as a percentage, comparing before and after the educational intervention. This project evaluated the practitioner's knowledge and confidence in identifying PIMs with older adults, and therefore posed no risk to the participants, and did not involve personal identifiers.

Barriers and Threats

Barriers and threats can be events that are both foreseeable and unforeseeable. Potential barriers to success included practitioner turnover, lack of or decreased funding, lack of interest for the new assessment tool, and revised CMS high-risk medications. If the practitioners lacked motivation or did not attend or participate in the educational intervention, this posed a threat and barrier to the project's success. In addition, change in organizational support and resources could cause a potential barrier. The DNPc and key stakeholders addressed any unforeseen events such as weather, and/or funding issues with alternative plans (White & Zaccagnini, 2011).

Stakeholders

All team members, administration, and patients were key stakeholders. Specifically, the Senior Vice President of Health Services was the DNPc's facilitator within the organization and was on the candidate's committee, so she was a major stakeholder. The DNPc was identified to her in the key stakeholder's commitment letter (Appendix J). Administration was key to support the resources such as available staff, setting, refreshments, patient population, space for the educational intervention, cooperation for pre- and post-intervention assessment of ADEs and CMS high-risk medications, and institutional data. Effectiveness of moving the EBP assessment tool and recognition of CMS high-risk medications into practice depended on the practitioners. The expectation was that the practitioners successfully "freeze" and "refreeze" the new information and move toward adoption into practice with eventual diffusion. A key stakeholder was the participant population of nurses, nurse practitioners, pharmacists, and social workers who make up the MCT. The patients were important because they were the recipients of the EBP changes in PIMs and prescribing patterns. By incorporating the stakeholders and addressing the

operational concerns, the expected outcome was that the project would improve patient

outcomes.

Time Frame and Budget

The budget included all costs and in-kind donations for materials and personnel. The

details are in Appendix K. Project time frame details are in Appendix L.

<div align="center">Results</div>

The outcome of the project was to show an increase in providers' knowledge and

confidence in identifying PIMs using the *2012 American Geriatrics Society (AGS) Beers Criteria*

for PIM use in older adults and the CMS high-risk medications, and prescribing alternatives.

Details of the results are reported below:

Comparison of Pre- and Post-Intervention Group

Knowledge gained about the *2012 AGS Beers Criteria for PIM use in older adults* and

application in practice was measured by the completion of the skill-building case study. After the

educational intervention, 69.62% of all participants were able to correctly identify appropriate

medications using the *2012 AGS Beers Criteria for PIM use in older adults* (Appendix M).

The confidence level was measured using a pre- and posttest *My Confidence Ruler.* A

total of 45.34% of the participants rated they were confident to identify PIMs using the *2012*

AGS Beers Criteria for PIM use in older adults before the intervention. After the intervention

the rating was 72.34%, with a 27% increase in confidence rating between pre- and posttest

(Appendix N).

Knowledge about methods to engage and empower patient or caregiver in their own PIM

was measured with a Content Evaluation Questionnaire. 48.61% of participants were able to

identify two methods of patient or caregiver engagement and empowerment before the

intervention. After the intervention the rate was 88.24 %, with a 39.63% increase between pre-

and posttest. (Appendix O). Methods to approach and engage providers in discussion about

patient's PIM and CMS high-risk medication was measured with the Content Evaluation

Questionnaire. 19.44% of participants were able to identify methods to approach and engage

providers in discussion before the intervention. After the intervention the rate was 74.12%, with

a 54.68% increase between pre- and posttest (Appendix O). A participant's understanding of the

importance of the *2012 AGS Beers Criteria for PIM use in older adults,* use as a standard of

practice and being able to state two or more quality agencies that use this criteria was measured

using the Content Evaluation Questionnaire. 13.89% of the participants were able to state two or

more quality agencies that used the *2012 AGS Beers Criteria for PIM use in older adults* as a

standard of practice. The rate in post intervention was 81.18% with a 67.29% increase between

pre- and posttest. The last question on the Content Evaluation Questionnaire measured the

participant's knowledge of the top three CMS high-risk medications prescribed to their MCT,

rationale, and potential alternatives. In pre-intervention, 9.72% of participants were able to state

the top three CMS high-risk medications, rationale, and alternatives. After the intervention, the

rate was 14.12%, with a 4.4% increase between pre- and posttests. (Appendix O).

Achievement of Goals (Appendix P)

        Goal 1. The outcome was to gain knowledge about the *2012 AGS Beers Criteria for PIM*

use in older adults and application in practice. Of the participants who attended the educational

intervention, 69.62% were able to complete the skill-building case study using the *2012 AGS*

Beers Criteria for PIM use in older adults and identify the appropriate medications. The

expected outcome of 90% was not met (Appendix P).

Goal 2. The outcome was to increase the confidence level of the participants to identify PIM using the *2012 AGS Beers Criteria for PIM use in older adults.* Of the participants who attended the educational intervention, the *My Confidence Ruler* pretest result was 45.34% and the *My Confidence Ruler* posttest was 72.34%. The expected outcome of 80% was not met. The *My Confidence Ruler* rating between the pre- and posttest was an increase of 27%. The expected outcome of 20% increase was met (Appendix P).

Goal 3. The outcome was to learn methods to engage and empower patient or caregiver in their own PIM. Of the participants attending the educational intervention, the content evaluation questionnaire pretest result was 48.61% and the posttest was 88.24%. The expected outcome of 80% was met. The comparison between the pre- and posttest was an increase of 39.63%. The expected outcome of 20% increase was met (Appendix P).

Goal 4. The outcome was to learn methods to approach and engage providers in discussions about patient's PIM and CMS high-risk medications. Of the participants attending the educational intervention, the content evaluation questionnaire pretest result was 19.44% and the posttest was 74.12%. The expected outcome of 80% was not met. The comparison between the pre- and posttest was an increase of 54.68%. The expected outcome of 20% increase was met (Appendix P).

Goal 5. The outcome was to increase the participant's understanding of the importance of the *2012 AGS Beers Criteria for PIM use in older adults,* use as a standard of practice with quality agencies. Of the participants attending the educational intervention, the content evaluation questionnaire pretest result was 13.89% and the posttest was 81.18%. The expected outcome of 80% was met. The comparison between the pre- and posttest was an increase of 67.29%. The expected outcome of 20% increase was met (Appendix P).

Goal 6. The outcome was to increase the participants' understanding of the top three CMS high-risk medications prescribed for their market care team enrollees, and rationale and potential alternatives. Of the participants attending the educational intervention, the content evaluation questionnaire pretest result was 9.72% and the posttest was 14.12%. The expected outcome of 80% was not met. The comparison between the pre- and posttest was an increase of 4.4%. The expected outcome of 20% increase was not met (Appendix P).

Goal 7. The outcome was a decrease in number of PIMs in each MCT. Over the 2-month analysis period pre- and post-intervention, a 36% decrease in PIMs was noted. The expected outcome of a 2% decrease in the number of PIMs per month was met.

Discussion

Improved Knowledge and Confidence

The project findings showed that the evidence-based educational intervention improved practitioners' knowledge and confidence in identifying PIMs using the evidence-based tool titled *2012 AGS Beers Criteria for PIM use in older adults* and CMS high-risk medications. Data collected supported that the educational intervention which included a PowerPoint© theory-based instruction with handouts, interactive group discussion, and a skill-based case study increased participants' knowledge and confidence. Distribution of handouts included the three tables of the evidence-based tool titled *2012 AGS Beers Criteria for PIM use in older adults.* This allowed each participant to read and synthesize the information on each table and identify similarities and differences. The evidence-based tool titled *2012 AGS Beers Criteria for PIM use in older adults* and the CMS high-risk medications are considered a standard of practice when assessing medications with older adults. For practitioners to apply this quality measure, the practitioners need the knowledge of the history, application, and rationale of the *2012 AGS Beers*

Criteria for PIM use in older adults and the CMS high-risk medications. Additionally, practitioners need confidence gained by this evidence-based educational experience to use the tool and interpret the results. Once the results are interpreted, practitioners are able to engage in a discussion with patients, caregivers, and providers about the patient's PIMs and CMS high-risk medications. By improving a practitioner's knowledge and confidence about PIMs, research translation between recent evidence and actual practice to reduce PIMs, result in safe, and improved patient outcomes.

The project findings highlight the importance of the use of case studies in educating practitioners. Using a skill-based case study in education is important because it allows the learner to combine theory and reality (Brooks, Harris, & Clayton, 2010). Case studies challenge the learner to think critically, analyze issues, and synthesize theory content to patient and family life scenarios (DeSanto-Madeya, 2007). In this project, case studies were administered as part of a skill-building exercise, allowing participants the opportunity to apply the recently learned theory into practice. As mentioned previously, during the education intervention and before the participants attempted to complete the case study, each participant received a hard copy of Tables 2, 3, and 4 of the *2012 AGS Beers Criteria for PIM use in older adults.* Participants stated they liked the case study approach because the case study reinforced the information about the evidence-based tool titled *2012 AGS Beers Criteria for PIM use in older adults.* In addition, the participants stated this approach provided the opportunity to use the tool in a risk-free environment and ask questions.

Despite positive feedback from the participants, the post-intervention expected outcome of 90% was not met. This educational intervention program was not mandatory, and a majority of the participants were required to travel back and forth to their daily responsibilities, and

motivational incentives were not offered could have been contributing factors to the unmet

outcomes. Participants may not have been familiar with using all available resources to complete

an assignment, such as a PowerPoint© handout, *2012 AGS Beers Criteria for PIM use in older*

adults Tables 2, 3, and 4, and Web-based resources.

       The confidence level of the participants increased between the pre- and posttest,

indicating that the educational intervention increased the participants' confidence level to

identify PIMs using the *2012 AGS Beers Criteria for PIM use in older adults.* The participants

who attended rated an increase in their confidence level. However, this increase did not meet the

post-intervention expected outcome of 80%, but it did meet the expected outcome of 20%

increase between comparison of pre- and posttest. For many participants, the educational

material was a new concept, and only one single educational intervention was not sufficient to

increase their confidence level. In addition, the *My Confidence Ruler* assessment tool may have

been unfamiliar to them. When the project was implemented, the DNPc identified that the

majority of the participants had never used the *Confidence Ruler* or any type of self-assessment

for confidence level.

       Another finding to highlight is that the project improved practitioners' ability to engage

with their patients and caregivers. Engagement of patients and caregivers is very important for a

team approach to identify PIMs and offer alternatives. The participants met the expected

outcome of 80% of being able to state two methods of patient or caregiver engagement and

empowerment in their own PIMs and CMS high-risk medications and did meet the expected

outcome of 20% increase between comparison of pre- and posttest. All of the practitioners

attending the educational intervention engage patients and caregivers daily. Patient and caregiver

education and engagement have been included in each practitioner's formal education, and they interact with patients and caregivers daily.

Another finding pertained to methods on how to approach and engage providers in discussion about patient's PIMs and CMS high-risk medications. The participants met the expected outcome of 20% increase comparison between pre- and posttest but did not meet the expected outcome that 80% of the participants would be able to state methods of provider approach and engagement in discussions regarding PIMS and CMS high-risk medications. Most of the practitioners do not interact with providers daily, which had not been included in their formal training. This was new information that needed to be assimilated into practice. The question about provider engagement and discussion regarding PIMs and CMS high-risk medications on the Content Evaluation Questionnaire followed the patient and engagement and empowerment in their own PIM question, which could have contributed to some confusion. Some posttests had the same answers; participant motivation may have factored into these results.

Quality agencies are familiar to most practitioners and they deal daily with expectations, guidelines, and reimbursement issues. The expected outcome of 80% was met with an increase of 20% between comparison of pre- and posttest. Therefore, once the participants learned the quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adults* as a standard of practice, it became familiar information to remember and related to their own practice. The participants were able to value the application and importance of the integration of this criteria into practice as a quality outcome measure.

One interesting finding from this evidence-based educational intervention project was the participants' unmet Goal 6. The participants did not meet the expected outcome that 80% of the

participants state the top three CMS high-risk medications prescribed on their MCT, rationale, and alternatives and did not meet the expected outcome increase of 20% between comparison of pre- and posttest. For the participants' to complete and understand the top three CMS high-risk medications per MCT enrollees with rationale and alternatives required documentation of nine possible answers, for this one question. This question was complex and the participants' motivation could have affected the answers and results. The number of posttests answered for this question was fewer than the number of pretests answered for this question; therefore, considering the complexity of the question, incomplete answers would affect the percentage between pretest and posttest. Only the nurse practitioners have prescriptive authority, which could have influenced the interest and motivation of completing the entire question. This also was new material to most of the participants, as stated in the process/program evaluation. The importance of CMS high-risk medication is ongoing and continuously changing, which provides an opportunity for future education and study recommendations. Another opportunity for future study is to have the participants complete the pretest completed electronically.

Analysis of the PIMs filled in each MCT for 2 months pre-intervention and 2 months post-intervention was an excellent indicator of practitioner's application of the evidence-based educational intervention of increasing practitioners' knowledge and confidence. A decrease in the percentage of PIMs improved patient safety and outcomes related to ADEs, falls, gastrointestinal bleeding, and delirium. The expected outcome of a 2% decrease of PIMs filled per MCT was met and exceeded by a 36% decrease in PIMs filled, post-intervention of the specific time period.

Nursing Practice Implications

One major nursing implication for increasing practitioner's knowledge and confidence of PIMs and high-risk CMS medications is an expectation of improved patient outcomes. These medications contribute to falls, gastrointestinal bleeding, delirium, and ADEs. By educating practitioners about inappropriate prescribing patterns, fewer medications may be ordered and there will be better monitoring of the PIMS and high-risk CMS medications that are ordered. This change in prescribing patterns contributes to improved quality of life and safety for patients.

This evidence-based educational intervention was offered with a multidisciplinary framework to nurses, nurse practitioners, pharmacists, and social workers. By incorporating all members of the team, the patient is at the center and individual disciplines do not work in silo. All members of the team have the knowledge and confidence to identify PIMs and CMS high-risk medications Therefore, using a team approach, either inappropriate prescribing can be decreased or PIMS and CMS high-risk medications can be monitored for side effects that contribute to falls, delirium, ADEs, or gastrointestinal bleeding.

Another strength of this evidence-based educational intervention was that it was easy and inexpensive to implement. Educational offerings could be conducted in small groups at different locations throughout the organization, with timely refresher courses that target the most current information. At the time this report was being written, efforts to create a Web-based educational module were underway. This educational module on PIMs and CMS high-risk medication is projected to be an annual competency for *MAX Healthcare*'s practitioners. The theory content would target information included in this nursing quality improvement project. Using the Web-based module approach, access to this information reaches a larger population, thus improving patient outcomes.

Limitations

This project had limitations related to attendance and the pre- and posttests' design. This organization has approximately 150 practitioners who were all invited to attend the educational intervention. A total of 79 practitioners attended and, because the educational intervention was offered during work time, many were late arriving. Therefore, the analysis showed that more posttests were completed than pretests. Although the pretests were given upon entering and completion was encouraged, some participants chose to not complete them.

Another limitation was in the pretest and posttest design related to the sections about market and discipline. These market and discipline sections were fill-in-the-blank, and many participants did not complete these sections. The Content Evaluation Questionnaire pre- and posttest had four questions. The fourth question was complex, and required nine correct answers. For a majority of the participants, this question was left blank.

Other Findings

Organizational support. As an organization**,** *MAX Healthcare* was supportive of the project. The DNPc's preceptor provided a welcoming environment, in-kind financial support, and contacts throughout the organization to promote the project (see Appendix K). Additionally, the DNPc's preceptor was responsive to questions, provided necessary information promptly, and was accessible for meetings and feedback. Organizational support and communication was critical for the success of this project.

<div align="center">

Conclusion

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Adults 65 years and older have a history of being prescribed potentially inappropriate medications. These medications contribute to adverse drug events, falls, delirium, and

gastrointestinal bleeding. Practitioners are in a position to identify PIMs and either prescribe alternatives or monitor closely to prevent complications and improve patient outcomes.

The evidence-based educational intervention increased practitioners' knowledge and confidence about an assessment tool called *2012 AGS Beers Criteria for PIM use in older adults* and the CMS high-risk medications. Results showed increased knowledge and confidence post-intervention. The number of PIMs filled in each MCT decreased when comparing a specific time period 2014 and 2015. Analysis of all the MCT combined resulted in a decrease of PIMs filled post-intervention of 36%.

Having the knowledge and confidence to identify PIMS, CMS high-risk medications, and use the evidence-based assessment tool called *2012 AGS Beers Criteria for PIM use in older adults* is important for nurses working with older adults. Often nurses are the first contact into a health care system and positioned to identify PIMs and CMS high-risk medications that could contribute to falls, ADEs, delirium, and gastrointestinal bleeding. An intervention targeted toward identification and monitoring PIMs and CMS high-risk medications has the potential to improve patient outcomes and promote safety.

This project had minor limitations but was received well by the organization and the participants. Participants stated they learned the importance of PIMs and the CMS high-risk medications as they interface with *MAX Healthcare's* formulary. Others stated that this topic is so important, it should be continued and providers should receive this knowledge. Implications for future studies include prescribing patterns per providers, locations, and disciplines.

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Appendix A

Search Strategy Model

Time Frame: February-March 2014
Electronic data bases: Pub med, Ovid Medline, CINAHL
Key words: inappropriate medication, inappropriate prescribing, potentially inappropriate medications, Beers, STOPP/START, PRISCUS, Medication Appropriateness Index, Good palliative Geriatric practice

Time Frame: May-June 2014
Electronic data bases: CINAHL/EBSCO host, OVID/Medline

Key words: Beers, nursing, nursing profession, pharmacy, pharmacist

[MESH] Filters: English language, aged 65+ years, research reports and literature within last 10 years, including international.
Reference lists and all articles were reviewed and excluded if they did not pertain to prescribing patterns, assessment tools, and adverse drug events.

[MESH] Filters: English language, aged 65+ years, research reports and literature within last 10 years, Reference lists and all articles were reviewed and excluded if they did not pertain to prescribing patterns, assessment tools, and adverse drug events and use of Beers Criteria in healthcare and nursing.
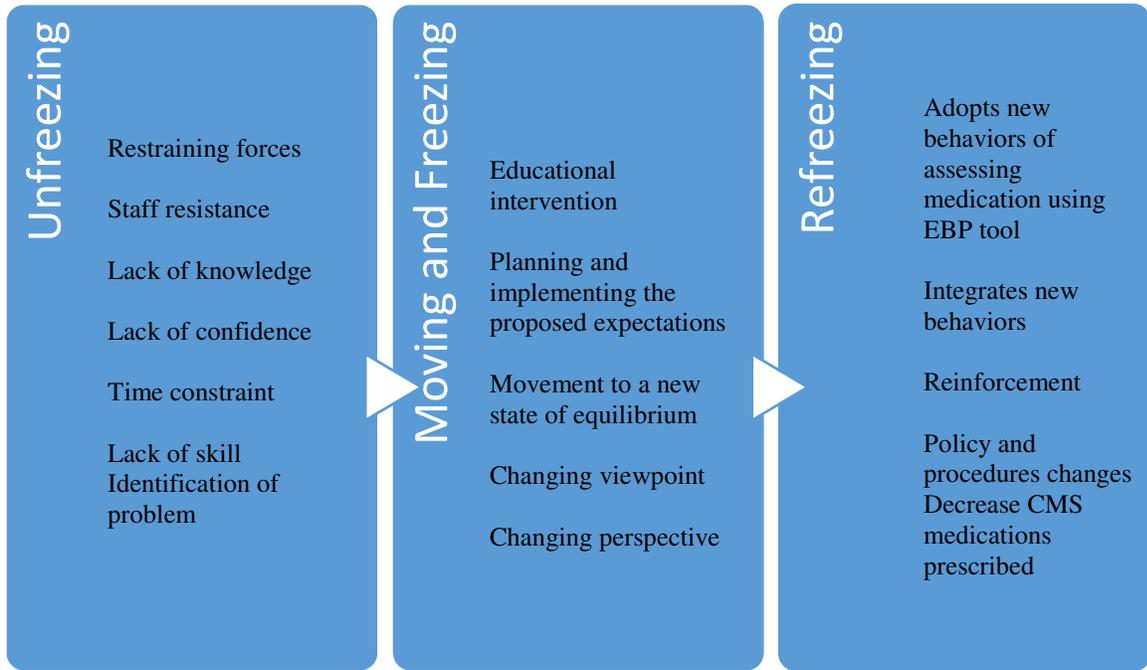
Initial search identified a total of 574 studies
Total of 13 studies included

Secondary search a total of 331 studies
Total of 10 studies included

Appendix B

Lewin's Model of Change

Unfreezing	Moving and Freezing	Refreezing
Restraining forces	Educational intervention	Adopts new behaviors of assessing medication using EBP tool
Staff resistance	Planning and implementing the proposed expectations	Integrates new behaviors
Lack of knowledge	Movement to a new state of equilibrium	Reinforcement
Lack of confidence	Changing viewpoint	Policy and procedures changes Decrease CMS medications prescribed
Time constraint	Changing perspective	
Lack of skill Identification of problem		

(Lewin's Model of Change adapted for Capstone project by EBeyer, 2014)

Appendix C

Content Evaluation Questionnaire

Pretest_____ Date_____ Market Member_____ Discipline_____

1. State two or more quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adult* as a standard of practice

2. State two methods of patient or caregiver engagement and empowerment in their own PIM

3. State two methods of provider engagement and discussions regarding PIMs and high-risk CMS medications

4. State three top CMS high-risk medications prescribed per your MCT enrollees, rationale and potential alternative

Appendix D

My Confidence Ruler

Pretest_____   Date_____   Market Member_____ Discipline_____

Using the scale below to rate your confidence level, please answer the following question.
0 is not confident at all, while 10 would describe extremely confident.
How confident are you, today, in identifying potentially inappropriate medication for older adults using the evidence-based criteria called
2012 American Geriatrics Society (AGS) Beers Criteria for potentially inappropriate medications (PIM) use in older adults

0   1   2   3   4   5   6   7   8   9   10
Not at all   Extremely
confident   confident

Why are you at _____and not zero?

What would it take for you to go from ____ to ____ (highest number)?

(Gold & Kokotailo, 2007)

Appendix E

Case Study

Date_____ Market Member_____ Discipline____

Smith, G., & Kireuk, T. (2013) Case Study: Moving beyond the Beers in translating into practice. *Geriatric Nursing 34,* 428–432.

New geriatric patients with complicated medical histories that come to our practice may challenge our general approaches to treatment and management. Many geriatric patients come with several chronic diseases, are taking multiple medications as well as, some experience the added challenge of having cognitive impairment. Case studies are invaluable tools for presenting and creating a dialog from real world examples of the many challenges in the world with older adults. This case study will examine our experiences with a newly admitted older patient to the clinic who has been prescribed several medications and who was experiencing questionable cognitive impairment.

The case study will examine the application of the Beers Criteria

The *2012 Beers Criteria for PIM use in older adults* was updated and revised. The intent of the criteria is guide the provider in selecting medications for older adults by considering the appropriateness of the drugs, drug-disease interactions, medications that warrant additional scrutiny when used with older adults. The Beers Criteria was not intended to mandate particular prescribing patterns, but are a guide good geriatric care and principles.

Fred is a 71-year-old Black male who emigrated to the U.S. from South Africa over 20 years with his primary language being French. He speaks broken English, and it is not clear how much he is able to understand in English. Fred was referred to the primary care clinic roam rehabilitation medicine after suffering from a Pontiac cerebral vascular accident (CVA) 2 months ago. He lives alone independently in a small apartment. He has a sister who lives about 20 minutes from his apartment and serves as his primary translator.

In addition to suffering a Pontiac CVA Fred has a history of hypertension, Diabetes Mellitus-Type II, Dyslipidemia, and Atrial Fibrillation. He is a nonsmoker and denies use of alcohol of illicit drugs. He fell twice without injury while in the rehabilitation unit. He also reports occasional urinary dribbling. Upon discharge from the rehabilitation facility, according to the discharge summary his blood pressure was well controlled. His sister was planning to check on him daily by phone and see him weekly to set up his medications, as well as, grocery shop. He receives two meals per day from *Meals on Wheels* and has personal care assistance for housekeeping services.

His vital signs included weight 152 lbs., height 68 inches, afebrile, blood pressure 180/09, pulse 61/min, respiratory rate 18/min., and pulse oximeter is 99% on room air. The visit was challenging due to his language barrier because his sister was unable to accompany him, as well as, possibly cognitive impairment due to the recent O/A. Pt. has +1 bilateral lower limb edema. The remainder of the exam was WNL lab results included A1C= 7.4, Sodium 137, Potassium 4.1, Creatinine 1.1, BUN 19, GFR 60.1, LDL 136, HLD 37, Triglycerides 132, INR 1.2

Assessment: Primary concerns: language barrier, questionable cognitive impairment, uncontrolled blood pressure, possible resistive hypertension, poorly controlled glucose, inadequate coagulation therapy

Plan: Medication reconciliation by care coordinator to assist patient's sister in medication set up and arrange for drug assistance program

Follow-up: Fred will be followed with a week visit in his home through tele health services. The clinic tele health visits will be coordinated weekly to have Fred's sister and clinic nurse present during the visit.

Appendix E continued

Table 1

Medications Prescribed Upon Discharge From Rehabilitation

Medications	Dose	Frequency
warfarin (Coumadin)	5mg.	daily
metaprolol (Lopressor)	150mg	BID
amlodipine (Norvasc)	10 mg.	daily
clonidine (Catapres)	0.1 mg	TID
chlorthalidone (Hygroton, Thalitone)	25 mg.	daily
metformin (Glucaphage)	500 mg.	BID
simvastatin (Zocar)	40 mg	daily
glyburide (Micronase)	5mg	daily
acetaminophen (Tylenol)		As needed for mild pain
senna (Senna)		As needed for constipation

Table 2

Application of Principles of Gerontologic Pharmacology and Beers Criteria

Medications	Beers Criteria	Application in practice
Warfarin (Coumadin)	*Use cautiously in older adults or unwilling to comply with laboratory blood draws or at risk for falls*	*Fred's calculate GFR is 60.1 ml/mint. Per Cockcroft formula. Continue Metformin 500 twice a day. Will monitor closely creatinine clearance.*
clonidine (Catapres)	Avoid due to potential for rebound HTN with missed doses, adverse CNS effects. potential for bradycardia and orthostatic hypotension. If required should be administered via transdermal patch to maximize steady dose.	Taper and discontinue Clonidine. May consider Clonidine via transdermal patch in the future.
glyburide (Micronase)	Long acting Sulfonylurea may contribute to prolonged hypoglycemic status and cause erratic glycemic control	Discontinue Glyburide, start Amaryl (glimepiride) a short acting sulfonylurea and which may decrease potential for hypoglycemic effects.

** The decision to discontinue anticoagulant therapy for individuals at risk for complications remains controversial. The decision to discontinue anticoagulation therapy needs to be individualized for each patient by evaluating fall risk and risk of stroke. (Permission granted by authors and publisher for educational use)

Appendix F

Content Evaluation Questionnaire

Posttest_____   Date_____   Market Member_____ Discipline_____

1. State two or more quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adult* as a standard of practice

2. State two methods of patient or caregiver engagement and empowerment in their own PIM

3. State two methods of provider engagement and discussions regarding PIMs and high-risk CMS medications

4. State the top three CMS high-risk medications prescribed for their MCT enrollees, and rationale and potential alternatives.

Appendix G

My Confidence Ruler

Posttest_____   Date_____   Market Member_____ Discipline_____

Using the scale below to rate your confidence level, please answer the following question.
0 is not confident at all, while 10 would describe extremely confident.
How confident are you, today, in identifying potentially inappropriate medication for older adults using the evidence-based criteria called
2012 American Geriatrics Society (AGS) Beers Criteria for potentially inappropriate medications (PIM) use in older adults

0   1   2   3   4   5   6   7   8   9   10
Not at all   Extremely
confident   confident

Why are you at _____and not zero?

What would it take for you to go from ____ to ____ (highest number)?

(Gold & Kokotailo, 2007)

Appendix H

Process/Program Evaluation Questionnaire

Date_____   Market Member_____ Discipline_____

1.   Was the program presented at a convenient time?   Yes   No

2. Was the program presented at a convenient location?   Yes   No

3. Was the room conducive to learning?   Yes   No

4. What did you learn from this educational intervention?

5. What recommendations do you have for improvement?

6. What recommendations do you have to facilitate provider engagement?

7. What recommendations do you have to facilitate patient/caregiver engagement?

8. What other learning opportunities would you like related to this topic?

Appendix I

Education Design Form

Date: _11.9.2014

STUDENT: _____Ellen Beyer_____

TOPIC: Using a Beers Criteria-Based Educational Intervention to Increase Practitioner's Knowledge and Confidence of Potentially Inappropriate

Medications With Older Adults

OVERALL GOAL OF PRESENTATION: To increase provider's knowledge and confidence in identifying PIMS and using the 2012 AGS Beers Criteria for PIM use in older adults

OBJECTIVES List learner objectives.	CONTENT Provide an outline of the content/topic to be presented and indicate to which objective(s) the content/topic is related.	METHODOLOGY List the teaching strategies (audio/visual/discussion) used for each topic/content area.	TIME Provide a time frame for content/topic area.	EVALUATION PLAN Activities/approaches to determine knowledge gain of participants
Participates will be able to: **Complete pretests** 1. To identify medications on the Beers Criteria (2012)	• What tables and medications are included in the Beers Criteria • Table 1 Therapeutic Drug • Table 2 Disease of syndrome • Table 3 • PIMs and classes to avoid • PIMS and classes to avoid with certain diseases • Syndromes and medications to be used	Lecture format (PP) Each participant will receive the Beers Criteria	10 min	To assess the confidence level using a *My Confidence Ruler* in the pre-posttest format design To Assess the Knowledge level using the pretest content evaluation questionnaire

	with caution			
2. To explain what the Beers Criteria (2012) is, how it was developed and the importance of identifying PIMs and CMS high-risk drugs	• History of Beers Criteria • Importance of PIMs related to mortality and morbidity, ADEs, Falls, delirium, and GI bleeding • Interface of Beers Criteria Meds and CMSmedications	Lecture format (PP) Group discussion	10 min	

3. To state two or more quality agencies that use the *2012 (AGS Beers Criteria for PIM use in older adult* as a standard of practice	• Quality agencies that consider the Beers Criteria as a standard of practice and history of that practice.
	  • National Committee for Quality Assurance (NCQA)
	  • Healthcare Effectiveness Data and Information (HEDIS)
	  • Pharmacy Quality Alliance
	  • CMS
	  • Medicare Part D
		Lecture format (PP)
		Group discussion
			10 min	80% of the participants attending the educational intervention will state two or more quality agencies that use the *2012 (AGS Beers Criteria for PIM use in older adult* as a standard of practice

4. To state two methods of patient or caregiver engagement and empowerment in their own PIM	• To lower chance of drug related problems • Keep a list of medications you take (non RX and RX) • Find out the side effects and be alert to them. That way you can report it. Find out the meds on the Beers	Lecture format (PP) Group discussion	7 min	80% of the participants attending the educational intervention will state two methods of patient or caregiver engagement and empowerment in their

				own PIM
	2012 list. This is a guide do not stop taking the meds • Patient's response to meds is different (healthinaging.org ned)			
5. To state two methods of provider engagement and discussions regarding PIMs and high-risk CMS medications	• Relationship with provider • Results of survey • Email • Phone conversation	Lecture format (PP) Group discussion	8 min	80% of the participants attending the educational intervention will state two methods of provider approach and engagement in discussions regarding PIM and CMS high-risk medications
6. To state the current CMS high-risk medications prescribed on their TEAM, rationale and alternatives	• Each team will have the top 3 CMS medications identified and alternatives	Lecture format (PP) Group discussion	5 min 5 Min case study 5 min posttest	80% of the participants attending the educational intervention will state the current CMS high-risk medications prescribed on their MCT, rationale and alternatives Complete the skill building case study/review of skill building case study Complete the posttest: Content evaluation, *My*

				Confidence Ruler, and Process/program evaluation questionnaire To complete a skill building case study using the *2012 AGS Beers Criteria for PIM use in older adults,*

Appendix J

Key Stakeholder Commitment Letter

UNIVERSITY OF MASSACHUSETTS AMHERST College of Nursing
Skinner Hall
651 North Pleasant Street
Amherst, MA 01003-9304

November 10, 2014

To Whom It May Concern:

I am the Director of the DNP Program at the University of Massachusetts, Amherst, School of Nursing. I am writing this letter on behalf of **Ellen Beyer DNP (c), PHCNS-BC, APRN, MBA,** your student preceptee. Your student is in the final year of the DNP program, is a DNP Candidate, and is planning to complete the final requirement for the Degree, a Capstone Scholarly Project, in your facility.

Your student will be designing, implementing, and evaluating the effect of translating a programmatic intervention into your practice or setting. As these projects are considered performance improvement or program evaluation projects and not research studies, the University does not require Institutional Review Board permission for this student to actualize the project as outlined by the student. I am using this letter as a "Key Stakeholder" commitment letter for the student to use in the Capstone Scholarly Project Proposal. A Graduate faculty member of the College of Nursing will, also, be working directly with your student as Chair of the Capstone Scholarly Project.

Thank you in advance for allowing this student to actualize the Capstone Project in your facility. If you have any questions, please call me at 413-545-5089 or email me at paselton@nursing.umass.edu

Key Stakeholder Signature: _____ **Date:** 11/11/14

Student Signature: _____ **Date:** 11/19/14

Sincerely,

Pamela Aselton

Pamela Aselton, PhD, FNP-BC
Associate Professor
Director DNP Program

Appendix K

Project Budget

Description	Cost	Total	Responsible Party
Program materials	Computer /and presentation software		In-kind by *MAX Healthcare* and LSUHSC-SON
Presentation materials	Educational material includes printing of the Beers Criteria, using card stock Which equals $79.00 ($1.00 per page) X 5 (Roche, 2013).	$395.00	Paid by DNP student
Staff training time	A 1-hour-long training session for 9 FNPs at $41.00 per hour ($369) 15 Pharmacists at $42.00 per hour ($630) 44 RN's at $32.00 per hour ($1408) 8 social workers at $28 per hour ($224) 3 administrative professionals (Sr VP, AVP, Exe Asst) ($500)	($3131.00)	In-kind by organization *MAX Healthcare*
Excel and Word	1 shared license and used for project time frame	($104.00)	In-kind by organization (LSUHSC-SON) and DNP student
Administrative		($1,120)	In-kind by organization *MAX Healthcare*
Meals::	Snacks, lunch, coffee, water for 79 participants	($350)	In-kind by organization *MAX Healthcare*
Supplies	Paper, pens, use of copier	(80.00)	In-kind by organization *MAX Healthcare*
Room	Setup/cleanup usage	($350)	*In-kind by organization MAX Healthcare*
Transportation to the one site twice	East bank 6mi. x2 x $.52 = $6.24 x 2	$12.48	Paid by DNP student
	Total out-of-pocket costs	$407.48	

Appendix L

Time Frame

<u>December</u>   Proposal approved by DNP committee

<u>December–January</u>   Arrange for presentation, market training, secure site, lunch
                                                     preparations, and materials

<u>January</u>   Secure all presentation material, present educational intervention,
                                                     present case study, and collect data via pre- and post-exam
<u>February–March</u>   Compile and analyze data from pre- and posttests. Start working on capstone
                                                     paper

<u>April</u>   Receive the data from MAX/*Healthcare* on HRM Feb. and March 2015
                                                     Compile and analyze data, finalize report, paper and presentation

<u>April–May</u>   Complete paper and presentation.
                                                     Report findings to participants and *MAX Healthcare* administration
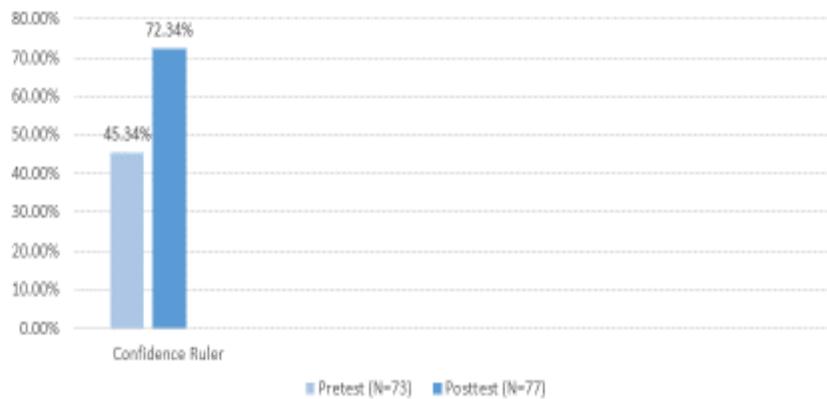
Appendix M

Case Study Results

Case Study-Application of Beers Criteria
For All participants (% correct)

30.38%   69.62%
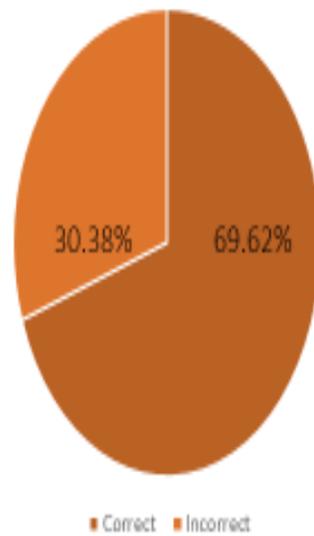
■ Correct   ■ Incorrect

Appendix N

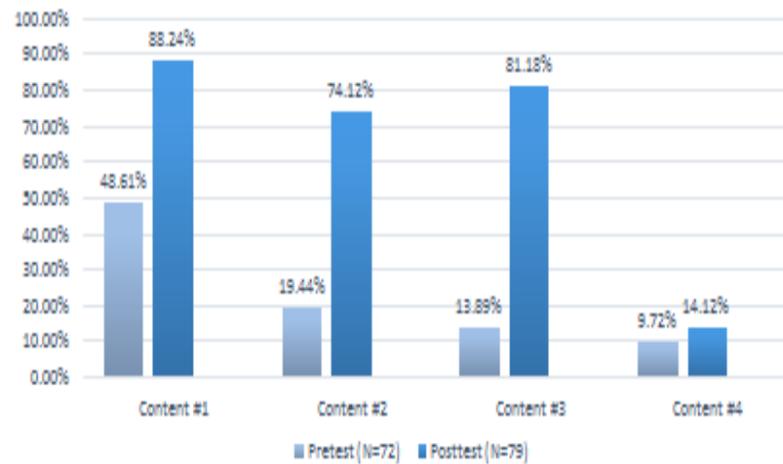**Confidence Ruler Results**

Confidence Ruler Pre and Post Test For All Participants (% correct)

Appendix O

Content Evaluation Questionnaire Results

Content pre and post test all participants (%correct)

Appendix P

Goals, Objectives, and Outcome Indicators

Goal 1: The expected outcome is to gain knowledge about the *2012 AGS Beers Criteria for PIM use in older adults* and application in practice

Objective	Outcome measurable	Met/Not Met
To complete a skill building case study using the *2012 AGS Beers Criteria for PIM use in older adults,* after the educational intervention is presented	90% of the participants attending the educational intervention will complete the skill building case study using *2012 AGS Beers Criteria for PIM use in older adults,* and identify the appropriate medications after the educational intervention is presented.	Not met 69.62% of all participants that attended identified the appropriate medications

Goal 2: The expected outcome is to increase the confidence level of the participants to identify PIM using the *2012 AGS Beers Criteria for PIM use in older adults*

Objective	Outcome measurable	Met/Not Met
To assess the confidence level using a *My Confidence Ruler* in the pre-posttest format design	80% of the participants attending the educational intervention will rate an increase in their own confidence level to identify PIM using the *2012 AGS Beers Criteria for PIM use in older adults* based on the results from the pre- and posttests of *My Confidence Ruler.*	Not met. 72.34% of the participants attending the educational intervention rated an increase in their own confidence level to identify PIM using the *2012 AGS Beers Criteria for PIM use in older adults* based on the results from the pre- and posttests of *My Confidence Ruler.*
	20% increase confidence rating between the pretest and posttest using *My Confidence Ruler*	Met a 27% increase confidence rating between pretest and postest

Goal 3: The expected outcome is to learn methods to engage and empower patient or caregiver in their own PIM

Objective	Outcome measurable	Met/Not Met
To identify two methods of patient or caregiver engagement and empowerment regarding a patient's own PIMs and CMS high-risk medications	80% of the participants attending the educational intervention will state two methods of patient or caregiver engagement and empowerment in their own PIM s and CMS high-risk medications	Met. 88.24% of the participants attending the educational intervention stated two methods of patient or caregiver engagement and empowerment in their own PIM s and CMS high-risk medications
	Increase of 20% between comparison of pre- and posttest	Met. Increase of 39.63% between comparison of pre- and posttest

Goal 4: The expected outcome is to learn methods to approach and engage providers in discussions about patient's PIM and high-risk CMS medications

Objective	Outcome measurable	Met/Not Met
To identify two methods of provider approach and engagement in discussions regarding PIM and CMS high-risk medications	80% of the participants attending the educational intervention will state two methods of provider approach and engagement in discussions regarding PIM and CMS high-risk medications	Not met. 74.12% of the participants attending the educational intervention stated two methods of provider approach and engagement in discussions regarding PIM and CMS high-risk medications
	Increase of 20% between comparison of pre- and posttest	Met. Increase 54.68% between comparison of pre- and posttest

Goal 5: The expected outcome is to increase the participant's understanding of the importance of the *2012 AGS Beers Criteria for PIM use in older adults,* use of a standard of practice with quality agencies

Objective	Outcome measurable	Met/Not Met
To state two quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adult* as a standard of practice	80% of the participants attending the educational intervention will state two or more quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adult* as a standard of practice	Met. 81.18% of the participants attending the educational intervention stated two or more quality agencies that use the *2012 AGS Beers Criteria for PIM use in older adult* as a standard of practice
	Increase of 20% between comparison of pre- and posttest	Met. Increase of 67.29 % between comparison of pre- and posttest

Goal 6: The expected outcome is to increase the participant's understanding of the top three CMS high-risk medications prescribed for their market care team enrollees, and rationale and potential alternatives.

Objective	Outcome measurable	Met/Not Met
To state the top three CMS high-risk medications prescribe on their MCT enrollees rationale and potential alternatives	80% of the participants attending the educational intervention will state the top three CMS high-risk medications prescribed on their MCT, rationale and potential alternatives	Not met. 14.12% of participants attending the educational intervention stated the top three CMS high-risk medications prescribed on their MCT, rationale and potential alternatives
	Increase of 20% between comparison of pre- and posttest	Not met. increase of 4.4% between comparison of pre- and posttest

Goal 7: The expected outcome is a decrease in number of PIMs in each MCT

Objective	Outcome measurable	Met/Not Met
To note a decrease in the number of PIMS in each MCT	A 2**%** decrease in the number of PIMs per month will occur in each MCT	Met. Decrease of 2% in the number of PIMs per month in each MCT, with a total 36% decrease in a 2-month period in all MCT