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# Establishing a Routine Process of Medication Reconciliation in a Rural Primary Care Clinic to Address Unnecessary Polypharmacy in Patients 65 and Older

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# Establishing a Routine Process of Medication Reconciliation in a Rural Primary Care Clinic to Address Unnecessary Polypharmacy in Patients 65 and Older

A DNP Project Submitted to the
Graduate Faculty
Of Jacksonville State University
In Partial Fulfillment of the
Requirements for the Degree of
Doctor of Nursing Practice

By

Jessica Kirkwood-Harp

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Jessica Kirkwood-Harp August 4, 2023

## Abstract

**Background:** Medication safety by reducing the proportion of older adults who use inappropriate medications is a Healthy People 2030 goal (Office of Disease Prevention and Health Promotion, n.d.(a)). The research for this proposal supported an established medication reconciliation (MR) to reduce errors and adverse drug events (ADEs). Consistent MR is essential for patient safety and positive patient outcomes in rural outpatient primary care clinics, as these patients possess multiple comorbidities.

**Purpose:** This Doctor of Nursing Practice (DNP) quality improvement project (QIP) established a routine MR process within a rural primary care clinic with reduced unnecessary polypharmacy and decreased risk of medication errors and ADEs as the implementation goals.

**Methods:** The DNP QIP included stakeholder meetings to identify the goals and discuss the QIP development, an educational session for clinic staff before the QIP implementation, and printed resources for the clinic staff and patients to reinforce awareness of the evidence-based practice (EBP) QIP.

**Results:** The post-implementation report produced a total of 99 patient visit records within the March 18-31, 2023, evaluation period. Ages ranged from 65-97 years with an average of 74.9 and a median of 81. There were 53 female and 46 male patients. The primary goal was to establish a consistent, routine MR process to address unnecessary polypharmacy in patients 65 and older, which documented consistent review of medication lists for polypharmacy for at least 95% or greater of all appointments at the end of the QIP or a greater than 4.4% increase (≥95%) of patients having a "medication review" completed less than 90 days ago, based on a retrospective chart review, compared to the baseline data collected. This goal was met with all 99 patient visits (100%) having a documented MR within the last 90 days. Other measurable clinic-

specific goals included a 10% or more significant reduction of patients with nine or more "unnecessary" medications listed (≤83.25%). This goal was also met with only 64 of the 99 patients (64.6%) having listed nine or more current medications. Of these patients, it was noted that female patients had the higher rate of nine or more medications at 53.1% (34/64), while 46.9% of male patients (30/64) had nine or more medications listed on their recent MRs. **Conclusion:** This QIP addressed unnecessary polypharmacy in older adult patients in a rural primary care setting. The results of the QIP provided encouraging findings and supported the hypothesis that primary care providers can appraise patient medication lists in an effort to successfully deprescribe. The results also validated the evidence in the literature review advocating education and evidence-based QIPs as part of those efforts. This QIP was successfully implemented during the eight weeks, and the MD-PC reported that she and the NP providers could see other benefits of the QIP including simplifying patients' medication lists, ensuring continuity of care, and preventing potential interactions or unnecessary side effects from medications. They also agreed that they saw re-freezing of the process begin as early as six weeks into the QIP. Preceptor evaluations were scored highly (5/5) and her comments were appreciative of the QIP being implemented at the clinic.

***Keywords:*** 65 and older, elderly, older adults, unnecessary polypharmacy, routine process, medication reconciliation

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Most importantly, I praise God for all the people, opportunities, and blessings in my life. The past several years would have been unachievable without God and my husband. I pray that my life and work always show God's love for those I encounter and that whatever I do, it is for His glory. *(I Corinthians 16:14)*

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## Establishing a Routine Process of Medication Reconciliation in a Rural Primary Care Clinic to Address Unnecessary Polypharmacy in Patients 65 and Older

According to Healthy People 2030, inappropriate use of medications, including over-the-counter (OTC) and prescriptions, is a significant concern for injury for older adults (Office of Disease Prevention and Health Promotion, n.d.(c)). A 2015 survey also found that 15.9% of adults 65 and older inappropriately used medications, both theirs and those belonging to others. This statistic was derived using a numerator including all adults 65 and older who received one or more of 33 potentially inappropriate medications during the calendar year included within the Beers criteria (ODPHP, n.d.(b)). All medical providers and prescribers should work towards the target goal of reduction by at least 4.7% as listed in the 2030 objective "Injury prevention in older adults: Reduce the proportion of older adults who use inappropriate medications — OA-02" (ODPHP, n.d.(a)).

### Background

Medication safety is enhanced by reducing the proportion of older adults who use inappropriate medications according to the Healthy People 2030 goal (ODPHP, n.d.(a)). Research supports the presence of an established routine of medication reconciliation (MR) as a strategy to reduce medication errors and adverse drug events (ADEs). A consistent MR process is essential for patient safety and positive patient outcomes in rural outpatient primary care clinics where patients are routinely considered for *high-risk* pharmaceutical therapies due to their multiple comorbidities. "Polypharmacy is defined as the use of multiple medications by a patient. *Problematic* polypharmacy is defined as using multiple medications in a way that is not considered appropriate" (Rochon, 2022). The minimum number of medications used to define 'polypharmacy' is variable but often ranges from 5 to 10. While polypharmacy most commonly

refers to prescribed medicines, it is essential to consider the number of OTC and herbal supplements used.

## Needs Analysis

Various sources were utilized to determine the need for the proposed QIP. These sources included data obtained from the proposed clinic site and external sources. Internal sources were patient population statistics, staff observations, and clinic characteristics. Although internal sources are most significant to clinic staff, external sources demonstrate and advocate implementing a QIP to reduce polypharmacy.

### Internal Data Supporting the QIP

The initial DNP QIP Stakeholder Meeting was held on Tuesday, June 7, 2022, at the focus clinic with the clinic's owner/medical director (MD). The physician was chosen as the clinic's DNP project champion (MD-PC) and a SWOT Analysis was performed (Appendix A). She discussed with the DNP Candidate, who will also function as the QIP's principal investigator (PI), that she and the certified registered nurse practitioner (CRNP) providers at the clinic recently met to discuss ideas for quality improvement (QI). Providers were especially concerned about polypharmacy in patients 65 and older. Since the DNP QIP site focuses on functional medicine and holistic treatment of their patients, the providers agreed to address polypharmacy in their patients' medical records and treatment plans.

No formal or consistent MR process was used at the focus clinic. Current practice expectations included medical assistants (MAs) asking patients about medication changes during each office encounter. Frequently, MAs addressed the prescribed therapies one by one with the patient, and the patient reported medication use or modifications to those therapies listed in the electronic medical record (EMR). Patients were also asked to bring their current medications to

their office visits. Providers also tried to review the medication list with the patient, focusing on the medications that manage chronic major medical conditions or those with potentially adverse effects. However, patients in this age group often need help remembering their medicines, their dosage and frequency, and bringing the medications with them. Further exacerbating polypharmacy risk, the rural clinic also encourages holistic approaches; therefore, many patients rely on natural remedies they find online, at local retail stores, or based upon recommendations from others. These remedies often pose significant risks, outweighing any negligible benefit for the patient.

From a report within the clinic's EMR over 12 days (June 8-20, 2022), 106 patients age 65 and older had an encounter with the clinic's providers. Of the 106 patients, 98 (92.5%) had nine or more medications included in their patient profile, and ten patients (9.4%) had a "medication review" conducted by office staff greater than 90 days before the dates within the focus report. The MD-PC and NPs noted that most patients have an increased risk of preventable adverse effects from unnecessary or inappropriate use of medications, especially medications included within the Beers criteria or with other known hazards (i.e., black box warnings, comorbid conditions, frequent falls, and lack of home assistance). Providers also noted that these patients have an increased frequency of office and hospital visits to manage, monitor, and require re-education efforts. These can all cause provider, patient, and caregiver frustration, as well as increased time and resource utilization.

The MD-PC and her colleagues acknowledged the following caveats: First, medications to treat or manage chronic diagnoses (i.e., cardiovascular or lung diseases; diabetes; pain, thyroid, inflammatory, or autoimmune conditions) would be excluded from restrictive interventions but would be evaluated for the lowest effective dose or need for adjustments to

dose or frequency by applying current evidence-based practice (EBP) and treatment guidelines. Secondly, medications the MD-PC mentioned that would be primary considerations for eliminating would be the long-term use of proton pump inhibitors (PPIs), histamine two antagonists, montelukast, vitamins, supplements, and herbals. The MD-PC echoed much of the same sentiments of "stepping past lists of medications that our older patients should not be using based on their individual medical and pharmacologic issues ('low hanging fruit') to address medications that were once suitable for them and their conditions but may not be any longer because of their current age, condition (life expectancy versus quality of life), preferences, or personal goals of care" (National Institute on Aging, 2021).

Therefore, the ultimate goal of this DNP QIP was to decrease or maintain these patients' medication lists at ≤ 9 "long-term use" medications to effectively treat or manage their significant, chronic, or uncontrolled conditions that have a considerable impact on the patient's quality of life, ability to function, perform ADLs, or that could cause harm, defect, or death.

**External Data Supporting the QIP**

Hession (2018) also implemented a DNP QIP in an outpatient clinic to improve the consistent use of MR and noted (p. 4), "in a busy, outpatient specialty clinic where patients are routinely considered for high-risk pharmaceutical therapies, a consistent MR process is essential for patient safety and positive health outcomes." Taylor (2021) explains an effective MR process as complex and requiring providers to complete multiple steps, including reviewing discharge paperwork, office records, and pharmacy records, then evaluating those with what the patient is currently using, including over-the-counter, supplements, natural remedies, and prescribed medications.

The main objective is to reconcile discrepancies; however, the actual method is not simple and does not have a specific structure. Patient expectations, goals, and personal commitment should also be variables considered.

When assessing the clinic's need for the QIP, it is equally important to consider patient goals, patient safety, and clinic resources. Comorbidities also escalate the need for QI interventions aimed at reducing polypharmacy. Although future complication risk is decreased, immediate polypharmacy risk may increase. Saljoughian (2019) found that roughly 44% of men and 57% of women older than 65 use five or more medications (non-prescription or prescription) per week. Twelve percent of people in this age group use ten or more medications non-prescription or prescription) per week. Patients with multiple comorbidities (i.e., respiratory problems, diabetes, cardiovascular disease) may use up to six or nine medications to address those illnesses and their associated complications. Rigorous compliance with standardized treatment guidelines for these conditions usually leads to a minimum of six prescription medications. Therefore, polypharmacy becomes challenging when adverse consequences happen.

It is important to consider individual patient factors when modifying prescription lists. Alsuwaidan et al. (2019) sought to collect patient data to review patients for appropriate numbers of prescription medications and consider their comorbidities. They analyzed 4,011 patient profiles in Saudi Arabia but disqualified 1,002 profiles (24.9%) for not meeting exclusion criteria due to the use of "inappropriate medications." The remaining 3,009 profiles (having one or more appropriate medications) included 56% males (n = 1685) and 44% females (n = 1,324). Analysis of the sample found that 55.7% (n = 1,676) of these patients were taking more than five appropriate medications (53% males; 47% females). The average age in years of the patients was

73.26 ± 6.6 (SD), with no considerable difference between the mean age of males (73.5 years) and females (72.8 years). The average amount of appropriate medications was 5.31 ± 2.8 SD, and the average number of comorbidities was 2.56 ± 1.25 SD.

Polypharmacy, especially in older adults, can create various problems, some of which may be life-threatening. Many OTC products and supplements can have potential interactions when used concurrently or with prescription medications. Rochon (2022) noted that one study included over 3,000 adults aged 75 years or older. Almost 75% of these individuals took at least one prescribed medication and one supplement. Providers usually do not ask patients whether they take herbal remedies, and patients do not think mentioning them is important. In one American survey, 75% of individuals 18 years and older stated that they did not tell their provider they were taking supplements or herbs. Another review of 369 patients aged 60 to 99 revealed possible interactions between their prescriptions and 10 of the 22 supplements reported. Both patients and providers must understand the significance surrounding the discussion of supplement use. Ensuring the accuracy of medication lists takes time and effort. Some medications may become “unnecessary” for the patient to use because the condition has been treated, managed, or resolved. Providers must also consider the patient who stops using a medication or it has expired but remains on the patient’s medication list. In this case, the provider may be reluctant to prescribe or alter the current medication order because it appears the patient is already receiving or using that medication at a specific dose or frequency. Patients may still be using medications or supplements that are no longer safe or recommended for long-term use, their risks outweigh the benefits, or they are weak in EBP (i.e., PPIs, H2 antagonists, montelukast). As the number of medications increases, especially in older adults with multiple

chronic conditions (MCC), so does the risk for patient misuse, confusion of medication details, and ADEs (i.e., interactions, minimized/maximized effects).

The Optimize Trial demonstrated "the importance of linking de-prescribing with patients' and care partners' overall goals of care, and framing deprescribing as routine and positive versus a withdrawal of treatment. Here too, physicians expressed the need for de-prescribing communication tips addressing specific clinical situations" (NIA, 2021). Tarn and Schwartz (2020) stated that the U.S. Food and Drug Administration (FDA) has authorized over 20,000 pharmaceuticals. Clinical experts and groups advocate for many medications to be used as part of their treatment guidelines so providers consistently prescribe them. Medicines have evolved from using plants, honey, grease, and other homeopathic remedies to evidence-based allopathic treatments; however, such developments do not have purely positive outcomes. In effect, providers have produced a new iatrogenic medical condition in the form of polypharmacy.

Providers acknowledge the creation of polypharmacy, but its definition varies, further illustrating the need for QIPs to investigate this issue. Saljoughian (2019) explains that among the many studies found, no specific number determines what polypharmacy means. "The use of medications that are not indicated, are ineffective, or constitute therapeutic duplication would be considered polypharmacy, and this definition necessitates a clinical review of medication regimens" (Saljoughian, 2019). It also causes multiple negative effects, including increased systemic and individual healthcare costs, poor medication adherence, an increased risk of ADEs and drug-drug interactions, an increased risk for falls and injuries, forgetfulness, unpleasant side effects, and many more issues. While many studies agree that nine or more medications constitute polypharmacy, others argue that anything more than five should be classified as polypharmacy. Again, many treatment guidelines often recommend using multiple medications

to manage chronic diseases and illnesses effectively. As a result, an older adult with two chronic conditions, such as diabetes and cardiovascular disease, will typically go over five or even nine medications.

NIA (2021) also addresses the issue of defining inappropriate polypharmacy and prescribed medications meant to treat one condition, exacerbate another or create an entirely new problem. “Polypharmacy also burdens patients and their families, who need to understand the purpose of the many prescriptions written by multiple providers, get refills, take each medication at the correct time of day, and recognize side effects” (NIA, 2021).

Some useful prescribing tools for use in the older adult and elderly population were identified in the initial literature review, such as the Beers criteria on the American Geriatrics Society website (Rochon, 2022). Although the Beers criteria is evidence-based and expert-developed, providers must “consider many factors in prescribing decisions, including using common sense and clinical judgment, understanding that strict adherence to the criteria is not always possible” (Rochon, 2022). The Centers for Medicare and Medicaid Services [CMS] drug utilization review standards focus on eight prescription drug classes (digoxin, calcium channel blockers, ACE inhibitors, H2 receptor antagonists, NSAIDs, benzodiazepines, antipsychotics, and antidepressants) along with four kinds of prescribing issues (inappropriate dose, inappropriate duration of therapy, duplication of treatments, and potential for drug-drug interactions). One study found that 19% of 2,508 older adults incorrectly used one or more medications, most commonly NSAIDs and benzodiazepines. Other instruments mentioned were the Screening Tool of Older Person’s Prescriptions (STOPP), STOPP/START (Screening Tool to Alert doctors to the Right Treatment), and the FORTA (Fit FOR The Aged).

Saljoughian (2019) considers that "the various models for ambulatory care often overlap to serve patients' fluctuating health and wellness needs, as well as to obtain income that might otherwise go elsewhere." According to Marcel Salive, a health science administrator in NIA's Division of Geriatrics and Clinical Gerontology, "A vast majority of health spending goes toward treating people with MCC which includes about 75% of older adults" (NIA, 2021). A current, concise, reconciled medication list and evidence-based treatment plans ensure safe and efficient practice, avoidance of ADEs, and continuity of care. This also affords healthcare communities and their patients positive individual patient outcomes, patient-centered care with informed and invested patients, subsequent decreased cost, and improved patient outcomes at all levels of the healthcare system.

An identified practice gap exists in developing a consistent, routine MR process. Possible additional approaches for ongoing QI efforts related to polypharmacy include the development of pre-appointment prompts to encourage patients to bring all medications to the scheduled visit, ongoing polypharmacy education of patients, caregivers, and staff, and regular provider chart review of polypharmacy avoidance. Saljoughian (2019) encourages that "the focus here [primary care clinics] is on team care that may include more collaborative medical services for group visits."

## Problem Statement and QIP Goals

The initial PICOT question is as follows, "Among patients 65 and older, does establishing a routine process of MR eliminate unnecessary polypharmacy, compared with no process, resulting in an increase in deprescribing activity over eight weeks?" (Appendix B). The PI and QIP Team determined that an eight-week implementation period was an appropriate timeframe. The clinic's MD-PC and CRNP providers had agreed upon a goal to reduce the

number of necessary medications in their patients 65 and older to between five and nine therapies, but less than nine for all patients. However, after discussing the QIP, a more significant goal was to establish a consistent, routine MR process to address unnecessary polypharmacy in patients 65 and older, which documented consistent review of medication lists for polypharmacy for at least 95% or greater of all appointments at the end of the QIP, based on a retrospective chart review, compared to the baseline data collected. This goal was agreed upon as more attainable and patient-centered. Other measurable clinic-specific goals included a 10% or more significant reduction of patients with nine or more "unnecessary" medications listed (≤83.25%) and a 4.4% or more increase (≥95%) of patients having a "medication review" completed less than 90 days ago. Other identified benefits of the QIP included simplifying patients' medication lists, ensuring continuity of care, and preventing potential interactions or unnecessary side effects from medications.

## Review of Literature

A literature review used the following keywords: *65 and older*, *elderly*, *older adults*, *unnecessary polypharmacy*, *routine process*, and *MR*. PubMed, CINAHL, MedLine, and Google Scholar searches gleaned academic and peer-reviewed journal articles as well as public health and governmental organization resources with information current within the last 5-7 years. At least 70 sources were reviewed, 37 were included in the evidence table (Appendix B), and 31 were directly referenced in this manuscript.

### Polypharmacy Defined and Its Effects

A Korean study by Chang et al. (2020) studied the connection between polypharmacy and the risk of hospitalization and death in a large, national longitudinal cohort of elderly community-dwelling persons from the Korean National Health Insurance Service (NHIS)

database, compared to the nationwide pharmacy claims data. Those prescribed more medications were also more likely to be older and have more comorbidities, as well as a correlation between the number of daily ordered medications and the risks of hospitalization and death. Their findings emphasize the need to identify approaches to decrease polypharmacy in clinical practice and prompt more thoughtful treatment with multiple medications, especially in the geriatric population.

Only when polypharmacy is taken more seriously and in a more clinically meaningful manner will the adverse outcomes linked with it be entirely known. Still, literature reviews such as Davies et al. (2020) found that the research analyzing the adverse outcomes of polypharmacy in older people is "complex, extensive, and conflicting" (p. 186). It synthesizes current evidence on the adverse health, social, medicine management, and healthcare utilization outcomes of polypharmacy in older people in any healthcare facility, residential setting, or country. Most reviews characterized polypharmacy as a specific medication count, but few researched medication classes or disease states as sub-groups. Evidence supporting a relationship between polypharmacy and adverse outcomes, including ADEs and disability, was conflicting. Patterns were observed between hospitalization and inappropriate prescribing. No research explored polypharmacy in the very old (≥85 years) or explored the possible social concerns of medication use (i.e., loneliness and isolation). The quality of the original primary studies was not assessed, but the artifact depended on the information provided in the systematic reviews. However, the authors of this artifact recognized that the resources fluctuated in style and quality. Most resources described polypharmacy as multiple medicines but did not distinguish between appropriate and inappropriate prescribing or details such as medication classes, indications, doses, and durations. Polypharmacy was defined as different numerical values, which could have

led to inconsistent effects. Observational studies are predisposed to confounding, which is also a concern in reviews that did not focus on polypharmacy.

Fernández et al. (2021) attempted to evaluate the pervasiveness and forms of potentially inappropriate medication according to the Beers criteria in the community-dwelling elderly and to distinguish the primary clinical and functional outcomes of potentially problematic medication over the following two years. The group with persistent potentially inappropriate medication discovered a deteriorating health self-assessment, intensified frailty, a higher occurrence of recurrent falls and depression, increased hospital admissions, urgent care visits, and additional prescribed medications. Although they did not find an impact on functional capacity, potentially inappropriate medication was more common among frail and depressed male individuals with poor health self-assessment and comorbidities, particularly diabetes mellitus and chronic obstructive pulmonary disease.

Sheikh-Taha and Asmar (2021) also evaluated polypharmacy among older adults with cardiovascular disease (CVD) and acknowledged severe potential adverse effects. Polypharmacy, hyper-polypharmacy, and severe adverse effects are commonplace in older adults with CVD. Providers should cautiously evaluate patients' drug lists and modify therapy appropriately to avoid adverse drug reactions and negative health outcomes.

Studies on polypharmacy range from 4% among community-dwelling older people to over 96.5% in hospitalized patients. Pazan and Wehling (2021) performed a narrative review to understand and synthesize recent publications on the "definitions, epidemiology and clinical consequences of polypharmacy" (pp. 443-444, 447), which found 143 explanations of polypharmacy and related terms, but most were numerical definitions. Numerous adverse clinical outcomes were also associated with polypharmacy.

However, another Korean study by Cho et al. (2022) delineated their results based on the definitions of "polypharmacy" (greater than five medications) and "hyper-polypharmacy" (> ten medications) in the elderly from 2010-2019. They found that polypharmacy remained high at 42 and 38%, while hyper-polypharmacy increased from 6.4 to 9.4%, respectively.

**Medication Reconciliation – The Answer to Polypharmacy?**

In 2008, Barnsteiner examined the evidence for MR and made recommendations for nursing practice based on a systematic literature review. It includes QIPs with small sample sizes conducted at focus clinical sites. It was noted that, although there was some evidence to validate that an MR process helps prevent adverse drug events, MR studies had focused on "the accuracy of the medication history during various transitions: ambulatory to acute care inpatient setting, skilled nursing facility to the acute care inpatient setting, inpatient acute care setting to the skilled nursing facility, inpatient acute care setting to discharge, inpatient floor to the intensive care unit (ICU), and ICU to discharge" (Barnsteiner, 2008, Ch. 38, pp. 2-461). However, research was still limited that concentrated on outcomes related to the frequency of errors stemming from a lack of or an inadequate patient medication list, as well as establishing how to do the process successfully or summarizing the costs related to the design and implementation of such programs.

Other patient safety website searches included the Institute for Safe Medication Practices (ISMP), the National Patient Safety Foundation (NPSF), the Joint Commission (JC), and the Institute for Healthcare Improvement (IHI). MR is valuable for patient safety and outcome intervention in all settings. Studies have concentrated on MR accuracy in different settings. Still, few have aimed at outcomes associated with the dominance of errors stemming from the absence of or an inadequate patient medication list. Evidence validates that an MR process is valuable in

avoiding adverse drug events (ADEs). There are also few published studies establishing how to implement the process effectively or describing the expenses related to the design and implementation of such strategies. However, successful MR processes throughout the continuum that compare the patient's current medications with what is ordered are essential to reduce errors, like avoiding omissions, drug-drug interactions, drug-disease interactions, and other discrepancies.

Qato et al. (2008) found that "medications are a critical modality for prolongation of life and improved quality of life for many older adults" (p. 2878). This statement may aid attempts to improve the safety and quality of pharmacotherapy for older adults in determining patterns of prescription and nonprescription medication use among the elderly, which is particularly imperative. In this study's sample of community-dwelling elderly in the US, 1 in 25 stated they received simultaneous drugs with the risk for injury from dangerous drug-drug interactions.

Rose et al. (2018) observed a high rate of discrepancies between the medicines used by the patient and the prescriptions documented by the primary care physician. A collaborative MR and medication management process that combines the complete medication list would prevent this and ensure patient safety.

Goldsmith et al. (2022) proposed in their study that polypharmacy intensifies with age and is related to significant health and economic expenses. It gave an account of the changes over ten years regarding common medication uses and polypharmacy in Israeli community-dwelling older adults aged ≥ 65. The findings were much the same – polypharmacy, while decreased in that time, involves constant awareness, particularly regarding lack of knowledge of indications leading to inadequate adherence and adverse side effects. Healthcare staff and providers must perform consistent MR in vulnerable elderly patients.

**Medication Reconciliation as an Evidence-Based Intervention**

Global studies on polypharmacy and the importance of MR have prompted organizations like the Agency for Healthcare Research and Quality (AHRQ, 2012) and National Institute on Aging (NIA, 2021) to develop helpful information and tools for designing or redesigning an MR process. The Institute for Healthcare Improvement (IHI, 2022a, b, c) also provides current resources that may be used or altered to develop and implement medication review and reconciliation processes.

Juma (2019) also conducted a DNP QIP on MR in a rural primary care clinic. He found that MR leads to "increased patient safety and a higher quality of care" (pp. 2, 16). Patients with numerous OTC medications compounded time spent in the clinic and had an increased risk for errors. The conclusions from his QIP provide evidence for application across all healthcare settings. In addition, the DNP provider plays a vital part in collaboration with the community in synthesizing and translating the evidence and advocating for improvement under their training.

Rochon et al. (2021) concentrate on improving prescribing for older adults through dose reductions or stopping potentially dangerous or no longer necessary drugs. It also studies how sex (biological) and gender (sociocultural) factors are significant in safe prescribing. It provides a practical approach to medication safety that providers can consistently apply to older patients, emphasizing how sex and gender affect medication decision-making. It used the International Reducing Inappropriate Medication Use and Polypharmacy position statement to find resources that use prescribing tools and deprescribing processes and conducted systematic reviews on these two topics. The study encourages the "DRUGS" approach to improve medication safety for older adults.

## Conclusion of Literature Review

Polypharmacy in the elderly has many definitions, subsets, variables, and adverse outcomes. Still, the best way to avoid or address it remains to be a constant theme within the literature: consistent MR processes throughout the healthcare continuum. This ensures that patients – especially the elderly with multiple comorbidities – their caregivers, healthcare staff, and providers are all aware, educated, and engaged participants in the process to be advocates and good stewards of medication use and prescribing. When medication lists are complete and reconciled as "current" and "appropriate," the risks for adverse effects and all accompanying negative outcomes can be avoided or decreased. Once this is achieved, other efforts such as education, titrating to the lowest effective dose, using alternative therapies, or de-prescribing can be attempted. Therefore, MR is the starting point for further efforts to minimize the risks of polypharmacy in the elderly.

## Theoretical Framework

Kurt Lewin's "Change Model Theory," or "Three-Stage Change Model Theory," was chosen for this DNP QIP. The application of Lewin's theory was significant to this QIP, as it included the three stages of change. Lewin's first stage, "unfreezing," identified a current gap in practice. The QIP's implementation phase served as Lewin's second stage of "changing." Finally, the third stage, "refreezing," incorporated the clinic staff's day-to-day use of a structured MR process following the QIP (Barto, 2019; Harrison et al., 2021; Saleem et al., 2019).

Many healthcare settings use Kurt Lewin's Change Theory, especially in nurse-led QIPs (Saleem et al., 2019). According to Lewin, the fundamental basis of process or behavior change includes three steps: unfreezing, changing, and refreezing. A method for changing behaviors, cultures, or processes is developed during *unfreezing*. Unfreezing addresses resistance to change,

but change agents should realize that it is a natural response, and attempting to remove all resistance is often a waste of valuable time. Following the unfreezing stage is the *changing* or moving stage. New thoughts, feelings, and behaviors are introduced during this time. A specific implementation plan and staff involvement are crucial for success. *Refreezing* is the last stage, where the implemented behavior is maintained. Lewin stated, "The stability of human behavior is based on quasi-stationary equilibrium supported by a large force field of driving and restraining forces" (Barto, 2019, p. 23).

Lewin's theory provides a framework for change, while transformational leadership applies the approach. A transformational leader steers, inspires, collaborates, and unites those involved to support change. According to Lewin, an organization must unfreeze its existing state to a neutral position to change internal processes. This process allows the previous method to be unlearned and the new one to occur. The change becomes the motivation for an organization to reduce the opposing influences. After implementing the change, the organization can refreeze into the new status. Harrison et al. (2021) further explained this, who reviewed 38 studies that used 12 change management methods in ten countries within various healthcare settings. The most frequently used were Kotter (19) and Lewin (11). "These methods were often valuable as steering ideologies to reinforce organizational changes in multifaceted healthcare settings and were utilized appropriately in implementing QI projects" (Harrison et al., 2021, pp. 85 & 100). Two of these nurse-led change QIPs used Lewin's Model to enhance hand-off communication in the various units of four Australian hospitals. This model was used to explain the change process instead of guiding the phases of the change. Just as in this DNP QIP, their baseline data collection period was a component of the unfreezing stage; the implementation phase was the actual change; the data collection and post-intervention period was considered the refreezing

stage. The second nurse-led change QIP involved using an electronic patient caseload tool in a community setting. The initial stages used were unfreezing and moving. A significant advantage of using Lewin's model was that it allowed the QIP manager to evaluate the change process and its evolution thoroughly. A similar QIP in the US used Lewin's Model and noted an increase in patient satisfaction results from 75% to 87.6% over six months (Harrison et al., 2021).

According to Sokol et al. (Harrison et al., 2021, p. 103), the Lewin and McKinsey models were also used to effect "office-wide culture and provide structural support to meet the twin goals of safe opioid prescribing and treating patients with opioid-use disorder." Combining the two approaches allowed the team to tackle specific issues in a broader framework of the overall change management process. Since Lewin's method includes phases, it enables change agents to evaluate QIP objectives and establish celebratory milestones. It also emphasizes engaging participants in change efforts, addressing reactions to change, and sustaining change with effective exchange and teamwork (Harrison et al., 2021).

Applying transformational leadership methods within Lewin's Theory can influence staff members to realize that the change is meaningful. Unfreezing the current practice involves having staff members surrender their opinions and views regarding the existing system to utilize EBPs as an alternative. Unfreezing stage approaches include performing a gap analysis to confirm inconsistencies between the current and desired status, sharing literature findings and data related to the EBP, recognizing the driving and resisting forces, devising ways to address them, and making sure that stakeholders work together to modify the behavior (Barto, 2019).

These unfreezing approaches were a part of the DNP QIP over the Summer and Fall 2022 semesters. The focus clinic's MD-PC participated in the QIP's development as the primary stakeholder from its inception. She also functioned as the QIP's champion within the clinic to

counter the internal resisting forces by validating the significance of the EBP. Other driving influences included engaging the CRNP providers as team leaders with a personal stake in supporting the EBP.

The moving stage included a staff education "lunch and learn" session provided by the MD-PC to gain staff members' commitment. The PI developed handouts (Appendix C) for the MD-PC, which were given to the staff to help explain and remind them of the process. Ongoing engagement and education of clinic staff, patients, and visitors was achieved through a PI-developed information sheet attached to the patient's medication list. This patient information sheet (Appendix C) describes the QIP's significance, steps, goals, and other pertinent details. Clear and regular communication is crucial. Therefore, the MD-PC, PI, and DNP Project Chair (DNP-PC) met during status update meetings (via Microsoft Teams) and communicated regularly (via email and texts) to discuss any issues that arose and any changes necessary to improve the initiative, both currently and for sustainability. Another communication method utilized throughout the QIP was the clinic's internal messaging system. The MD-PC was identified as an in-clinic resource that staff members could consult regarding the QIP. The PI created "Files" within the Microsoft Teams group link with all current documentation for easy access by the QIP Team (PI, MD-PC, and DNP-PC). The PI included her contact information on the staff education sheets in case they needed to contact her directly with issues, questions, or input throughout the QIP's implementation stage.

It should be noted that during the QIP process, AthenaHealth has been advancing its EMR software, including the patient portal (Freedman, 2023; Pifer, 2022). Most notably, recent software updates have allowed patients to review their medication lists during the electronic pre-registration and check-in process. The PI brought this new feature to the MD-PC and clinic

staff's attention on February 28, 2023. Most medications allow the patient to edit their dosage and frequency or delete the medicines if they no longer take them. However, some could not be edited or deleted by the patient. Although the MD-PC and clinic staff were unaware of this particular update in the patient portal and AthenaHealth is still perfecting these updates, all were hopeful that this would be another helpful step in their QIP efforts.

Promoting awareness of the clinic's successes to its staff, patients, and community is another approach to commend their commitment to providing quality care and refreezing the new system (Barto, 2019). According to Barto (2019), refreezing is the process of assimilating the change as part of the organization's culture and is achieved through ongoing monitoring of the EBP's use. Following the QIP, the MD-PC will decide which staff members will be delegated to conduct this monitoring. The MD-PC and her team leaders will address lapses in the EBP's utilization, and necessary retraining must occur for sustainability. The clinic's new employee orientation must include training on the EBP method to ensure knowledge and compliance.

## Methodology

MR is an established EBP per the review of literature, including being an identified goal of the Healthy People 2030 (HP 2030) initiative and the Joint Commission's National Patient Safety Goals (JC-NPSG). This QIP aimed to support the clinic and its providers in addressing unnecessary polypharmacy in patients 65 and older by implementing a consistent, routine MR process. The primary intervention for the clinic was to establish, implement, and better utilize this process.

The PI's role in this QIP was to support the basis of the EBP's implementation through a Gap and Needs Analysis, a literature review, an analysis of pre-and post-implementation findings, and dissemination of the results to the stakeholder, clinic, and our colleagues for use in

similar clinical settings. Since this qualitative project enhanced the performance and completion of an established EBP and standard of practice, it is primarily provider-driven with little or no delegation to unlicensed staff. However, the primary stakeholder acknowledged that the best way for the clinic to succeed is to involve all staff members during the patient's visit – from check-in through check-out.

**Setting**

The focus clinic was a primary care family medicine and direct primary care clinic in rural Northeast Alabama. Its MD-PC and three CRNP providers care for newborn to elderly patients with acute illnesses, chronic disease management, routine care, and wellness. The staff includes approximately 12-16 full-time and part-time multi-skilled employees who function as office and clinic staff.

**Population**

The population of interest was the clinic's patients 65 and older who visited the clinic for a scheduled appointment within the eight-week implementation timeframe. This process and data enabled the providers to address patients within that population who were receiving nine or more medications, as those would be potential candidates for deprescribing unnecessary drugs.

**Inclusion/Exclusion Criteria for Patients**

Inclusion criteria included:

- Patients/charts for review must have had scheduled appointments within the eight-week implementation period
- Patient age was ≥65 and older

There were no exclusions to the inclusion criteria.

**Recruitment, Risks, Benefits, and Compensation**

First, clinic staff was made aware of the QIP's purpose, initial findings (i.e., baseline data) and literature review, the EBP process to be implemented, post-implementation analysis, and dissemination of the results. Participation by the clinic staff was necessary and expected by the MD-PC, especially since implementing the EBP was part of the clinic's ongoing QI process. There was no promise of reward or risk for the clinic staff for their participation, or lack of, from the PI; however, benefits to clinic staff included improving the current standard of care, enhanced quality of patient care, and heightened patient outcomes.

Patients, family members, and other visitors to the clinic were made aware of the QI initiative through a visual aid in the form of a patient information sheet (Appendix C), which was attached to the patient's medication list. Implementation was part of the clinic's QI initiative and mandated by HP 2030 and JC-PSHG; therefore, patient and staff consent was unnecessary. Also, there were no identified physical risks or rewards for patients who met the inclusion criteria. There was only a minimal potential risk for breach in patient confidentiality participating in this QIP, but benefits to the patient's medication adherence and outcomes were more significant. The PI assured all involved parties that the collected data would be unidentifiable. In addition, the PI utilized safeguards to maintain the privacy and confidentiality of all data.

This QIP was implemented during Spring 2023 after institutional review board (IRB) approval (Appendix D) and receiving a letter of support from the facility (Appendix E) during Fall 2022. The QIP adhered to all ethical standards to protect the clinic staff and patients, including the completion of CITI Training (Appendix F). Primarily, this QIP observed the principles of non-maleficence and beneficence by acting in the best interest of the participants while minimizing or preventing risk. The principle of autonomy was respected by encouraging

the patient's involvement in the MR process. The PI, MD-PC, DNP-PC, and clinic staff promoted the principle of justice by treating all participants equitably, regardless of their age, sex, religion, race, medical conditions, or insurance status. Overall, this QIP's core was to support the clinic in improving standards and quality of patient care and outcomes.

## Design

This QIP applied the Plan, Do, Study, Act (PDSA) design model. This design model is commonly used in QIPs in healthcare settings and is simple yet successful with MR processes, as cited in Dabrowski and Lawrie (2021), Sabeen et al. (2021), and numerous other works of literature referenced by this QIP. *Planning* occurred during Summer and Fall 2022 semesters' tasks. Implementation of the QIP took place during the Spring 2023 semester, signifying the *doing* stage of the PDSA model. Analysis and data dissemination represented the *study* and *action* stages of PDSA. Other specific QIP tasks using PDSA included finding the appropriate methods and tools necessary to develop the MR process, educating the clinic personnel regarding the process, identifying the patients meeting the QIP criteria, communicating the need for reconciliation, ongoing documentation of the MR process, evaluation, analysis, and dissemination of the post-implementation findings.

### Strengths and Weaknesses

The positive outcomes and strengths of this QIP and its design far outweigh any weaknesses. Resistance to the process was expected to be minimal because the QIP enhanced the current clinic's practice instead of introducing an entirely novel approach. Also, face-to-face interaction between the providers and patients regarding MR provided opportunities to increase rapport, educated and empowered patients to become more actively involved in their healthcare, and initiated behavior changes for patients, families, caregivers, and clinic staff. This process

also provided numerous opportunities for sustainability and growth of further interventions, such as the ability to focus on specific medication classes for patient education and focused deprescribing attempts, such as with PPIs.

Some weaknesses identified were time, adherence, and perception. The MR process required varying amounts of time per patient visit depending on the patient's interpersonal needs and personality, medication adherence, comorbidities, fragility, cognitive status, presence of caregivers during the MR process, and fluctuating health status. This variability in time may cause other patients to perceive that providers are spending excessive time with an exclusive group of patients or that providers prefer patients who require more time to address their needs and concerns related to their medications. Ancillary clinic staff can also hold this misconception. Finally, non-adherence by tenacious, uncommunicative, or ambivalent patients may cause frustration and resentment between patients, providers, and clinic staff, driving poor or unmet QIP outcomes.

**Timeline**

The QIP from development, planning, approval, implementation, analysis, and dissemination occurred over four academic semesters (one calendar year), from Summer 2022 to Summer 2023 (Appendix G). Development, planning, and approval took place during the Summer and Fall 2022 semesters (Appendix G), while the implementation phase occurred over eight weeks during the Spring 2023 semester. Final data analysis, manuscript completion, and QIP dissemination occurred during the Summer 2023 semester, followed by the conferral of the DNP Degree in early August 2023.

### Budget and Resources

The PI, MD-PC, QIP Team members, and participants had no excessive financial costs during the QIP. Overall, the most valuable resource utilized was time.

## Data and Informatics

### Data Review Process and Data Security

The PI conducted a pre-intervention chart review during the Summer of 2022 using the inclusion criteria to demonstrate the QIP's need within the clinic. The current documentation of MR for patients during their office visits included a single checkbox to indicate the MR was completed by staff on that date. Providers did not consider this a reliable or credible source of MR documentation. The MD-PC (or her designee) monitored the MR intervention regularly during implementation to ensure adherence by office staff. After eight weeks, the PI completed the post-intervention chart review to analyze the use of the standardized MR process, including any documented changes in the medication lists after the scheduled visits.

The report compiled within the clinic's AthenaHealth EMR only contained the patients' dates of birth as identifiable data; however, after the data was retrieved, all identifiable data fields were omitted (or de-identified), making the patient's record unidentifiable. The PI was the only person retrieving and analyzing the data, identifiable or de-identified. Unidentifiable data was the only data analyzed in this QIP.

### Data Gatekeepers

The PI requested and gained access from the MD-PC and office manager to the EMR utilized by the practice. The clinic's EMR, AthenaHealth, is accessed through the entry of a username and is password-protected. All AthenaHealth passwords must be 8-20 characters in length and include all of the following elements: one upper case letter, one lower case letter, one

unique character, and one numerical character. After 90 calendar days, the system will prompt the user to change their password. The clinic's office manager asked the PI to communicate if this prompt occurs during the login process so the office manager may reset the password. The login to access provided to the PI is shared for all students within the clinic (i.e., NPs and PAs).

**Data Acquisition Process: Access, Collection, Storage, and Maintenance**

Despite being in a rural community, the clinic has access to a computerized, cloud-based EMR, AthenaHealth, which includes patient data tracking and reports, uploading documents from patients and other healthcare providers, intra-office texting communication capabilities, and provides access to a patient portal. AthenaHealth also has built-in medication and treatment "alerts" for contraindications, ICD-10 and CPT coding, and considers the provider's medical decision-making. AthenaHealth also provides immediate, in-application access to Epocrates, an additional application with prescribing information. Before submitting any prescription, Epocrates includes information to help providers make EB decisions and includes tools such as dosage information, insurance formulations, anticipated patient costs, side-effect information, potential interaction information, alternative therapies, and dosage calculators.

The DNP QIP did not require access to administrative, staffing, or financial data; however, the process to access this data was the same, as Athena Health is an all-inclusive EMR system. After the PI requested and gained access through a username and password to the EMR supplied by the MD-PC and office manager, the PI used the "Help" function of the EMR system to learn the necessary steps to create a report utilizing practice data. Although the PI did not include any specific demographic or identifying data in the initial baseline information, some descriptive data may be used in the final results. However, the PI took proactive measures to ensure compliance with the Health Insurance Portability and Accountability Act of 1996

(HIPAA). The PI had personal access to a locked filing cabinet and document shredder for any printed EMR documents utilized within the QIP during the process could be stored or disposed of in a HIPPA-compliant manner. Any EMR files or downloaded documents relevant to the QIP were kept on a dedicated flash drive, set to private, and encrypted.

**Defining the Data Fields**

To obtain baseline data to support the practice gap and the need for the QIP, the PI compiled a report from the clinic's EMR. The parameters used to compile the initial report were "patients seen by the clinic providers during a specific timeframe" and "patients 65 and older." The PI printed this report and manually reviewed it for the additional criteria of "patients with nine or more meds listed" and "date of last medication review." This process was replicated after the QIP to determine the results.

To maintain consistency between the baseline and post-implementation reports using the same criteria, the PI replicated the process during pre- and post-implementation data analysis. This process ensured that each data set could be compared without variations to evaluate the QIP's efficacy and interventions. The initial criteria of "patients seen by the clinic providers during a specific timeframe" and "patients 65 and older" remained the same to run the post-implementation report. Since the baseline report was run for 12 calendar days, the PI ran the final post-implementation report for 12-14 days to maintain consistency with that specific criterion. She then printed the post-implementation report to review it manually for the additional criteria of "patients with nine or more meds listed" and "date of last medication review." Other descriptive data items were gleaned from this report and are discussed in the evaluation and analysis.

## Evaluation and Analysis

### Statistical Considerations

The data gathered to evaluate the QIP performance included analysis of a post-implementation report the PI compiled from the clinic's EMR. The parameters used to compile the report were "patients seen by the clinic providers during March 18-31, 2023," and "patients 65 and older." The PI printed this report and manually reviewed it for the additional criteria of "patients with nine or more meds listed" and "date of last medication review."

To maintain consistency between the baseline and post-implementation reports using the same criteria, the PI replicated the process during pre- and post-implementation data analysis. This process ensured that each data set could be compared without variations to evaluate the QIP's efficacy and interventions. The criteria of both reports included similar date ranges and "patients 65 and older." Since the baseline report was run for 12 calendar days, the PI ran the post-implementation report for 14 calendar days at the end of the implementation phase (March 18-31) to maintain consistency with that specific criterion. She then printed the post-implementation report to review it manually for the additional criteria of "visit/encounter date," "patients with nine or more meds listed," and "date of last medication review." Other items such as "age" and "gender" were also gleaned from this report to provide the focus clinic with more specific descriptive data to evaluate trends and establish additional goals in the future.

## Results

The post-implementation report produced a total of 99 patient visit records within the March 18-31, 2023, evaluation period. Ages ranged from 65-97 years with an average of 74.9 and a median of 81. There were 53 female and 46 male patients.

The primary goal was to establish a consistent, routine MR process to address unnecessary polypharmacy in patients 65 and older, which documented consistent review of medication lists for polypharmacy for at least 95% or greater of all appointments at the end of the QIP or a greater than 4.4% increase (≥95%) of patients having a "medication review" completed less than 90 days ago, based on a retrospective chart review, compared to the baseline data collected. This goal was met with all 99 patient visits (100%) having a documented MR within the last 90 days.

Other measurable clinic-specific goals included a 10% or more significant reduction of patients with nine or more "unnecessary" medications listed (≤83.25%). This goal was also met with only 64 of the 99 patients (64.6%) having listed nine or more current medications. Of these patients, it was noted that female patients had the higher rate of nine or more medications at 53.1% (34/64), while 46.9% of male patients (30/64) had nine or more medications listed on their recent MRs.

## Discussion

This QIP aimed to address unnecessary polypharmacy in older adult patients in a rural primary care setting. The results of the QIP provided encouraging findings and supported the hypothesis that primary care providers can appraise patient medication lists in an effort to successfully deprescribe. The results also validated the evidence in the literature review advocating education and evidence-based QIPs as part of those efforts.

This QIP was successfully implemented during the 8-week period, and the MD-PC reported that she and the NP providers could see other benefits of the QIP including simplifying patients' medication lists, ensuring continuity of care, and preventing potential interactions or unnecessary side effects from medications. They also agreed that they saw re-freezing of the

process begin as early as six weeks into the QIP. Preceptor evaluations were scored highly (5/5) and her comments were appreciative of the QIP being implemented at the clinic.

**Implications for Clinical Practice**

The QIP's goals regarding clinical practice were met as evidenced by an increase in MR consistency within the last 90 days, a decrease in older adult patients with nine or more meds, and an increase in the providers' and patients' awareness of polypharmacy. The QIP presented beneficial findings for clinical practice, including compelling evidence regarding the high number of rural primary care clinic patients with unnecessary medications. This also confirms that these patients can undergo successful deprescribing of at least some of the unnecessary medications. It is also evident that providers can effectively manage the additional time commitment necessary for evaluating patients' medication lists and discussing potentially inappropriate medications with patients.

**Implications for Healthcare Policy**

The results of the QIP imply that clinical management or individual clinics can implement the assessment of patient medication lists as a necessity for providers. Additionally, those in charge of healthcare policy can decide which evidence-based clinical tools are most helpful in their setting and establish which medications can be placed on a focus list for deprescribing. Policy leaders could require prescribing providers to review medication lists with patients with their annual comprehensive exam and schedule a more detailed discussion regarding each medication.

**Implications for Quality and Safety**

The QIP employed the participation of all team members, including patients, to improve the knowledge of unnecessary polypharmacy, foster open communication, reconcile and correct

errors on patient medication lists, provide opportunities for follow-up education regarding medication use, and encourage positive change through deprescribing when possible. When medications are found inappropriate, unnecessary, or no longer used, those can be considered for deprescribing between the provider and patient. As the patient's medication burden is reduced, so is the financial burden – on the patient, clinic, and entire healthcare system – as well as reducing any potential drug-drug or drug-disease interactions (Halli-Tierney et al., 2019).

Medication safety is a major safety issue in healthcare, especially as age life expectancy and co-morbidities increase (Halli-Tierney et al., 2019). Polypharmacy, chiefly those unnecessary or duplicated medications, comprises a substantial portion of medication safety risk, causing negative outcomes when patients take multiple medications (Halli-Tierney et al., 2019). Addressing polypharmacy also involves considering other quality and safety issues like reducing patient falls, decreasing untoward side effects and concomitant risks, as well as increasing quality of life (Halli-Tierney et al., 2019).

**Implications for Education**

This QIP shows that all healthcare team members, including patients, can be informed about polypharmacy and the need for deprescribing efforts. Education and communication regarding these topics were positively received by all those involved in the clinic's QIP. Increasing educational opportunities, resources, and their frequency can emphasize awareness of polypharmacy and promote consistent MRs in recognizing inappropriate medications.

All levels of healthcare, especially primary care clinics, should consider annual education sessions involving polypharmacy and deprescribing efforts. These can be presented during clinic in-services, new employee orientation, to patients and the public during clinic and community

outreach events. Educational sessions should be informative and include an open discussion with opportunities for questions to facilitate an optimal learning environment.

## Limitations

There were very few limitations of this QIP. However, the existing ones were consistent with similar DNP QIPs or out of the control of the PI and clinic (i.e., staffing and turnover, weather, and technology issues).

During the PI's review of the post-implementation reports, it was noted that many patients with nine or more medications were taking treatments to manage chronic conditions such as cardiovascular, respiratory, metabolic, or inflammation. Therefore, these patients would not be candidates for rigid deprescribing efforts. Another observation was that one-time doses and self-limiting prescriptions (i.e., antibiotics) were still on the patients' current medication lists. There are multiple options that the provider and clinic staff could discuss to have these automatically clear from the current list. Floyd (2022, p. 20) states that polypharmacy may continue for many patients despite deprescribing efforts. For example, a patient taking twelve medications may have two unnecessary medications deprescribed, leaving ten current "necessary" medications for that patient. Deprescribing occurred but the patient still experienced polypharmacy.

Early during the implementation phase of the QIP, one NP provider gave short notice that she was leaving and was replaced during the second half of the implementation. A second NP provider gave a longer notice and stayed throughout the QIP. There was also some staffing turnover with the MAs. AthenaHealth EMR had some updates during QIP implementation, most of which were helpful for this QIP.

## Dissemination

The findings of this research will be shared at the Jacksonville State University Annual Virtual Dissemination Day on July 13, 2023. The findings will be disseminated via poster presentation or podium presentation, as well as within this manuscript. The results were shared with the clinical preceptor after project implementation.

## Sustainability

Sustainability is achievable after the completion of the QIP, with many different areas in which to revise, adapt, or expand the implementation process as the focus clinic sees fit. Another goal would be to decrease unnecessary polypharmacy by at least 5%. This may be achieved by educating the clinic personnel and patients on the dangers of polypharmacy, the risks versus benefits of long-term use of unnecessary medications (i.e., PPIs, H2 antagonists, montelukast), and gauging the patient's desire for deprescribing based on their individual needs. Still, this goal may be limited by the length of the QIP and may be set by the focus clinic in the future. The plan for sustainability includes leaving the participating clinic with copies of the handouts for continued use and ongoing education. Collaborating with patients will greatly benefit the clinic and its outcomes. Additionally, obtaining patient input concerning their views about polypharmacy and deprescribing will support sustainability. This QIP can easily be implemented in any outpatient clinical setting. In addition, it can be used by staff during the triage, new patient, or routine MR processes. Various other methods exist that providers and clinics can use for MR and deprescribing medications.

The PI will also apply the routine in her practice and while educating her nursing students on the importance of consistent MR, the risks of polypharmacy, and coordinating deprescribing with providers. The PI is excited to be an advocate for patients in the decision-making process,

evaluate medication lists for those in her care, deprescribing unnecessary medications when possible, and being able to address polypharmacy.

## Plans for Future Scholarship

This QIP confirms existing data and literature regarding polypharmacy and deprescribing. However, more research is necessary to support the consistent use of MRs in reducing polypharmacy and deprescribing. Additional studies to apply different clinical tools and methods will be enlightening. Furthermore, future studies on patient involvement can focus on the barriers of patient reluctance concerning deprescribing.

This QIP was led by the PI and involved the participation of a rural primary care clinic with four prescribing providers, the clinic staff, and patients. Future scholarship in other clinics would benefit from including all prescribing healthcare providers in the study, including NPs and physician assistants (PAs). Pharmacy staff could also be included since pharmacists are primarily responsible for dispensing prescribed medications. Consequently, this project involved more than 100 patients over an eight-week implementation period and evaluated 99 patient records over the last two weeks. Future studies would be more useful if evaluating a larger group of patients over a longer timeframe. In addition, patient follow-up after deprescribing medications would benefit gauging effectiveness.

Throughout this QIP, the PI was confident it would produce valuable outcomes for the professional field. The PI has also been inspired and gained confidence that future research can be conducted and will bear data to support the professional community.

## Conclusion

Polypharmacy is a concerning issue nationally and locally. Ensuring consistent use of MR processes to address polypharmacy and deprescribing efforts is an established evidence-

based practice (Saljoughian, 2019). This QIP assisted providers in establishing a consistent MR process. Despite current evidence-based research and studies, a need still exists for more effective MR methods and identifying inappropriate medications (Halli-Tierney et al., 2019). This QIP project aimed to establish an MR process and increase its consistent use, raise awareness of polypharmacy in primary care practice settings, reduce polypharmacy, and support deprescribing efforts. Projects like this emphasize the benefits of implementing evidence-based QIPs for the MR process to identify inappropriate medications and unnecessary polypharmacy, allowing providers to collaborate with patients to deprescribe when indicated.

## References

Agency for Healthcare Research and Quality (AHRQ). (2012). Developing change: Designing the medication reconciliation process. https://www.ahrq.gov/patient-safety/resources/match/match3.html

Alsuwaidan, A., Almedlej, N., Alsabti, S., Daftardar, O., Al Deaji, F., Al Amri, A., & Alsuwaidan, S. (2019). A comprehensive overview of polypharmacy in elderly patients in Saudi Arabia. *Geriatrics (Basel, Switzerland)*, *4*(2), 36. https://doi.org/10.3390/geriatrics4020036

Barnsteiner, J. H. (2008). Medication reconciliation. In R.G. Hughes (Ed.), *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Agency for Healthcare Research and Quality (AHRQ, US). https://pubmed.ncbi.nlm.nih.gov/21328749/

Barto, D. (2019). Nurse-driven protocols. *Nursing Critical Care*, *14*(4), 18–24. Ovid Technologies (Wolters Kluwer Health). https://doi.org/10.1097/01.ccn.0000560104.63793.d9

Chang, T. I., Park, H., Kim, D. W., Jeon, E. K., Rhee, C. M., Kalantar-Zadeh, K., Kang, E. W., Kang, S. W., & Han, S. H. (2020). Polypharmacy, hospitalization, and mortality risk: A nationwide cohort study. *Scientific Reports*, *10*(1), 18964. https://doi.org/10.1038/s41598-020-75888-8

Cho, H. J., Chae, J., Yoon, S. H., & Kim, D. S. (2022). Aging and the prevalence of polypharmacy and hyper-polypharmacy among older adults in South Korea: A national retrospective study during 2010-2019. *Frontiers in Pharmacology*, *13*, 866318. https://doi.org/10.3389/fphar.2022.866318

Dabrowski, P. M., & Lawrie, K. (2021). Twelve-week project to improve medication reconciliation at hospitals in Wellington, New Zealand. *BMJ open quality*, *10*(2), e000787. https://doi.org/10.1136/bmjoq-2019-000787

Davies, L. E., Spiers, G., Kingston, A., Todd, A., Adamson, J., & Hanratty, B. (2020). Adverse outcomes of polypharmacy in older people: Systematic review of reviews. *Journal of the American Medical Directors Association*, *21*(2), 181–187. https://doi.org/10.1016/j.jamda.2019.10.022

Fernández, A., Gómez, F., Curcio, C. L., Pineda, E., & Fernandes de Souza, J. (2021). Prevalence and impact of potentially inappropriate medication on community-dwelling older adults. Prevalencia e impacto de la medicación potencialmente inapropiada en ancianos que viven en comunidad. *Biomedica: Revista del Instituto Nacional de Salud*, *41*(1), 111–122. https://doi.org/10.7705/biomedica.5787

Floyd, L. (2022). Addressing polypharmacy: Implementing the medication appropriateness index clinical tool to increase deprescribing by healthcare providers. Doctor of Nursing Practice Projects. 57. https://digitalcommons.jsu.edu/etds_nursing/57

Freedman, M. (2023). AthenaHealth medical software review. *Business News Daily*. https://www.businessnewsdaily.com/16246-athenahealth-medical-software.html

Goldsmith, R., Dichtiar, R., Shimony, T., Nitsan, L., Axelrod, R., Laxer-Asael, I., Rasooly, I., Sinai, T., & Berry, E. M. (2022). Comparisons in polypharmacy over a decade in community-dwelling older adults-findings from Israel national health and nutrition surveys. *BMC Geriatrics*, *22*(1), 502. https://doi.org/10.1186/s12877-022-03171-8

Halli-Tierney, A., Scarbrough, C., & Carroll, D. (2019). Polypharmacy: Evaluating risks and deprescribing. *American Family Physician, 100(*1), 32–38.

https://www.aafp.org/afp/2019/0701/p32.html

Harrison, R., Fischer, S., Walpola, R. L., Chauhan, A., Babalola, T., Mears, S., & Le-Dao, H. (2021). Where do models for change management, improvement and implementation meet? A systematic review of the applications of change management models in healthcare. *Journal of Healthcare Leadership*, *13*, 85–108. https://doi.org/10.2147/JHL.S289176

Hession, M. J. (2018). Best practice medication reconciliation in the outpatient setting. Doctor of Nursing Practice (DNP) Projects. 164. https://scholarworks.umass.edu/nursing_dnp_capstone/164

Institute for Healthcare Improvement (IHI). (2022a). Medication list for patients and families. http://www.ihi.org/resources/Pages/Tools/MedListforPatientsFamilies.aspx?PostAuthRed=/resources/_layouts/download.aspx?SourceURL=/resources/Knowledge%20Center%20Assets/ea0612af-ce01-4bad-990c-8d46fdd72bb3/MassCoalitionPatientMedListFormOct06.pdf

Institute for Healthcare Improvement (IHI). (2022b). Medication list for patients and families [PDF]. http://www.ihi.org/resources/_layouts/download.aspx?SourceURL=%2fresources%2fKnowledge+Center+Assets%2fea0612af-ce01-4bad-990c-8d46fdd72bb3%2fMassCoalitionPatientMedListFormOct06.pdf

Institute for Healthcare Improvement (IHI). (2022c). Reconcile medications in outpatient settings. http://www.ihi.org/resources/Pages/Changes/ReconcileMedicationsinOutpatientSettings.aspx

Juma, E.O. (2019). Medication reconciliation at a rural primary care clinic. Doctor of Nursing Practice (DNP) Projects. University of Maryland at Baltimore. http://hdl.handle.net/10713/9534

National Institute on Aging (NIA). (2021). The dangers of polypharmacy and the case for deprescribing in older adults. United States Department of Health and Human Services (USDHHS). https://www.nia.nih.gov/news/dangers-polypharmacy-and-case-deprescribing-older-adults

Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(a)]. Healthy people 2030 – Older adults: Reduce the proportion of older adults who use inappropriate medications (OA-02) – Data. United States Department of Health and Human Services (USDHHS). https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/reduce-proportion-older-adults-who-use-inappropriate-medications-oa-02/data

Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(b)]. Healthy people 2030 – Older adults: Reduce the proportion of older adults who use inappropriate medications (OA-02) – Data Methodology and Measurement. United States Department of Health and Human Services (USDHHS). https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/reduce-proportion-older-adults-who-use-inappropriate-medications-oa-02/data-methodology

Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(c)]. Healthy people 2030 – Older adults: Overview and objectives. United States Department of Health and Human Services (USDHHS). https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults

Pazan, F., & Wehling, M. (2021). Polypharmacy in older adults: A narrative review of definitions, epidemiology and consequences. *European Geriatric Medicine*, *12*(3), 443–452. https://doi.org/10.1007/s41999-021-00479-3

Pifer, R. (2022). New app, streamlined EHR: How AthenaHealth is tackling 2022, according to its chief product officer. *Industry Dive: Healthcare Dive*. https://www.healthcaredive.com/news/athenahealth-app-himss-paul-brient-hospitals-ehr/620492/

Qato, D. M., Alexander, G. C., Conti, R. M., Johnson, M., Schumm, P., & Lindau, S. T. (2008). Use of prescription and over-the-counter medications and dietary supplements among older adults in the United States. *JAMA*, *300*(24), 2867–2878. https://doi.org/10.1001/jama.2008.892

Rochon, P.A. (2022). Drug prescribing for older adults. Up-to-date. https://www.uptodate.com/contents/drug-prescribing-for-older-adults

Rose, O., Jaehde, U., & Köberlein-Neu, J. (2018). Discrepancies between home medication and patient documentation in primary care. *Research in Social & Administrative Pharmacy: RSAP*, *14*(4), 340–346. https://doi.org/10.1016/j.sapharm.2017.04.003

Sabeen, A., Aziz, A., & Amirali, A. (2021). Using PDSA (Plan – Do – Study – Act) model to increase medicine reconciliation in a tertiary care hospital of a developing country. *BMJ Leader* 2021; 5:A28. https://bmjleader.bmj.com/content/5/Suppl_1/A28.2

Saleem, S., Sehar, S., Afzal, M., Jamil, A., & Gilani, S. A. (2019). Accreditation: Application of Kurt Lewin's theory on private health care organizational change. *Saudi Journal of Nursing and Health Care*, *2*(12). https://www.researchgate.net/profile/Syed-Amir-Gilani/publication/340765406_Accreditation_Application_of_Kurt_Lewin's_Theory_on

_Private_Health_Care_Organizationanl_Change/links/5ea16aa892851c87d1ad6741/Accreditation-Application-of-Kurt-Lewins-Theory-on-Private-Health-Care-Organizationanl-Change.pdf

Saljoughian, M. (2019). Polypharmacy and drug adherence in elderly patients. *US Pharm,44*(7), 33-36. https://www.uspharmacist.com/article/polypharmacy-and-drug-adherence-in-elderly-patients

Sheikh-Taha, M., & Asmar, M. (2021). Polypharmacy and severe potential drug-drug interactions among older adults with cardiovascular disease in the United States. *BMC Geriatrics*, *21*(1), 233. https://doi.org/10.1186/s12877-021-02183-0

Tarn, D. M., & Schwartz, J. B. (2020). Polypharmacy: A five-step call to action for family physicians. *Family Medicine*, *52*(10), 699–701. https://doi.org/10.22454/FamMed.2020.909136

Taylor, K. (2021). Geriatric medication reconciliation in the home setting. *American Nurse J., 16*(7), 14-17. https://www.myamericannurse.com/geriatric-medication-reconciliation-in-the-home-setting/

## Appendix A

SWOT Analysis Table

| Internal | | External | |
|---|---|---|---|
| Strengths | Weaknesses | Opportunities | Threats |
| • The focus family medicine clinic has a strong core staff with MD-PC and NP providers dedicated to addressing unnecessary polypharmacy in their elderly patients.<br>• The MD-PC and NP providers are willing to accept assistance, guidance, and feedback regarding this initiative.<br>• The MD-PC and NP providers are supportive of the PI and excited about the QIP. | • The general reluctance of patients to change or stop medications they have taken for many years because those medications may no longer be safe, helpful, or otherwise necessary.<br>• TIME:<br>– The time needed for all clinic staff, including providers, to be involved in the medication reconciliation process to review and discuss with patients.<br>– Consultation with the patients' pharmacies and other providers may be required to ensure a current and accurate medication list, which may also be time-consuming and present other complexities. | Patients at the focus clinic are expected to benefit from the providers' efforts to obtain a reconciled medication list with outcomes of:<br>• appropriate prescribing and possible deprescribing,<br>• ensuring a safe continuum of care for these patients,<br>• reduced medication load at home for patients and caregivers,<br>• increased medication adherence, and<br>• increased community awareness of the dangers of unnecessary polypharmacy in the elderly and the benefits of addressing unnecessary polypharmacy. | • The reluctance of patients to change or stop medications they have taken for many years because they believe those medications are necessary.<br>• Clinic staff and providers may view the time required to consistently implement a formal routine medication reconciliation process as excessive and unnecessary. |

# Appendix B

PICOT and Evidence Table

Clinical Question (PICOT): "Among patients 65 and older (P), does establishing a routine process of medication reconciliation (I) eliminate unnecessary polypharmacy (O), compared with no process (C), resulting in an increase in deprescribing activity (O) over eight weeks (T)?"

*Evidence Table: Polypharmacy among adults 65 and older*

**"Establishing a routine process of medication reconciliation in a rural primary care clinic to address unnecessary polypharmacy in patients 65 and older."**

| | APA Citation | Study Objectives | Design/Subjects | Intervention and Outcome | Results | Limitations | Implications | Level of Evidence |
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| 1 | Agency for Healthcare Research and Quality (AHRQ). (2012). Developing change: Designing the medication reconciliation process. https://www.ahrq.gov/patient-safety/resources/match/match3.html | **PURPOSE:** Provides helpful information and tools for designing or redesigning a medication reconciliation process. | **Clinical practice guidelines** Developed by expert committees based on review of literature **[AHRQ website with resources]** | N/A | N/A | N/A | Provides resources for project implementation. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process | | | | | | |
| 2 | Alsuwaidan, A., Almedlej, N., Alsabti, S., Daftardar, O., Al Deaji, F., Al Amri, A., & Alsuwaidan, S. (2019). A comprehensive overview of polypharmacy | **OBJECTIVES:** • To develop a full-framed picture about the utilization of medications for geriatric patients. • To review the percentage of older adults with five | **Retrospective cross-sectional study** Patients 65 years of age and older, who are taking multiple chronic medications for different indications. Only qualified and professional candidates were | Descriptive analysis and frequency of the main variables were used as appropriate. Investigators defined "appropriate medication" as prescribed medication used in systemic chronic medications with a | This study was conducted on 4011 patient profiles, after which 1002 profiles were disqualified for not meeting exclusion criteria as they did not have appropriate medications. The remaining total was | None identified and/or discussed. | This study contraindicated the theory that the "number of medications increased as the patients age increasing" and controverting other studies; in the meantime, this study | III Controlled Trial |

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| | in elderly patients in Saudi Arabia. *Geriatrics (Basel, Switzerland)*, *4*(2), 36. https://doi.org/10.3390/geriatrics4020036 | medications or more.<br>**AIM:**<br>• To investigate the association between polypharmacy and comorbidities in elderly patients. | chosen for data entry to present the quality and accuracy of data. | duration of at least six months, not including herbal/folklore drugs, vitamin/mineral supplements, and other short-duration medications—nor will over the counter drugs be counted as appropriate medications. Other medications such as ophthalmic, topical, intranasal, and other non-systemic medications are not considered as "appropriate medications." Each appropriate medication being administered to the patient throughout the last year was aggregated and presented as "total" with the exception of "other." Our classification of the medication was in accordance with the classification of British National Formulary (BNF). | 3009 profiles (having one or more appropriate medication), with 56% males (n = 1685) and 44% females (n = 1324). It was found that 55.7% (n = 1676) of the total patients were receiving more than five proper medications— 53% males and 47% females. The average of patients' age in years was 73.26 ± 6.6 (SD). There was no significant difference between the mean age of males (73.5 years) and females (72.8 years). The average number of appropriate medications was 5.31 ± 2.8 SD, while the average number of the comorbidities was 2.56 ± 1.25 SD illnesses. | | confirmed SIMPATHY (Stimulating Innovation Management of Polypharmacy and Adherence in The Elderly), looking toward the year 2030 to approach and implement medication safety management program. | |
| | **THEMES:** | Controlled trial; Polypharmacy and comorbidities in elderly | | | | | | |
| **3** | Barnsteiner, J. H. (2008). Medication Reconciliation. In R.G. Hughes (Ed.), *Patient safety and quality: An evidence-based handbook for nurses*. Agency for Healthcare Research and Quality (AHRQ, US). https://pubmed.ncbi.nlm.nih.gov/21328749/ | **PURPOSE:**<br>The chapter reviews the evidence for medication reconciliation and makes recommendations for nursing practice. | **Systematic review of literature**<br>Descriptive articles and published studies (quality improvement projects with small sample sizes limited to single clinical sites)<br>**[Chapter in a Nursing EBP Textbook]** | Searches were conducted using the terms "medication reconciliation," "medication verification," "medication safety" "medication systems," and "medication errors." OVID databases for CINAHL®, MEDLINE®, and Google databases were searched. English-language health care literature from 1965 through March 2007 was reviewed. Additional searches were conducted on numerous patient safety Web sites, such as the Institute for Safe Medication Practices, the National Patient | Medication reconciliation studies have focused on the accuracy of the medication history during various transitions: ambulatory to acute care inpatient setting, skilled nursing facility to acute care inpatient setting, inpatient acute care setting to skilled nursing facility, inpatient acute care setting to discharge, inpatient floor to the intensive care unit (ICU), and ICU to discharge. | Little research has focused on outcomes related to the prevalence of errors resulting from a lack of or an incomplete patient medication list. | There is some evidence to demonstrate how a medication reconciliation process is effective at preventing adverse drug events. Few studies have been published demonstrating how to do the process effectively or outlining the costs associated with design and implementation of programs. Nonetheless, an effective medication reconciliation process across care settings—where medications a patient is taking are compared to what is being ordered—is believed to reduce errors. Comparing | I<br>Clinical guidelines based on systematic review of literature (SRoL) |

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| | | | | Safety Foundation, the Joint Commission, and the Institute for Healthcare Improvement. Reference lists from articles on medication reconciliation were also used to identify additional publications. | | | what is being taken in one setting with what is being prescribed in another will avoid errors of omission, drug-drug interactions, drug-disease interactions, and other discrepancies. Medication reconciliation is a major component of safe patient care in any environment. | |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines | | | | | | |
| 4 | Barto, D. (2019). Nurse-driven protocols. *Nursing critical care*, *14*(4), 18–24. Ovid Technologies (Wolters Kluwer Health). https://doi.org/10.1097/01.ccn.0000560104.63793.d9 | **PURPOSE:** Healthcare institutions that implement nurse-driven protocols can benefit from greater retention rates because of increased nursing staff job satisfaction. This article explores the positive outcomes associated with nurse-driven protocols and details how to plan, design, and implement a new protocol in a hospital setting | **Systematic review of literature** Written by expert based on review of literature **[Article in a peer-reviewed Nursing Journal]** | Use of Lewin's Change Theory in nurse-driven protocols | N/A | N/A | Provides justification for theoretical framework (Lewin) of this project. | I Systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; Lewin's Change Model (Theoretical Framework) | | | | | | |
| 5 | Chang, T. I., Park, H., Kim, D. W., Jeon, E. K., Rhee, C. M., Kalantar-Zadeh, K., Kang, E. W., Kang, S. W., & Han, S. H. (2020). Polypharmacy, hospitalization, and mortality risk: A nationwide cohort study. *Scientific reports*, *10*(1), 18964. https://doi.org/10.1038/s41598-020-75888-8 | **OBJECTIVE:** Sought to examine the association of polypharmacy with the risk of hospitalization and death in a large longitudinal cohort of elderly community-indwelling individuals from the Korean National Health Insurance Service (NHIS) database linked to the nationwide pharmacy claims data | **National (large) longitudinal cohort** The source population comprised 6,100,982 elderly individuals aged ≥ 65 years who were captured in the 2012 NHIS database. the final study population comprised 3,007,620 individuals | Obtained data from the Korean NHIS database, which is linked to nationwide pharmacy claims data. The pharmacy claims database provides details on all prescription medications for each individual, which include drug names (generic and brand names), start and end dates of prescription, number of days for drug supply, and prescribed doses. The median (inter-quartile range, IQR) age of the participants was 72 years (68–77 years), among whom 39.5% (95% confidence interval [CI], 39.4%-39.6%) were men, 86.3% (95% CI, 86.3%- | Individuals who were prescribed with a greater number of medications were more likely to be older and have a higher prevalence of comorbidities. Overall, the distributions of sex and residential area were similar across the groups. There was a graded association between the number of daily prescribed medications and the risks of hospitalization and death. | None identified and/or discussed. | To date, this is the largest study that examined over three million elderly adults in Korea, thereby providing a strong statistical power. While the underlying mechanisms responsible for polypharmacy-related adverse outcomes should be further investigated, our findings highlight the need to identify strategies that can reduce polypharmacy in clinical practice and motivate more judicious prescription of multiple medications, particularly in the geriatric population. | III Controlled Trial |

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| | | | | 86.3%) were urban residents, and 81.5% (95% CI, 81.5%-81.5%) had at least one comorbidity based on the Charlson comorbidity index (CCI). In the study population, the mean (standard deviation, SD) and median (IQR) numbers of daily prescribed medications were 4.9 (3.2) and 4.0 (2.0–7.0), respectively. | | | | |
| | **THEMES:** | Controlled trial; Polypharmacy, hospitalizations, and mortality in elderly | | | | | | |
| 6 | Cho, H. J., Chae, J., Yoon, S. H., & Kim, D. S. (2022). Aging and the prevalence of polypharmacy and hyper-polypharmacy among older adults in South Korea: A national retrospective study during 2010-2019. *Frontiers in pharmacology*, *13*, 866318. https://doi.org/10.3389/fphar.2022.866318 | **OBJECTIVE:** This study evaluated the prevalence of polypharmacy and hyper-polypharmacy in elderly patients in South Korea during 2010–2019. | **National (large) retrospective study** Outpatient care of persons aged ≥65 years covered by National Health Insurance (NHI) using NHI claims data from 2010 to 2019 | Analyzed the outpatient care of persons aged ≥65 years covered by National Health Insurance (NHI) using NHI claims data from 2010 to 2019. Polypharmacy was defined as the use of ≥5 medications, and hyper-polypharmacy was defined as the use of ≥10 medications, and we examined them over periods of ≥90 days and ≥180 days. The average annual percent change (AAPC) was calculated using Joinpoint statistical software. | The prevalence of polypharmacy among ≥90 days of medication use elderly decreased from 42.5% in 2010 to 41.8% in 2019, and the prevalence of hyper-polypharmacy for ≥90 days increased from 10.4% to 14.4%. The prevalence of polypharmacy for ≥180 days increased from 37.8% in 2010 to 38.1% in 2019, and the prevalence of hyper-polypharmacy for ≥180 days increased from 6.4% to 9.4%. The prevalence of polypharmacy for ≥90 days and ≥180 days steadily increased among elderly patients, with AAPCs of 3.7 and 4.5, respectively. The prevalence of polypharmacy for ≥90 days and ≥180 days remained stably high, with rates of about 42 and 38%, respectively, and hyper-polypharmacy increased over the past 10 years in South Korea. | • Longer-term hospitalizations were not included in the analysis<br>• The analysis was based only on claims data<br>• Polypharmacy was defined based on a numerical definition<br>• Since injections are used for a short time and the dose of topical treatments is not high, this study was limited to oral drugs | Therefore, strategies to address polypharmacy need to be implemented. Further research is also required to identify the clinical outcomes (including mortality risks) associated with polypharmacy. | III Controlled Trial |
| | **THEMES:** | Controlled trial; Prevalence of polypharmacy and hyper-polypharmacy in elderly | | | | | | |
| 7 | Dabrowski, P. M., & Lawrie, K. (2021). Twelve-week | **AIM:** This project aimed to improve the medication | **Process/Quality Improvement Project (P/QIP)** | The work was conducted as a twelve-week quality improvement project | Successes of the project include achieving target percentage for | There were significant limitations to the project. Data collection across the | Education, standardization of practice and improved notification | V Quality Improveme |

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| | project to improve medication reconciliation at hospitals in Wellington, New Zealand. *BMJ open quality*, *10*(2), e000787. https://doi.org/10.1136/bmjoq-2019-000787 | reconciliation process at CCDHB by improving doctors' knowledge of the medication reconciliation process, improve the rate of completed medication reconciliations and improve communication between doctors and pharmacists.<br>Two specific, measurable, achievable, realistic and timely aims were established, both to be completed by the end of May 2018:<br>1. To increase the percentage of discrepancies rectified by doctors from 80% to above 90%.<br>2. To increase the percentage of completed medication reconciliations (defined as all prescription discrepancies rectified and all forms completed) by doctors from 0% to above 35%.<br>A further aim evaluated how pharmacists communicated with the relevant house surgeon during the medication reconciliation process, and whether the method of communication used was the most effective. | | using the Institute for Healthcare Improvement's Model for Improvement. This included baseline data collection and analysis, followed by three different interventions introduced at two weekly intervals with data collection and analysis after each intervention. | completed reconciliations and standardizing communication between pharmacists and doctors, this project also demonstrated a successful partnership across professional lines; with pharmacists collecting data and providing education and doctors championing the quality improvement. | project was problematic; though pharmacists were asked to collect data as part of their routine work, data were collected as a snapshot rather than continuously. Although this was done on the same day each week (in order to avoid wide variability in practice), this approach provided only a few data points. There were numerous wards within CCDHB that were not captured by baseline data or subject to the quality improvement cycles. As discussed above, we were not able to fully explain the decrease in the proportion of discrepancies that were rectified, in hindsight we would have needed to examine the types of discrepancies and ask the house surgeons about each one to identify why this decrease occurred. This could be the subject of future audit work. | systems have improved the quality of medication reconciliations at CCDHB. Although regular education sessions would need to be on-going for new house surgeons, other interventions are simple and inexpensive to implement within this DHB and others. On-going auditing of the medication reconciliation process will reveal if these changes continue to produce sustainable change in the longer term. | nt Project (QIP) |
| | **THEMES:** | P/QIP, PDSA Design; MR implementation and outcomes | | | | | | |
| **8** | Davies, L. E., Spiers, G., Kingston, A., Todd, A., Adamson, J., & Hanratty, B. (2020). Adverse outcomes of polypharmacy in older people: Systematic | **OBJECTIVE:** Synthesize current evidence on the adverse health, social, medicines management, and health care utilization outcomes of polypharmacy in older people. | **Systematic review of literature**<br>Older people in any health care setting, residential setting, or country. | Systematic review, of systematic reviews and meta-analyses of observational studies, was conducted. Eleven bibliographic databases were searched from 1990 to February 2018. Quality was assessed using AMSTAR (A | Twenty-six reviews reporting on 230 unique studies were included. Almost all reviews operationalized polypharmacy as medication count, and few examined medication classes or disease states within | First, as this was a review of reviews, we did not search for, extract from, or assess the quality of the original primary studies. Instead, we relied on information provided by the authors of the included systematic | The literature examining the adverse outcomes of polypharmacy in older people is complex, extensive, and conflicting. Until polypharmacy is operationalized in a more clinically relevant manner, the | I Systematic review of literature (SRoL) |

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| | review of reviews. *Journal of the American Medical Directors Association (JAMDA)*, *21*(2), 181–187. https://doi.org/10.1016/j.jamda.2019.10.022 | | | Measurement Tool to Assess Systematic Reviews). | this. Evidence for an association between polypharmacy and many adverse outcomes, including adverse drug events and disability, was conflicting. The most consistent evidence was found for hospitalization and inappropriate prescribing. No research had explored polypharmacy in the very old (aged ≥85 years), or examined the potential social consequences associated with medication use, such as loneliness and isolation. | reviews but acknowledge that reporting varied in style and quality. Most reviews operationalized polypharmacy as multiple medicines, so we could not draw the distinction between appropriate and inappropriate prescribing in terms of medication classes, indications, doses, and durations. The measurement of polypharmacy through different numerical cut-points also could have led to variable effect sizes. All observational studies may be liable to confounding, and this is a particular concern in reviews where polypharmacy was not the main focus. Because of the challenges of residual confounding and | adverse outcomes associated with it will not be fully understood. Future studies should work toward this approach in the face of rising multimorbidity and population aging. | |
| | | | | | | collinearity, polypharmacy could also be a proxy for morbidity. A number of the reviews included cross-sectional studies that provide no information on the direction of any associations. Their inclusion is justified by our intention to produce a review of reviews that could be a useful platform for further longitudinal research to inform prescribing decisions. Several outcomes also came from a small number of primary studies but were reported in line with our review protocol. The influence of gender and socioeconomic position on the adverse outcomes of polypharmacy were also seldom studied. | | |

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| | | | | | | Lastly, the use of inconsistent or unclear measurement instruments for outcomes such as disability, cognitive impairment, and depression reflects international variation, and limited cross-study comparison. | | |
| | **THEMES:** | SRoL; Polypharmacy in elderly | | | | | | |
| **9** | Fernández, A., Gómez, F., Curcio, C. L., Pineda, E., & Fernandes de Souza, J. (2021). Prevalence and impact of potentially inappropriate medication on community-dwelling older adults. Prevalencia e impacto de la medicación potencialmente inapropiada en ancianos que viven en comunidad. *Bio medica: Revista del Instituto Nacional de Salud*, *41*(1), 111–122. https://doi.org/10.7705/biomedica.5787 | **OBJECTIVE:** Estimate the prevalence and types of potentially inappropriate medication according to the Beers criteria in community-dwelling older persons and to identify the major clinical and functional consequences of potentially inappropriate medication during two years of following. | **Longitudinal, descriptive, and observational study of random sampling (2012-2016)** | Conducted a longitudinal, descriptive, and observational study that included 400 65-year or older community-dwelling people (48% women) selected by simple random sampling in 2012. In 2014, 372 people were re-evaluated and classified into two groups based on the presence or absence of potentially inappropriate medication through the follow-up period. | Thirty-one percent had polypharmacy (5-9 medications) and 1,8% had excessive polypharmacy (10 or more medications). The mean of the number of medications was higher in the potentially inappropriate medication group (3 vs. 5.78; $p<0.001$) and 21.9% still had the potentially inappropriate medication status during the follow-up; of them, 75% had one potentially inappropriate medication and 23% two. The presence of potentially inappropriate medication was more frequent among frail and depressed male individuals with a bad health self-assessment and comorbidities, especially diabetes mellitus and chronic obstructive pulmonary disease. In the group with sustained potentially inappropriate medication, we found a worsening health self-assessment, increased frailty, a higher incidence of recurrent falls and prevalence of depression, as well as a higher hospital admission rate, ambulatory medical | Due to selection filters, the sample size might not have been enough to find a significant association among some variables. Another limitation was the narrow age range, 65 to 74 years old, which limits the generalization of results to populations with higher potentially inappropriate medications intake, such as very old or institutionalized people. | Validated the negative effects of potentially inappropriate medication overall for the health of older people and, therefore, potentially inappropriate medications should be monitored in primary care services to avoid greater risks. | II ≥1 randomized controlled trials (RCTs) |

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| | | | | | consultation, and more prescribed medications. We did not find an impact on functional capacity. | | | |
| | **THEMES:** | RCTs; Prevalence and types of inappropriate medication in elderly according to the Beers criteria | | | | | | |
| 10 | Floyd, L. (2022). Addressing polypharmacy: Implementing the medication appropriateness index clinical tool to increase deprescribing by healthcare providers. Doctor of Nursing Practice Projects. 57. https://digitalcommons.jsu.edu/etds_nursing/57 | **PURPOSE:** Increase deprescribing activity among prescribing healthcare providers and to increase prescribing healthcare providers' awareness and adherence to incorporating evidence-based clinical guidelines for adults aged 62 years and older experiencing polypharmacy. | **Process/Quality Improvement Project (P/QIP)** | This quality assurance project involved educational sessions provided to prescribing healthcare providers educating them how, when, and why to use the Medication Appropriateness Index (MAI) clinical tool supplemented with handouts and clinical scenarios. | Key results included statistically significant implications of deprescribing activity with utilization of the MAI clinical tool (p=0.0003). Numerical increases were observed as deprescribing activity increased. Notably, the average number of medications deprescribed was 1.85 medications. | Three main limitations of this project exist. The first limitation was the limited number of participating providers. One provider at the family medicine clinic participated. The participating healthcare provider was the lead provider at the clinic and thereby does hold considerable influence over the other providers at the clinic. However, the other healthcare providers did not participate in the project implementation. The other limitation was the small sample size. | This project underscored the importance of utilizing an evidence-based clinical tool like the MAI clinical tool to increase the awareness of healthcare providers regarding polypharmacy and increase the occurrence of deprescribing activity. | V Quality Improvement Project (QIP) |
| | | | | | | Twenty patients were included in the population pool of patients. These patients' medication lists were evaluated, and the participating healthcare provider attempted, during the intervention, to deprescribe medications. Time constraints, namely the short implementation timeframe, also contributed as a limitation since less patients were able to be seen. In addition, time constraints existed for the healthcare provider attempting to use the MAI during patient office visits to review extensive medication lists, identify potentially inappropriate medications, and then | | |

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| | | | | | | initiate the process of deprescribing. | | |
| | **THEMES:** | P/QIP, DNP Project, PDSA Design, Lewin's Change Model; MR, polypharmacy, deprescribing, elderly | | | | | | |
| 11 | Goldsmith, R., Dichtiar, R., Shimony, T., Nitsan, L., Axelrod, R., Laxer-Asael, I., Rasooly, I., Sinai, T., & Berry, E. M. (2022). Comparisons in polypharmacy over a decade in community-dwelling older adults-findings from Israel national health and nutrition surveys. *BMC geriatrics*, *22*(1), 502. https://doi.org/10.1186/s12877-022-03171-8 | **OBJECTIVE:** Polypharmacy increases with age and is associated with serious health and economic costs. This study reports changes over a decade in medication-use patterns and polypharmacy in Israeli community-dwelling older adults aged ≥ 65 years. | **Review of literature – (2) national health cross-sectional surveys** Israeli community-dwelling older adults aged ≥ 65 years. | Demographic and health data from two representative national health cross-sectional surveys - MABAT ZAHAV 1 (MZ1) in 2005-2006, and MZ2 in 2014-2015 were analyzed. Polypharmacy was defined as use of ≥ 5 medications. Risk factors for polypharmacy were estimated by multivariable logistic regression with adjusted odds ratios (aOR) and their 95% confidence intervals (CI). | Self-reported data on medications taken were available for 1647 participants (91.5%) in MZ1, and for 833 participants (80.2%) in MZ2, 55% women, and about 20% aged ≥ 80, in both surveys. The prevalence of polypharmacy was significantly lower in MZ2 than in MZ1: 64.2% versus 56.3%, p = .0001; with an aOR (95%CI) of 0.64 (0.52, 0.80). The most commonly taken drugs were for hypertension (27.0%, 25.3%), dyslipidemia (9.7%, 12.4%) and anticoagulation (9.2%, 9.8%). For approximately 10% of drugs, indications were either unknown or incorrect. | First, a causal relation between the factors examined and medication use cannot be assumed, due to the cross-sectional design of both surveys. Secondly, the study is based on self-reported data, which may be subject to social desirability response bias. However, self-reported medication use has been shown to be one of the most reliable ways of ascertaining medication uses (including OTC drugs) taken by the elderly [35, 37]. A small percentage reported taking medications on a regular basis, but nevertheless refused | Polypharmacy, although reduced in the last decade, requires constant attention, especially concerning lack of knowledge of indications which leads to poor adherence and adverse side effects. Health-care teams should conduct regular medicine reconciliation in at-risk elderly patients. | V Systematic review of descriptive & qualitative studies |
| | | | | | Polypharmacy was significantly associated with poor self-health assessment 2.47 (1.99, 3.06), ≥ 4 versus 1-3 chronic illnesses 6.36 (3.85, 10.50), and age ≥ 80 versus younger 1.72 (1.32, 2.24). Similar associations were observed with major polypharmacy of ≥ 8 medications. | to bring their drugs. However, this was more than offset by the study methodology, which insisted that the interviewees produce their actual medications rather than just remember them. | | |
| | **THEMES:** | Systematic review of descriptive & qualitative studies; Reports changes over a decade in medication-use patterns and polypharmacy in elderly | | | | | | |
| 12 | Harrison, R., Fischer, S., Walpola, R. L., Chauhan, A., Babalola, T., Mears, S., & Le-Dao, H. (2021). Where do models for change management, improvement and implementation meet? A systematic | **PURPOSE:** Whilst a multitude of change management methodologies exist, their application in complex healthcare contexts remains unclear. Our review sought to establish the methodologies applied, and the nature and effectiveness of their application in the context of healthcare. | **Systematic review of literature** and narrative synthesis written by expert reviewers **[Article in a peer-reviewed Medical Journal]** | The most commonly applied methodologies were Kotter's Model (19 studies) and Lewin's Model (11 studies). Change management methodologies were applied in projects at local ward or unit level (14), institutional level (12) and system or multi-system (6) levels. The remainder of the studies | Change management methodologies were often used as guiding principle to underpin a change in complex healthcare contexts. The lack of prescription application of the change management methodologies was identified. Change management methodologies were valued for providing guiding principles for | N/A | Provides justification for theoretical framework (Lewin) of this project. | I Systematic review of literature (SRoL) |

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| | review of the applications of change management models in healthcare. *Journal of healthcare leadership*, *13*, 85–108. https://doi.org/10.2147/JHL.S289176 | | | provided commentary on the success of change efforts that had not utilised a change methodology with reference to change management approaches. | change that are well suited to enable methodologies to be applied in the context of complex and unique healthcare contexts, and to be used in cooperation with implementation and improvement methodologies. | | | |
| | **THEMES:** | SRoL; Lewin's Change Model (Theoretical Framework) | | | | | | |
| **13** | Hession, M. J. (2018). Best practice medication reconciliation in the outpatient setting. Doctor of Nursing Practice (DNP) Projects. 164. UMass Amherst. https://scholarworks.umass.edu/nursing_dnp_capstone/164 | **PURPOSE:** To improve consistency of medication reconciliation in this high-risk outpatient setting. | **Process/Quality Improvement Project (P/QIP)** High-risk outpatient setting | Based on a gap analysis between evidence-based and current practice, a quality improvement intervention was implemented to increase patient engagement in the medication reconciliation process. A reminder prompt was added to automated appointment notification calls and staff provided verbal cues to patients along with a printed copy of the medication list for review during the check-in and rooming process. A report was created to capture whether medication reconciliation was completed at the same time as provider-patient visits, and rates of reconciliation completions were calculated. | Prior to implementation of this project, medication reconciliation completion rates were calculated at an average of 35.6% over the three months prior. During the six-week intervention period, reconciliation rates improved in the range of 4.4-10.7% over that of the pre-intervention average rate. Medication list completeness and accuracy, however, remain a challenge. | The process for project review and exemption from the facility IRB was a slow moving one, and required multiple outreaches, meetings and resubmissions of documentation to various committee members. Once approved, the implementation site was in process of installing an upgrade to the current EMR, which further deterred initiation of the project as report capabilities were out of function for a few days. Between the time the project proposal was submitted and the time for implementation came about, the process for patient reminder calls was transitioned from clinic staff calling manually, to an automated appointment reminder call. The process for changing the script relayed to patients through this automated call was an additional time delay in implementation of the project. | Increased patient engagement showed a positive effect on medication reconciliation completion rates in the outpatient setting but did not surpass the goal of at least 50% reconciled. Further interventions, including staff training to improve competency in comprehensive, accurate medication reconciliation is warranted. | V Quality Improvement Project (QIP) |
| | **THEMES:** | P/QIP, DNP Project; Improve consistency of MR in outpatient clinic | | | | | | |
| **14** | Institute for Healthcare Improvement (IHI). (2022a). Medication list for patients and | **PURPOSE:** Provides helpful information and tools for designing or redesigning a medication | **Clinical practice guidelines** Developed by expert committees based on review of literature | N/A | N/A | N/A | Provides resources for project implementation. | I Clinical guidelines based on systematic review of |

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| | families. http://www.ihi.org/resources/Pages/Tools/MedListforPatientsFamilies.aspx?PostAuthRed=/resources/_layouts/download.aspx?SourceURL=/resources/Knowledge%20Center%20Assets/ea0612af-ce01-4bad-990c-8d46fdd72bb3/MassCoalitionPatientMedListFormOct06.pdf. | reconciliation process. | **[IHI website with resources]** | | | | | literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process | | | | | | |
| **15** | Institute for Healthcare Improvement (IHI). (2022b). Medication list for patients and families [PDF]. http://www.ihi.org/resources/_layouts/download.aspx?SourceURL=%2fresources%2fKnowledge+Center+Assets%2fea0612af-ce01-4bad-990c-8d46fdd72bb3%2fMassCoalitionPatientMedListFormOct06.pdf | **PURPOSE:** Provides helpful information and tools for designing or redesigning a medication reconciliation process. | **Clinical practice guidelines** Developed by expert committees based on review of literature **[IHI website with resources]** | N/A | N/A | N/A | Provides resources for project implementation. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process | | | | | | |
| **16** | Institute for Healthcare Improvement (IHI). (2022c). Reconcile medications in outpatient settings. http://www.ihi.org/resources/Pages/Changes/ReconcileMedicationsinOutpatientSettings.aspx. | **PURPOSE:** Provides helpful information and tools for designing or redesigning a medication reconciliation process. | **Clinical practice guidelines** Developed by expert committees based on review of literature **[IHI website with resources]** | N/A | N/A | N/A | Provides resources for project implementation. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process | | | | | | |
| **17** | Juma, E. O. (2019). Medication reconciliation at a rural primary care clinic. | **PURPOSE:** Ensure that an accurate and comprehensive patient medication information is | **Process/Quality Improvement Project (P/QIP)** A primary care physician clinic on the East Coast | The MR quality improvement (QI) project was implemented in a 14-week period. The first four weeks were | The QI project was implemented on a total sample (N= 343). Sixty-six percent of the sample population completed | A limitation of the project was utilizing MA's rather than a health care provider for patient interviews and reviewing the | MR leads to an increased patient safety, and a higher quality of care. The results from this quality improvement | V Quality Improvement Project (QIP) |

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| | Doctor of Nursing Practice (DNP) Projects. University of Maryland at Baltimore. http://hdl.handle.net/10713/9534 | communicated throughout the transitions of care. | provided approximately 5700 patient visits annually. It was standard practice at the clinic to assess and treat patients without a formal medication reconciliation process. | educational. The Plan, Do, Study, Act (PDSA) cycle was implemented in weeks 5 through 7, and the QI was fully implemented in weeks 8 through 14. The Medications at Transition and Clinical Handoff (MATCH) medication reconciliation (MR form) was used to document the patients' current medications that were omitted from their Electronic Medical Record (EMR). The secretary printed a MR form along with the patient medication list and placed them on a clipboard. The MR form was accessed through the MR folder added to the computer system. The patients | the MR form. The percentage of reconciled EMRs from the MR forms was 66 percent; an increase of 48.5 percent from baseline. An average of 1.3 medication discrepancies per participant was identified (N= 239), with 64.4 percent of participants experiencing at least one discrepancy. Sixteen-point-three percent were discrepancies of omission. A total of 49 (n= 49) sample observations were made to determine the percentage of the sample who received a copy of their updated medication list at check-out. Forty-seven percent of the observed sample received an updated medication | MR form along with the patient medication list prior to the provider approval. Most researched studies used a registered nurse, or a pharmacist for MR. However, the provider was generally able to identify duplication of medications and identify noncompliance with prescribed medications. Another limitation was the inclusion criteria. Patient's younger than 18 years old and patients with cognitive impairment were excluded from the study. The providers plan to include all the patients' seen in the clinic. A family member is usually present | project provides support for the implementation in other settings. However, patients with multiple over the counter medications increased interview time and had the potential for error. The DNP practitioner has an integral role in the partnership with the community in synthesizing and translating the evidence and promoting education in compliance with their training. | |
| | | | | reviewed their patient medication list, and added any medication that were omitted, or discontinued on the MR form. The MA's reviewed the patient's current medications and reconciled them with the clinics EMR. They highlighted the changes made on the EMR, and on the patients MR form for the provider's approval. The MR form and patient medication list were placed in a clearly marked folder in a locked cabinet in the secretary's office. The secretary printed an accurate medication list at checkout from the updated EMR and encouraged the patients to carry the list to all appointments. They | list at check-out; an increase of 47 percent from baseline. | accompanying the cognitively impaired patient or patients below 18 years old. The family will be included in the MR process in both populations. A validity threat to the generalizability of the project is the small sample size of 343. Additionally, the sample population demographics was rural, mean age 59.8 (SD= 17.4), and predominantly female (62 percent). This system may not be as effective in larger practice settings or in a place with a different patient demographics. | | |

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| | | | | scanned the MR form and patient medication list into the clinics EMR, under the MR folder. The forms were shredded once completed. | | | | |
| | **THEMES:** | P/QIP, DNP Project, PDSA Design; Improve communication of accurate and comprehensive MR throughout transitions of care | | | | | | |
| **18** | National Institute on Aging (NIA). (2021). The dangers of polypharmacy and the case for deprescribing in older adults. United States Department of Health and Human Services (USDHHS). https://www.nia.nih.gov/news/dangers-polypharmacy-and-case-deprescribing-older-adults | **PURPOSE:** Provides helpful information and tools for designing or redesigning a medication reconciliation process. | **Clinical practice guidelines** Developed by expert committees based on review of literature **[NIA website with resources]** | N/A | N/A | N/A | Provides resources for project implementation. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process | | | | | | |
| **19** | Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(a)]. Healthy people 2030 – Older adults: Reduce the proportion of older adults who use inappropriate medications (OA-02) – Data. United States Department of Health and Human Services (USDHHS). https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/reduce- | **OBJECTIVE:** Reduce the proportion of older adults who use inappropriate medications. | **Retrospective cross-sectional study** (Research study – National initiative goals) Patients 65 years of age and older, who are taking multiple chronic medications for different indications. Only qualified and professional candidates were chosen for data entry to present the quality and accuracy of data. | Trend, track, and project goals over a 10-year period based on national patient data (MEPS, AHRQ). Linear trend fitted using weighted least squares and a projection at the 50 percent prediction interval. | Ongoing (2030) | None identified and/or discussed. | Ongoing – Goals evaluated and revised every 10 years. | III Controlled Trial |

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| | proportion-older-adults-who-use-inappropriate-medications-oa-02/data | | | | | | | |
| | **THEMES:** | Controlled trial; Sets and explains national goals to reduce inappropriate polypharmacy in elderly by 2030 | | | | | | |
| **20** | Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(b)]. Healthy people 2030 – Older adults: Reduce the proportion of older adults who use inappropriate medications (OA-02) – Data methodology and measurement. United States Department of Health and Human Services (USDHHS). | **OBJECTIVE:** Reduce the proportion of older adults who use inappropriate medications. | **Retrospective cross-sectional study** (Research study – National initiative goals) Patients 65 years of age and older, who are taking multiple chronic medications for different indications. Only qualified and professional candidates were chosen for data entry to present the quality and accuracy of data. | Trend, track, and project goals over a 10-year period based on national patient data (MEPS, AHRQ). Linear trend fitted using weighted least squares and a projection at the 50 percent prediction interval. | Ongoing (2030) | None identified and/or discussed. | Ongoing – Goals evaluated and revised every 10 years. | III Controlled Trial |
| | https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/reduce-proportion-older-adults-who-use-inappropriate-medications-oa-02/data-methodology | | | | | | | |
| | **THEMES:** | Controlled trial; Sets and explains national goals to reduce inappropriate polypharmacy in elderly by 2030 | | | | | | |
| **21** | Office of Disease Prevention and Health Promotion (ODPHP). [n.d.(c)]. Healthy people 2030 – Older adults: Overview and objectives. United States Department of Health and Human Services (USDHHS). | **OBJECTIVE:** Reduce the proportion of older adults who use inappropriate medications. | **Retrospective cross-sectional study** (Research study – National initiative goals) Patients 65 years of age and older, who are taking multiple chronic medications for different indications. Only qualified and professional candidates were chosen for data entry to present the quality and accuracy of data. | Trend, track, and project goals over a 10-year period based on national patient data (MEPS, AHRQ). Linear trend fitted using weighted least squares and a projection at the 50 percent prediction interval. | Ongoing (2030) | None identified and/or discussed. | Ongoing – Goals evaluated and revised every 10 years. | III Controlled Trial |

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| | https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults | | | | | | | |
| | **THEMES:** | Controlled trial; Sets and explains national goals to reduce inappropriate polypharmacy in elderly by 2030 | | | | | | |
| **22** | Pazan, F., & Wehling, M. (2021). Polypharmacy in older adults: A narrative review of definitions, epidemiology and consequences. *European geriatric medicine*, *12*(3), 443–452. https://doi.org/10.1007/s41999-021-00479-3 | **PURPOSE:** This narrative review aims to find and summarize recent publications on definitions, epidemiology and clinical consequences of polypharmacy | **Narrative literature review** Older adults (65 years old and older) | The MEDLINE database was used to identify recent publications on the definition, prevalence and clinical consequences of polypharmacy using their respective common terms and their variations. Systematic reviews and original studies published between 2015 and 2020 were included. | One hundred and forty-three definitions of polypharmacy and associated terms were found. Most of them are numerical definitions. Its prevalence ranges from 4% among community-dwelling older people to over 96.5% in hospitalized patients. In addition, numerous adverse clinical outcomes were associated with polypharmacy. | None identified and/or discussed. | The term polypharmacy is imprecise, and its definition is yet subject to an ongoing debate. The clinically oriented definitions of polypharmacy found in this review such as appropriate or necessary polypharmacy are more useful and relevant. Regardless of the definition, polypharmacy is highly prevalent in older adults, particularly in nursing home residents and hospitalized patients. Approaches to increase the appropriateness of polypharmacy can improve clinical outcomes in older adults. | V Systematic review of descriptive & qualitative studies |
| | **THEMES:** | Systematic review of descriptive & qualitative studies; Find and summarize recent publications on definitions, epidemiology and clinical consequences of polypharmacy | | | | | | |
| **23** | Poon, I. O., Skelton, F., Bean, L. R., Guinn, D., Jemerson, T. L., Mbue, N. D., Charles, C. V., & Ndefo, U. A. (2021). Building community-engaged multidisciplinary partnerships to improve medication management in elderly patients with multiple chronic conditions. *Journal of patient-centered research and reviews*, *8*(2), 113–120. | **PURPOSE:** This project aims to engage minority elderly patients with multiple chronic conditions in the development of research questions and strategies to improve medication safety. | **Participatory research (workgroups); Systematic review of literature** Elderly patients (≥ 65 years old) who were prescribed 7 or more chronic medications were recruited through a university-based aging resource network in a historically African American community in Houston, Texas. | Patients and a caregiver participated in a multidisciplinary workgroup comprised of a physician, pharmacists, a nurse, health educators, and a social worker. Patients were engaged by utilizing the four patient-centered outcomes research engagement principles. The workgroup created a strategic plan, completed an environmental scan, identified research problems, and reviewed current evidence-based approaches in the literature. | From April 2018 to July 2018, 3 patients and 1 caregiver participated in five multidisciplinary workgroup meetings. A total of 74 seniors attended the town hall meeting, and 69 completed the surveys. The most common drug-related problems among survey participants were doubts about drug advertisements (79%) and drug interactions (70%). Most participants (88%) were more comfortable in receiving face-to-face counseling compared to an app or virtual visits. Findings aided | Multiple – It recruited seniors from a community exercise/health promotion program through the university-based geriatric resources network. Therefore, patients who were disabled, were bedridden, or lacked interest in exercise and health promotion activities were not included. Most workgroup and town hall participants were female, and this could limit the applicability of the result to male elderly patients. Patient partners and town hall participants varied in literacy | This narrative provides a roadmap for conducting multidisciplinary, patient-centered participatory research to refine research strategies in minimizing drug-related problems. | I Clinical guidelines based on systematic review of literature (SRoL) |

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| | https://doi.org/10.17294/2330-0698.1778 | | | | in developing three grant proposals. | level and knowledge in the use of electronic devices, and this could affect the result of the study. | | |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Engage minority elders in medication safety process | | | | | | |
| **24** | Qato, D. M., Alexander, G. C., Conti, R. M., Johnson, M., Schumm, P., & Lindau, S. T. (2008). Use of prescription and over-the-counter medications and dietary supplements among older adults in the United States. *JAMA*, *300*(24), 2867–2878. https://doi.org/10.1001/jama.2008.892 | **PURPOSE:** Estimate the prevalence and patterns of medication use among older adults (including concurrent use), and potential major drug-drug interactions. | **National cross-sectional probability sample** Three thousand five community-residing individuals, aged 57 through 85 years. | Three thousand five community-residing individuals, aged 57 through 85 years, were drawn from a cross-sectional, nationally representative probability sample of the United States. In-home interviews, including medication logs, were administered between June 2005 and March 2006. Medication use was defined as prescription, over-the-counter, and dietary supplements used "on a regular schedule, like every day or every week." Concurrent use was defined as the regular use of at least two medications. Population estimates of the prevalence of medication use, concurrent use, and potential major drug-drug interactions, stratified by age group and gender. | The unweighted survey response rate was 74.8% (weighted response rate, 75.5%). Eighty-one percent (95% confidence interval [CI], 79.4%-83.5%) used at least one prescription medication, 42% (95% CI, 39.7%-44.8%) used at least one over-the-counter medication, and 49% (95% CI, 46.2%-52.7%) used a dietary supplement. Twenty-nine percent (95% CI, 26.6%-30.6%) used at least five prescription medications concurrently; this was highest among men (37.1%; 95% CI, 31.7%-42.4%) and women (36.0%; 95% CI, 30.2%-41.9%) aged 75 to 85 years. Among prescription medication users, concurrent use of over-the-counter medications was 46% (95% CI, 43.4%-49.1%) and concurrent use of dietary supplements was 52% (95% CI, 48.8%-55.5%). Overall, 4% of individuals were potentially at risk of having a major drug-drug interaction; half of these involved the use of nonprescription medications. These regimens were most prevalent among men in the oldest age group (10%; 95% CI, 6.4%-13.7%) and nearly half involved anticoagulants. No | First, methodological differences across studies may limit some cross-study comparisons. Second, virtually all therapeutic classes are underused by some populations and overused by others; our data do not allow for us to completely examine important questions for health policy and clinical care regarding the appropriateness of the regimens that we observe. For example, even in cases of a potential major drug-drug interaction, an individual's physician may have prescribed the regimen, may be aware of the risks, and may be monitoring the patient appropriately. Third, we based our analyses of major medication interactions on Thomson Micromedex classifications; other methods of classification may lead to different estimates of the population prevalence of drug-drug interactions. No one method of classification is able to capture the entirety of clinical evidence to support a given drug's safety, and we examined potential interactions, rather than actual patient harm. Despite this, Thomson Micromedex is a widely used clinical | Medications are a critical modality for prolongation of life and improved quality of life for many older adults. By establishing patterns of prescription and nonprescription medication use among older adults, these data may help support efforts to increase the safety and quality of pharmacotherapy for older adults. This is especially important, since in this sample of community-dwelling older adults in the United States, nearly 1 in 25 reported taking concurrent drugs with the potential for harm from serious drug-drug interactions. | III Controlled Trial |

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| | | | | | contraindicated concurrent drug use was identified. | reference. Our method of classification would generally lead to underestimates of the potential risks associated with concurrent use of prescription and nonprescription therapies because the related drug safety literature, albeit increasing, is limited. Furthermore, because we identified interactions only among the 20 most common medications and dietary supplements and focus only on major interactions, our results underestimate the total risk for potential interactions. | | |
| | **THEMES:** | Controlled trial; Estimate the prevalence and patterns of medication use among older adults (including concurrent use), and potential major drug-drug interactions. | | | | | | |
| **25** | Rahman, S., Singh, K., Dhingra, S., Charan, J., Sharma, P., Islam, S., Jahan, D., Iskandar, K., Samad, N., & Haque, M. (2020). The double burden of the COVID-19 pandemic and polypharmacy on geriatric population - Public health implications. *Therapeutics and clinical risk management*, *16*, 1007–1022. https://doi.org/10.2147/TCRM.S272908 | **PURPOSE:** This review explains the public health implications associated with polypharmacy on the geriatric population with pre-existing co-morbidities during the COVID-19 pandemic. | **Narrative literature review** Geriatric population with pre-existing co-morbidities during the COVID-19 pandemic. | The literature search for this narrative review was performed by searching bibliographic databases (including Google Scholar and PubMed). We principally depend on free downloads as this research did not obtain any financial support. Additionally, the link provided by the Universiti Pertahanan Nasional Malaysia [(UPNM) the National Defence University of Malaysia], Kuala Lumpur, Malaysia. The search terms used were: "Elderly," "Aging Process," "Geriatric Community," "Aged Population," "Treatment Options," "Treatment Difficulty," "COVID-19", "Pandemic", "Viral infection", "Polypharmacy", "Co-morbidity", | COVID-19 pandemic is inducing acute respiratory distress syndrome, multi-organ failure, and eventual death. Respiratory failure is the leading cause of mortality in the elderly population with pre-existing medical conditions. This group is particularly vulnerable to infections due to a declined immune system, comorbidities, geriatric syndrome, and potentially inappropriate polypharmacy. These conditions make the elderly population more susceptible to the harmful effects of medications and the deleterious consequences of infections, including MERS-CoV, SARS-CoV, and SARS-CoV-2. Chronic diseases among elderlies, including | None identified and/or discussed. | The prevalence of polypharmacy is abruptly increasing in the elderly. Frail and comorbid elderly populations are at the utmost risk due to a decrease in intrinsic capacity and resilience, which undermines their resistance to any disease/infection. Majority of COVID-19 patients with pneumonia who require ICU treatment were geriatric patients with multiple co-morbidities. Currently, the detail of the epidemiology of COVID-19 is still emerging, and the typical pathological progression is not well-determined. COVID-19 has similar pathogenic potential to cause respiratory complications, disability, and death as SARS-CoV and MERS-CoV. | V Systematic review of descriptive & qualitative studies |

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| | | | | "Public health", and "Global" followed by snowballing references from high-ranking reputed leading journals around the planet and persuasive highly cited manuscript. Only peer-reviewed articles published in English were included. Articles for which the full text was not available and those not written in English were excluded. The articles retrieved in the first round of search; further references were spotted by a manual search among the cited references. As this is a narrative review, whilst we have included predominantly recent papers, those with historical significance (which are older papers) to the | respiratory diseases, hypertension, diabetes, and coronary heart diseases, present a significant challenge for healthcare professionals. To comply with the clinical guidelines, the practitioner may prescribe a complex medication regimen that adds up to the burden of pre-existing treatment, potentially inducing adverse drug reactions and leading to harmful side-effects. Consequently, the geriatric population is at increased risk of falls, frailty, and dependence that enhances their susceptibility to morbidity and mortality due to SARS-CoV-2 respiratory syndrome, | | Pneumonia is the most severe complication of the Influenza virus or COVID-19, and any infection in the elderly patient can turn into fatal pneumonia. Respiratory failure due to ARDs is the leading cause of death in the elderly. Polypharmacy may be required in some cases, and "appropriate polypharmacy" is the key to success. The treatment of COVID-19 patients with co-morbidities may result in problematic polypharmacy. The consequence of polypharmacy among the aged population is often correlated with poor compliance, DDIs, medication errors, and ADRs, which includes falls, | |
| | | | | narrative have also been included. There was no attempt to develop a systematic review or meta-analysis. | particularly interstitial pneumonia. The major challenge resides in the detection of infection that may present as atypical manifestations in this age group. Healthy aging can be possible with adequate preventive measures and appropriate medication regimen and follow-up. Adherence to the guidelines and recommendations of WHO, CDC, and other national/regional/international agencies can reduce the risks of SARS-CoV-2 infection. Better training programs are needed to enhance the skill of health care professionals and patient's caregivers. | | skeletal bone fractures, confusion, and delirium. A multidisciplinary approach with pharmacists mediating with the medical team/primary care provider to prevent polypharmacy should be followed; excessive dispensing and irrational medication should be strictly avoided in order to prevent any likelihood of ADRs and reduce health care costs; computerized discharge instructions and prescriptions are essential for follow up. Better Training programs are needed for health care professionals and patient's caregivers. Clinical management should follow the WHO, CDC, and | |

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| | | | | | | | other national/regional/international guidelines and recommendations. Overall, the global pandemic gives us a lesson to overhaul total healthcare based on primary health care all over our planet. | |
| | **THEMES:** | Systematic review of descriptive & qualitative studies; Explains the public health implications associated with polypharmacy on the geriatric population with pre-existing co-morbidities during the COVID-19 pandemic | | | | | | |
| **26** | Rochon, P. A., Petrovic, M., Cherubini, A., Onder, G., O'Mahony, D., Sternberg, S. A., Stall, N. M., & Gurwitz, J. H. (2021). Polypharmacy, inappropriate prescribing, and deprescribing in older people: Through a sex and gender lens. *The lancet: Healthy longevity*, *2*(5), e290–e300. https://doi.org/10.1016/s2666-7568(21)00054-4 | **PURPOSE:** This review focuses on optimising prescribing for older adults by reducing doses or stopping drugs that are potentially harmful or that are no longer needed. We explore how sex (biological) and gender (sociocultural) factors are important considerations in safe drug prescribing. We conclude by providing a practical approach to optimising medication safety that clinicians can routinely apply to the care of their older patients, highlighting how sex and gender considerations inform medication decision making. Our review encourages clinicians to consider how sex (biologic) and gender (sociocultural) factors should inform medication prescribing and deprescribing decisions for older adults. We hope that the "DRUGS" approach to optimizing medication safety for older adults will | **Systematic review of literature** | To identify inappropriate prescribing tools and deprescribing processes, we used the International Reducing Inappropriate Medication Use and Polypharmacy position statement to identify key papers. This was supplemented by systematic reviews on these two topics. To identify inappropriate prescribing tools and deprescribing processes that are most known, we restricted the list to those that were the most highly cited as of January 19, 2021, using Google Scholar. Only those papers focusing on older adults were included. We searched Google Scholar in January 2021, for papers published in English, using "sex" or "gender" and the name of the inappropriate prescribing tool or deprescribing process as search terms. | Despite the importance of deprescribing and the evidence that older women experience more drug-related adverse events, to our knowledge, only one study has explored gender differences in the deprescribing process. This study showed that women were more aware of harmful medications and were more likely than men to initiate a deprescribing conversation and to seek out medication-induced harm. Although women make up the majority of older people and are more vulnerable than men to drug-related harm, existing research has almost completely neglected this consideration. The solutions offered in this Review will require a consideration of sex and gender, alongside age, in all drug research, from early clinical trials through to postmarketing surveillance. These considerations will inform the current understanding of polypharmacy, improve the development of future tools and frameworks to identify inappropriate prescribing, and | None identified and/or discussed. | Improving prescribing for older adults is an international priority for all health-care systems. The approach of geriatric medicine to polypharmacy is one that carefully considers the goals of care of an older person. Although polypharmacy is a major problem, there are tools and frameworks that identify inappropriate prescribing and deprescribing protocols that provide guidance to judiciously decrease doses and stop unnecessary medications. Our DRUGS guide to deprescribing, created by eight geriatricians with a background in geriatric pharmacology, provides five simple steps to stop inappropriate drug therapy. Further research needs to consider the potentially important influence of sex and gender on inappropriate prescribing and deprescribing to optimize medication safety. | I Systematic review of literature (SRoL) |

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| | | encourage clinicians to routinely incorporate sex and gender considerations into their decision-making. Only then can we truly optimize prescribing for older women and men. | | | guide geriatric medicine-informed deprescribing protocols. | | | |
| | **THEMES:** | SRoL; Using the "DRUGS" approach to optimize medication safety for older adults (gender effects on polypharmacy in elderly) | | | | | | |
| **27** | Rose, O., Jaehde, U., & Köberlein-Neu, J. (2018). Discrepancies between home medication and patient documentation in primary care. *Research in social & administrative pharmacy: RSAP*, *14*(4), 340–346. https://doi.org/10.1016/j.sapharm.2017.04.003 | **OBJECTIVE:** The study aim was to provide accurate data on the magnitude of discrepancy between the prescription and the actually taken medicine. Clinical relevance of discrepancies was assessed to estimate the impact on medication safety. | **Cohort study** Medication of 142 elderly patients from 12 practices was reconciled. | Patients were assessed at home; data was reconciled with the physician's documentation. Discrepancies were analyzed and stratified. Risk for hospitalization, risk for falls and the potential for drug-drug interactions was estimated based on literature. Drugs were assessed for its origin and grouped to indication clusters. Detected DRPs at a Medication Review were linked to the results at Medication Reconciliation. The analysis was stratified to gender, age, and medication plan. | 1498 drugs were found at the home assessment, 1099 (73.4%) of which were detected in the physician's documentation. 94.4% of the patients were affected by discrepancies. A total of 2.8 ± 2.4 drugs was undocumented per patient. 26.6% of missing drugs were prescribed by medical specialists, 42.5% of drugs of unknown origin were prescription drugs. 53.9% of the patients used an undocumented drug, which carried a substantial risk for hospitalization. 23.1% of the drugs not covered were used for treatment of cardiovascular diseases. 65.8% of the differing drugs caused at least one DRP. 94 percent of the patients had a medication discrepancy, with an average of 2.8 drugs per patient missing from the primary care EMR. | None identified and/or discussed. | A high discrepancy between the drugs used by the patient and the medication documented by the primary care physician could be found. Relating drugs had a profound systemic effect and were particularly relevant to medication safety. Many drugs were prescription drugs. The majority of differing drugs caused DRPs. A collaborative Medication Reconciliation as part of a Medication Management could compile the entire medication and increase patient safety | IV Case-control or cohort study |
| | **THEMES:** | Cohort study; Clinical relevance of discrepancies was assessed to estimate the impact on medication safety | | | | | | |
| **28** | Sabeen, A., Aziz, A., Amirali, A. (2021). 77 Using PDSA (Plan – Do – Study – Act) model to increase medicine reconciliation in a tertiary care hospital of a | **OBJECTIVE:** Using PDSA (Plan – Do – Study - Act) model to increase medicine reconciliation in a tertiary care hospital of a developing country. | **Process/Quality Improvement Project (P/QIP)** | A quality improvement project conducted in the Department of Medicine, Aga Khan University Hospital Karachi. We included residents and interns working in Medicine department. The written proforma was distributed in three | The Medicine reconciliation compliance improved from 4% in February 2019 to 96% in May 2019. | None identified and/or discussed. | With the help of PDSA cycle we advised and managed to implement quality improvement interventions and changes that resulted in significant improvement in medication reconciliation compliance. This | V Quality Improvement Project (QIP) |

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| | developing country. *BMJ Leader* 2021; **5:**A28. https://bmjleader.bmj.com/content/5/Suppl_1/A28.2 | | | sessions for three consecutive weeks. The PDSA model was implemented for four months from February 2019 to May 2019 in the department of internal medicine. | | | strategy of PDSA cycle can be applied in other quality indicator projects also for increasing patient safety and decrease preventable harm. This project also shows that engaging the health care workers will overcome the resistance to change and implement sustainable systems. | |
| | **THEMES:** | P/QIP, PDSA Design; MR implementation and outcomes | | | | | | |
| **29** | Saleem, S., Sehar, S., Afzal, M., Jamil, A., & Gilani, S. A. (2019). Accreditation: Application of Kurt Lewin's theory on private health care organizational change. *Saudi journal of nursing and health care*, *2*(12). https://www.researchgate.net/profile/Syed-Amir-Gilani/publication/340765406_Accreditation_Application_of_Kurt_Lewin's_Theory_on_Private_Health_Care_Organizational_Change/links/5ea16aa892851c87d1ad6741/Accreditation-Application-of-Kurt-Lewins-Theory-on-Private-Health-Care-Organizationanl-Change.pdf | **PURPOSE:** An accreditation plan can improve an organizational facilities and services regarding patient care and provides quality improvement skills. In my case scenario, I conceptualized an idea about accreditation of private well-established health care setting. The Kurt Lewin's theory insights a framework of change at the accreditation level, which will be achieved by the application of the transformational leadership style. Transformational leadership style works as guider, motivator, collaborative and bind with sustain the change management mission. The accreditation requires an international standard of practices and high quality of patient care in an organization. The accreditation requirement is fulfilled in the context of organizational cultural and environmental values, beliefs and delivery of services. In the case scenario | **Systematic review of literature** and case study application written by expert reviewers **[Article in a peer-reviewed Nursing Journal]** | This case study paper applies the change management process. It presents the change management theory application for accreditation plan in private health care organization, following the transformational leadership style. | This style motivates the co-workers to participate in achieving the goal in formal and in the way of sustainable change. The literature reviews reflected that most of respondents report changes in an organization are stressful. | The limitation of this study is that the change theory is only used to analyze the phenomenon, but not be used as instructions in private organization accreditation | Provides justification for theoretical framework (Lewin) of this project. | I Systematic review of literature (SRoL) |

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| | | presented an idea by the reflection on its organizational change. The private health care organization had accreditation capabilities. All essential and standardized equipment and performing procedural guidelines and following protocols. Kurt Lewin's theory give directions to such these kind of organizations in the context of change at the level of accreditation | | | | | | |
| | **THEMES:** | SRoL; Lewin's Change Model (Theoretical Framework) | | | | | | |
| **30** | Saljoughian, M. (2019). Polypharmacy and drug adherence in elderly patients. *US pharm. 2019;44*(7):33-36. https://www.uspharmacist.com/article/polypharmacy-and-drug-adherence-in-elderly-patients#:~:text=approximately%2044%25%20of%20men%20and,or%20prescription%20medications%20per%20week | **PURPOSE:** Polypharmacy and medication adherence in the elderly are significant public-health considerations worldwide and are an important focus of integrated care. | **Clinical practice guidelines** Developed by expert based on review of literature **[Article in a peer-reviewed Medical Journal]** | N/A | N/A | N/A | Polypharmacy is common among elderly persons because of the need to treat the various disease states that develop with age. Although the deprescribing of unnecessary medications is a way of limiting polypharmacy, the underprescribing of effective therapies in older patients is a concern. Therefore, healthcare providers must evaluate each drug and balance its potential adverse effects against its potential benefits. Advances in information technologies such as electronic prescribing, electronic medical records, and electronic laboratory results will help prevent adverse drug effects and interactions. Medication management in nursing homes and outpatient settings is feasible because of alterations in | I Clinical guidelines based on systematic review of literature (SRoL) |

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| | | | | | | | administration and technology-driven prescribing systems | |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, MR process, polypharmacy and adherence in elderly | | | | | | |
| **31** | Sheikh-Taha, M., & Asmar, M. (2021). Polypharmacy and severe potential drug-drug interactions among older adults with cardiovascular disease in the United States. *BMC geriatrics*, *21*(1), 233. https://doi.org/10.1186/s12877-021-02183-0 | **PURPOSE:** The objective of this study was to assess the prevalence of polypharmacy among older adults with cardiovascular disease (CVD) and to identify severe potential DDIs. | **Retrospective chart review** Inclusion criteria were age ≥ 65 years, history of CVD, and admission to the cardiology service. | A retrospective chart review was conducted in a tertiary care center over a three-month period where we reviewed home medications of older adults upon hospital admission. Polypharmacy was defined as five or more medications taken concomitantly, hyper-polypharmacy was defined as ten or more medications taken concomitantly, and severe potential DDIs were considered to be those belonging to category D or X using Lexicomp® Drug Information Handbook. Category D interaction states that modification of | A total of 404 patients with a mean age of 76.6 ± 7.4 years were included. Patients were taking an average of 11.6 ± 4.5 medications at home and 385 (95%) received polypharmacy, 278 (69%) received hyper-polypharmacy, and 313 (77.5%) had at least one severe potential DDI. Under category D, the most common potential DDIs were drugs with additive central nervous system (CNS) depressant effect and drugs that increase the risk of QT prolongation. Under category X, the most common potential DDIs were | A major limitation is that the study was limited to describing potential DDIs on admission to a cardiology service, and that other important aspects were not assessed. These aspects include assessing the clinical relevance of potential DDIs at individual level, analyzing how these DDIs were managed during hospital admission, and analyzing the factors associated with these potential severe DDIs. In addition, the study was a retrospective chart review and data was collected from a single medical center. A multi-centered study would have | Polypharmacy, hyper-polypharmacy, and severe potential DDIs are quite common in older adults with CVD. Clinicians should vigilantly review patients' drug records and adjust therapy accordingly to prevent adverse drug reactions and negative health outcomes. | II ≥1 randomized controlled trials (RCTs) |
| | | | | therapy should be considered while category X states that the combination should be absolutely avoided. | non-selective β-blockers that may diminish the bronchodilator effect of $\beta_2$ agonists and drugs with anticholinergic properties that enhance the ulcerogenic effect of oral solid potassium. | tackled probable differences in prescribing patterns and would have allowed the data to be more generalizable. In addition, due to the nature of the study some data was missing, and different forms of bias might have been introduced. Furthermore, in our study we did not assess whether the polypharmacy was appropriate or inappropriate. | | |
| | **THEMES:** | RCTs; Prevalence of polypharmacy among older adults with cardiovascular disease (CVD) and to identify severe potential DDIs | | | | | | |
| **32** | Stolldorf, D. P., Ridner, S. H., Vogus, T. J., Roumie, C. L., Schnipper, J. L., Dietrich, M. S., Schlundt, D. G., & Kripalani, S. (2021). Implementation strategies in the context of medication | **PURPOSE:** Guided by the Expert Recommendations for Implementing Change (ERIC) taxonomy, we report the differing strategies hospital implementation teams used to implement an evidence-based | **Qualitative study** Using purposive sampling, the principal investigator (PI) (DPS) recruited implementation teams, site leaders, and executive leaders for interviews. | A qualitative study was conducted with implementation teams and executive leaders of hospitals participating in the federally funded 'Implementation of a Medication Reconciliation Toolkit to Improve Patient Safety' (known as | Data were collected from 16 hospitals using two focus groups, three group interviews, and 11 individual interviews, ten sites' meeting minutes, and an email interview of an executive. Major categories of implementation strategies | This study was limited to MARQUIS2 participating hospitals selected in an application process that required executive leadership support and a desire to improve their MedRec processes. Thus, participating hospitals were | Complex interventions like the MARQUIS MedRec Toolkit can benefit from the ERIC taxonomy, but adaptations and new strategies (and even categories) are necessary to fully capture the range of approaches to implementation. | V Systematic review of descriptive & qualitative studies |

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| | reconciliation: A qualitative study. *Implementation science communications*, *2*(1), 63. https://doi.org/10.1186/s43058-021-00162-5 | MedRec Toolkit (the MARQUIS Toolkit). This paper reports MARQUIS2 Toolkit implementation strategies and how implementation teams operationalized these strategies. Understanding these strategies and their associated operationalizations are important as MARQUIS is recognized as the premier evidence-based approach to MedRec and is being spread through the Society of Hospital Medicine's national collaborative. | | MARQUIS2) research study. Data consisted of transcripts from web-based focus groups and individual interviews, as well as meeting minutes. Interview data were transcribed and analyzed using content analysis and the constant comparison technique. | predominantly mirrored the ERIC strategies of "Plan," "Educate," "Restructure," and "Quality Management." Participants rarely used the ERIC strategies of finance and attending to policy context. Two new non-ERIC categories of strategies emerged—"Integration" and "Professional roles and responsibilities." Of the 73 specific strategies in the ERIC taxonomy, 32 were used to implement the MARQUIS Toolkit and 11 new, and non-ERIC strategies were identified (e.g., aligning with existing initiatives and professional roles and responsibilities). | contextually at an elevated level of readiness, without the need for new policy-driven strategies. It is possible that our findings would be different in hospitals less ready to change. For example, although The Joint Commission lists MedRec as a national patient safety goal (NPSG.03.06.01), accreditation was not a major driver for MARQUIS2 participation but rather gap analyses of existing MedRec processes and other motivators, such as reduced staffing levels in the emergency room of nurses who completed MedRec. Accreditation bodies can play a significant role in forcing change in organizations | | |
| | | | | | | resistant to change but their role in organizations with an elevated level of readiness appears muted. Although this study did not find finance and policy context to be common drivers, the researchers still recommend their inclusion in future efforts involving more uncertain policy contexts and with hospitals where readiness for change and contextual factors driving implementation might be different. Although the study sample size was relatively small as only 16 hospitals participated in this study, data saturation was achieved with consistent themes emerging across hospitals prior to the | | |

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| | | | | | | completion of all interviews. Of the two hospitals not represented in this report, one also demonstrated limited engagement with and did not collect sufficient data during MARQUIS2 study to be included in the analysis of the primary outcomes. The other hospital participated in the larger MARQUIS2 study, but the researchers were unable to recruit implementation team members for interviews. As noted above, selection bias is possible as MARQUIS2 hospitals were limited to those that applied to participate and they may inherently be different from those hospitals that did not | | |
| | | | | | | apply to participate in MARQUIS2. Although the study results underrepresent the voices of executive leaders, implementation team members indicated ways executives supported toolkit implementation as reflected in the planning strategy of "Involve executive boards and/or sponsors." Response bias, including social desirability, are additional potential study limitations. However, phrasing questions to prevent leading participants towards a specific answer, asking questions in a non-threatening, neutral manner, and using simple, unbiased language helped to mitigate this risk. | | |

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| | | | | | | Although generalizability may be limited, the hospitals were heterogeneous in type, size, and location, and thus, the findings may be applicable to hospitals with similar characteristics. | | |
| | **THEMES:** | Systematic review of descriptive & qualitative studies; Use of Expert Recommendations for Implementing Change (ERIC) taxonomy and the different strategies hospital implementation teams used to implement an evidence-based MedRec Toolkit (the MARQUIS Toolkit). | | | | | | |
| **33** | Tarn, D. M., & Schwartz, J. B. (2020). Polypharmacy: A five-step call to action for family physicians. *Family medicine*, *52*(10), 699–701. https://doi.org/10.22454/FamMed.2020.909136 | **PURPOSE:** There is a need for effective methods to address polypharmacy, particularly in the primary care setting. We propose five steps for primary care physicians, practices, health systems, and organizations to take. | **Clinical practice guidelines (article / commentary)** proposed by experts based on review of literature written by experts based on review of literature | N/A | N/A | N/A | Today, over 20,000 drugs are approved by the Food and Drug Administration (FDA) for marketing in the United States. Clinical guidelines recommend medications for use, and health care providers routinely prescribe them. Medicine has moved from plant powders, honey, and grease to evidence-based medical therapies, but these advances are not without consequence. Physicians have created a new iatrogenic medical condition—that of polypharmacy, or the concurrent use of multiple medications by a patient. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process in primary care setting | | | | | | |
| **34** | Taylor, K. (2021). Geriatric medication reconciliation in the home setting. *American nurse*, *16*(7), 14–17. https://www.myamericannurse.com/geriatric-medication-reconciliation-in-the-home-setting/ | **PURPOSE:** There is a need for universal clinical practice guidelines exist for medication reconciliation, especially in the home setting. | **Clinical practice guidelines (article / commentary)** proposed by experts based on review of literature written by experts based on review of literature | N/A | N/A | N/A | No universal clinical practice guidelines exist for medication reconciliation, especially in the home setting. | I Clinical guidelines based on systematic review of literature (SRoL) |
| | **THEMES:** | SRoL; EBP, Clinical practice guidelines, Developing MR process in home setting | | | | | | |
| **35** | Wang, R., Chen, L., Fan, L., Gao, D., Liang, Z., He, | **Purpose:** We investigated the clinical characteristics of | **Prospective cohort study** Older men aged ≥80 years (n = 1562) were | Patients were recruited at the geriatric outpatient clinic on the occasion | The mean (range) age of the included participants was 85.2 (80–104) years. | This study is subject to certain limitations. The sample of patients came from a | Our study demonstrates that polypharmacy is quite common in the | III Controlled Trial |

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| | J., Gong, W., & Gao, L. (2015). Incidence and effects of polypharmacy on clinical outcome among patients aged 80+: A five-year follow-up study. *PloS one*, *10*(11), e0142123. https://doi.org/10.1371/journal.pone.0142123 | polypharmacy and identified the effects of polypharmacy on clinical outcome among patients aged 80+ admitted to Chinese PLA general hospital. | included in this study. | of routine check-up visits in the South Building of Chinese PLA General Hospital in 2009. All participants in this study were the leaders of Chinese People's Liberation Army, had been provided VIP health care services including individualized health exam and medical healthcare programs by high-quality specialists and currently in a stable clinical status. This study excluded patients with advanced disease (cancer or noncancer) in whom the initial estimate of life expectancy was less than 3 months and patients in whom follow-up availability was shorter than 3 months. Subjects who | Medication exposure was reported by 100% of the population. Mean number of medications reported in this population was 9.56±5.68. The prevalence of polypharmacy (≥6 medications) in the present study was 70%. At the time of the follow-up survey, an increase in the number of taken medicines had occurred among half of the survivors. The risk of different outcomes in relation to number of medications rises significantly, the odds ratios were 1.21 (95% confidence interval [CI]1.17–1.28) for adverse drug reactions, 1.18 (95% CI 1.10–1.26) for falls, 1.16 (95% CI 1.09–1.24) for | single health center and all of them were male. | very old patients and observed that number of medications was a factor associated with difference clinical outcome independently of the age, type of medications prescribed and accompanied comorbidities. Our study clearly demonstrates that polypharmacy is quite common in the most multimorbid patients and observed that number of medications was a factor associated with difference clinical outcome independently of the age, type of medications prescribed and accompanied comorbidities. Well-designed intervention studies that focus on enrolling high risk | |
| | | | | were transferred to inpatient departments directly from clinic were not recruited. If the participant was unable to answer the questions, a close relative or a friend could give the required information. The included participants attended a structured clinical examination and an interview conducted by a geriatrician and trained nurses. A follow-up survey in 2014 was conducted on survivors in the same way as in 2009. Patients were interviewed using a questionnaire that included medical histories, current diagnoses and drug use were recorded from a combination of electronic and paper-based records. Data on medication | disability, and 1.19 (95% CI 1.12–1.23) for mortality. There was no association between increasing number of medications and cognitive impairment. | | older patients with polypharmacy have shown that they can be effective in improving the overall quality of prescribing with mixed results on distal health outcomes. | |

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| | | | | use was extracted from the medication management plan, a form used by clinical pharmacists to document patients' medication use prior to and during admission. Drug use refers to regular and as-needed consumption of regularly and as-needed taken drugs, vitamins and mineral supplements. Drugs taken daily or at regular intervals were defined as being in regular use. Whereas occasionally taken drugs were defined as as-needed taken drugs. Polypharmacy status was defined as a three-class variable. Excessive polypharmacy was defined as the use of ten or more drugs, polypharmacy as the use of six to nine drugs, and non-polypharmacy as the use of five or less drugs concomitantly. | | | |
| **THEMES:** | | Controlled trial; Clinical characteristics of polypharmacy and identified the effects of polypharmacy on clinical outcomes in 80 and older | | | | | | |
| **36** | Waters, S. (2020). Nurse champions for medication reconciliation: Making a difference. Doctor of Nursing Practice Projects. 3. https://digitalcommons.jsu.edu/etds_nursing/3 | **OBJECTIVE:** Determine if the use of dedicated, highly trained nurse champions to collect medication histories at the point of hospital admission had a significant impact on the number of medication history discrepancies. | **Process/Quality Improvement Project (P/QIP)** | This project included in-class training of 18 nurse champions in best practice recommendations to collect the best possible medication history on high-risk patients admitted to the inpatient setting. After the training, chart reviews were conducted, with multiple source verification, to identify any discrepancies in the medication regimen resulting from errors of omission, addition, dosing, route, or frequency. | Following training, the nurse champions decreased the average number of errors in the medication history from 4.38 errors per patient (SD = 2.94) to 1.28 errors per patient (SD = 1.85), far exceeding the project goal of a 15% reduction in discrepancies ($p < 0.001$). | None identified and/or discussed. | In smaller hospitals with limited resources, the use of nurse champions provides an effective option for improving the medication reconciliation process and promoting medication safety. | V Quality Improvement Project (QIP) |
| **THEMES:** | | P/QIP, DNP Project, PDSA Design, Lewin's Change Model; MR, hospital setting, nurse champions | | | | | | |
| **37** | Young, E. H., Pan, S., Yap, A. G., Reveles, K. R., & Bhakta, | **PURPOSE:** This study aims to describe the prevalence of | **National cross-sectional study** | This was a cross-sectional study of the Centers for Disease Control and | Over two billion patient visits were included. Overall, Polypharmacy was | As the NAMCS dataset provides information from single office visits, | Most patients over 65 years experienced some degree of polypharmacy, with | III Controlled Trial |

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| | K. (2021). Polypharmacy prevalence in older adults seen in United States physician offices from 2009 to 2016. *PloS one*, *16*(8), e0255642. https://doi.org/10.1371/journal.pone.0255642 | polypharmacy and high-risk medication prescribing in U.S. physician offices. | All patients over 65 years old were included. | Prevention's National Ambulatory Medical Care Survey from 2009 to 2016. Polypharmacy was categorized as no polypharmacy (< 2 medications), minor polypharmacy (2–3 medications), moderate polypharmacy (4–5 medications), and major polypharmacy (>5 medications). Medications were further categorized into high-risk medication categories (anticholinergics, cardiovascular agents, central nervous system (CNS) medications, pain medications, and other). Comparisons between the degrees of polypharmacy were performed utilizing chi-square or Wilcoxon rank-sum tests with JMP | common (65.1%): minor polypharmacy (16.2%), moderate polypharmacy (12.1%), and major polypharmacy (36.8%). Patients with major polypharmacy were older compared to those with moderate or minor polypharmacy (75 vs. 73 years, respectively) and were most frequently prescribed pain medications (477.3 per 1,000 total visits). NSAIDs were the most frequently prescribed, with 232.4 per 1,000 total visits resulting in one high-risk NSAID prescription, while 21.9 per 1,000 total visits resulted in two or more high-risk NSAIDs. | previous visits and longitudinal follow-ups were unavailable. However, as the NAMCS includes a random sample of visits from various physician offices in the country, there is a low probability that one patient was sampled multiple times. In addition, medication data from this dataset only indicate which medications patients were newly prescribed or were taking at the time of visit with or without the corresponding disease state for which it was being prescribed. Therefore, this study is unable to account for the accuracy of this list in terms of previous medications, active medications, or chronic use of these | many experiencing major polypharmacy. This indicates an increased need for expanded pharmacist roles through medication therapy management and safety monitoring in this patient population. In this nationally representative study, polypharmacy and more specifically, major polypharmacy, was prevalent in U.S. physician offices within the elderly population. High-risk medications were also common in this population, with high-risk pain medications being the most commonly prescribed. Findings from this study support enhanced pharmacist roles in medication therapy management in order | |
| | | | | Pro 14® (SAS Institute, Cary, NC). | | medications. As such, this study was not able to concretely differentiate between essential and inappropriate polypharmacy, but it did identify potentially inappropriate medications based on the drug class and the age of the population studied. Next, the survey used in this study collected data on only outpatient physician offices, so study findings are not representative and can underestimate high-risk medication prescribing in the elderly in the U.S., particularly in the inpatient setting and over-the-counter medications. Lastly, due to the survey setting, this study was also unable to account for patients | to improve drug therapy regimens in the elderly population. | |

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| | | | | | | getting medications filled from multiple physicians or picking up medications from multiple pharmacies. | | |
| **THEMES:** | Controlled trial; Prevalence of polypharmacy and high-risk medication prescribing in U.S. physician offices | | | | | | | |

**Appendix C**

QIP Implementation – Clinic Education Handouts

*Clinic Staff Educational Session Outline*

# Project Team Meeting

*Tuesday, January 24, 2023 - "Lunch & Learn" Session*

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| **Facilitator** | Jessica Kirkwood-Harp | **Attendees:** Please read the *"Medication Reconciliation Process Implementation"* document which outlines the process and everyone's responsibilities. |
| **Project Champion** | Dr. Frannie Koe, MD | |
| **Attendees** | Wills Valley Family Medicine & Valley Care DPC Clinic Staff | |

**Agenda Items**

**Topic**

- ☐ **Project: "Establishing a Routine MR Process to Address Unnecessary Polypharmacy in Adults 65 and Older"**
- ☐ **Problem and Population: Polypharmacy in Older Adults**

  Why is it a problem and how do we know when is it a problem? (Global, national, and clinic data)

  The risks of polypharmacy and unnecessary medications in older adults
- ☐ **Intervention: Establishing a Routine MR Process**

  MR as an EBP

  What are the benefits of a consistent and routine MR process?

  Why should everyone be involved?

  What are we doing?
- ☐ **Discussion / Q&A**

**You may contact me directly with any questions:**

Jessica Kirkwood-Harp, DNP(c), MSN, FNP-BC, FNP-C

jharp@stu.jsu.edu

*Staff Education: Color-coded Staff MR Flow Chart and Policy*

# Medication Reconciliation (MR) Process Implementation

## Front Office/Reception and/or Clinical Manager

Call patients at least 24-72 hours prior to their "scheduled" appointments.
- Remind them of their appointment.
- Remind them to bring ALL medications. *(including supplements, OTC, PRN, etc.)*

Print a current Medication List for all patients with "scheduled" appointments. *(You may do this the day before or the morning of)*

Have patients sign in.

Hand patients their current printed Medication List. Ask them to review it while they are waiting and discuss any changes or issues with MA & Provider.

## Medical Assistants (MAs)

During triage and intake:
- Discuss the patients' medications with them.
- Include any comments, concerns, issues, or changes related to their medications in your note so the provider will be aware and can review the information prior to going in.

*AFTER* patients have seen the provider and *BEFORE* they leave, make sure they are given a printed copy of their updated Medication List.

## Providers (CRNPs / MD)

*PRIOR* to going in to visit with the patient:
- Review the MA's notes.
- Review the patient's chart and complete any preliminary research pertinent to the patient's reported Medication List and concerns.

*DURING* your visit with the patient:
- Reassure the patient that the goal is to only prescribe medications that are necessary to manage their chronic conditions at the lowest effective dose to prevent further complications. The patient is the MOST important part of this team and approach.
- Discuss the patients' medications with them and provide necessary patient education.
- Reconcile the patient's Medication List in their EMR Chart and let the Front Office/Reception/Clinical Manager know so they can print the patient a copy of their updated Medication List.
- Document in your Progress Notes that time was spent (and how much) for "Medication Reconciliation and Patient Education."
- If applicable, make sure to code for "Medication Reconciliation and Patient Education" (1111F, 99483, 99211, etc.)

*JKH_JSU DNP Project_202*

*Patient (General Use) Information Sheet*



# Medication Review Process

*Beginning Monday, February 6, 2023*

***A consistent medication review process decreases the use of too many medications that may be unnecessary and harmful to patients, especially older adults and those with many health problems.***

A major focus of the Healthy People 2030 goals is medication safety by reducing unnecessary medication use by older adults. A survey in 2015 found that 15.9% of adults 65 and older misused medications, including over-the-counter and prescriptions – both theirs and those belonging to others. Including over-the-counter and herbal/supplements is important when reviewing patients' medication lists. "Polypharmacy" is the use of multiple medications by a patient. It becomes a bigger problem when these medications are not necessary for the patient to use. The exact number of polypharmacy depends on the patient but generally ranges from 5 to 10. About 44% of men and 57% of women 65 and older take five or more medications. Overall, 12% of these people take ten or more medications.

A consistent medication review process is important for patient safety. It improves patient outcomes, especially for older adults and patients with multiple health problems. There is a considerable amount of medical research that supports routine medication review as a way to decrease medication errors and adverse effects from medications. Other benefits of medication review and limiting unnecessary medications include simplifying patients' medication lists, making sure patients have a current and correct list, and preventing medication interactions or unnecessary side effects.

The goal is for our patients to take less than nine (9) necessary medications. However, we understand that patients with chronic illnesses like respiratory problems, type 2 diabetes, and heart disease may take more medications to avoid further problems. Therefore, we are committed to working with patients on individual goals depending on their conditions. We will be educating patients and staff on the dangers of polypharmacy and possible drug-drug interactions, as well as discussing the risks and benefits of medication use. We want to partner with you to improve your quality of life and ability to function, live as independently as possible, and be proactive in avoiding the harm caused by drug effects and unnecessary medications. As a part of this team, we ask that you:

- bring ALL medication and supplement containers with you to your visits;
- review the medication list given to you at the sign-in desk; and
- discuss your medications, concerns, and goals with your provider (MD, NP).

Thank you for your support and for joining our team's efforts to improve our processes to provide you with safe, quality care! Also, please feel free to ask your providers any questions regarding this process – we are open to suggestions.

*Wills Valley Family Medicine / Valley Care DPC*
*Dr. Koe, Virginia, Dana, Misty, and the Staff*
*Jessica Kirkwood-Harp, DNP(c), MSN, CRNP*

## Appendix D

University IRB Approval

INSTITUTIONAL REVIEW BOARD
JACKSONVILLE STATE UNIVERSITY

**Institutional Review Board for the Protection of Human Subjects in Research**
249 Angle Hall
700 Pelham Road North
Jacksonville, AL 36265-1602

November 14, 2022

Jessica Kirkwood-Harp
Jacksonville State University
Jacksonville, AL 36265

Dear Jessica:

Your protocol for the project titled "Establishing a Routine Process of Medication Reconciliation in a Rural Primary Care Clinic to Address Unnecessary Polypharmacy in Patients 65 and Older" protocol number 11142022-04 has been granted exemption by the JSU Institutional Review Board for the Protection of Human Subjects in Research (IRB).

If your research deviates from that listed in the protocol, please notify me immediately. One year from the date of this approval letter, please send me a progress report of your research project.

Best wishes for a successful research project.

Sincerely,

Jennifer Mead
Senior Human Protections Administrator
Institutional Review Board

## Appendix E

Facility Support Letter

**Wills Valley Family Medicine**

52 South Valley Avenue – Suite B

Collinsville, AL 35961

Ph: (256) 524-3090 / Fax: (256) 524-2885

September 29, 2022

To whom it may concern,

This letter confirms my support for Jacksonville State University Graduate Nursing Student and DNP Candidate, Mrs. Jessica Kirkwood-Harp. Mrs. Harp has received our approval to focus on "Establishing a Routine Process of Medication Reconciliation in a Rural Primary Care Clinic to Address Unnecessary Polypharmacy in Patients 65 Years Old and Older" over the next year.

In our clinic here at Wills Valley Family Medicine, we strive hard to keep people off so many medications. So, this project means a lot to us. Many patients come to us on many medications and get very confused about what they should be taking and when.

We are excited to support her as she works toward improving patient care delivery, safety, and outcomes in our facility. Please let me know if I can assist in any way.

Sincerely,

Frances H. Koe

# Appendix F

CITI Training Certificate

## Appendix G

Projected Timeline

*Simplified QIP Timeline*

| Task | *May* | *June* | *July* | *August* | *September* | *October* | *November* |
|---|---|---|---|---|---|---|---|
| | **SUMMER 2022** | | | **FALL 2022** | | | |
| Obtained Preceptor/Site | X | | | | | | |
| Stakeholder Analysis | X | X | | | | | |
| Met with Stakeholder | | X | X | | | | |
| Stakeholder Approved Problem | | X | | | | | |
| Gap/Needs Analysis | | X | | | | | |
| Search of Problem | | | X | | | | |
| Evidence Table | | | X | | | | |
| PICOT Question | | | X | | | | |
| Draft Proposal | | | X | | | | |
| IRB/PERC Approval | | | | | | X | X |
| Theoretical Framework, Design and Methodology, Expanded Evidence Table, and Review of Literature | | | | X | X | X | X |

| Task | *January* | *February* | *March* | *April* | *May* | *June* | *July* | *August* |
|---|---|---|---|---|---|---|---|---|
| | **SPRING 2023** | | | | **SUMMER 2023** | | | |
| Staff Education, Buy-in, Feedback, and Planning | X | | | | | | | |
| Implementation | | X | X | | | | | |
| Analysis and Synthesis of Findings | | | | X | X | | | |
| Disseminate Findings to Focus Clinical Site | | | | | X | | | |
| Present QIP during JSU DNP Dissemination Day | | | | | | | X | |