Standardized Medication Screening to Decrease Fall Rates in Hospitalized Older Adults

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Abstract

Problem & Purpose*:** In fiscal year 2023, a mid-sized Maryland hospital reported 243 falls, with 34.4% causing harm. One medical-surgical unit had 55 falls, highest among the units in the organization, primarily affecting adults aged 65 and older. Internal review revealed inadequate assessment of high fall-risk medications (HFRM's) impacting mobility, strength, and blood pressure, contributing to high fall rates. No standardized HFRM screening process existed. This quality improvement (QI) project aimed to implement a HFRM screening process among older adults on a medical-surgical unit using section K of the Screening Tool for Older Persons' Prescriptions (STOPP) during rounds to mitigate unnecessary polypharmacy and decrease falls. ***Methods: Over 15 weeks, electronic medication records of patients 65 years of age and older on a 26-bed medical-surgical unit were screened daily for HFRM's using the STOPP tool. A pharmacist conducted screenings with nurses, presenting findings at rounds for hospitalists to assess and take appropriate deprescribing actions. Training was provided to all staff prior to implementation. Visual aids, bulletin boards, and pocket reference cards reinforced the process. Weekly chart audits tracked compliance and deprescribing actions. Descriptive statistics were used to evaluate outcomes. ***Results:*** One hundred percent of pharmacists (n=4), 84% of nurses (n=32), and 86% of hospitalists (n=77) were trained on the screening process and tool. Of 311 eligible patients, the median weekly screening compliance was 53%, with a median deprescribing rate of 14.7% for identified HFRM's. Two falls occurred during implementation. ***Conclusions:*** HFRM screening and deprescribing are feasible, effective strategies for fall prevention in hospitalized older adults. Long-term implications for practice include a reduction in adverse drug reactions, falls and fall-related complications, and health care expenditures.

Keywords: high fall risk medications, screening, falls, deprescribe, hospital, pharmacist

Standardized Medication Screening to Decrease Fall Rates in Hospitalized Older Adults

Despite being recognized as a preventable adverse event, falls remain a significant issue for patient safety in hospitals. Each year, around 1 million falls occur in hospitals across the nation, leading to approximately 250,000 injuries and up to 11,000 deaths (LeLaurin & Shorr, 2019). Injuries from falls in hospitals can range from minor bruises to severe fractures and head injuries, which complicate recovery and prolong hospital stays (LeLaurin & Shorr, 2019).

A local community hospital identified falls as a quality improvement (QI) priority after 243 falls occurred during fiscal year 2023 with 34.4% resulting in harm. One medical-surgical unit had 55 falls (4.58 per month) during this time, making it the highest in the organization. While falls are typically caused by multiple factors, a root cause analysis identified that insufficient assessment and review of high fall risk medication's (HFRM's) affecting mobility, blood pressure, and strength contributed to the rise in falls at the hospital (Figure 1). Older adults were disproportionately affected, facing severe repercussions from these incidents, including extended hospital stays, injuries, and diminished independence. Antidepressants, sedatives or hypnotics, and anti-epileptics have shown to cause recurrent falls in this vulnerable population (Ming & Zecevic, 2018). Other medications that may increase fall risk include vasodilators, first generation antihistamines, opioids, and psychotropics that affect the central nervous system (O'Mahony et al., 2023).

The hospital's fall prevention policy advises conducting medication reviews and considering side effects. The existing falls risk assessment flowsheet does not factor in medication usage, and there is no standardized process in place for screening or discussing HFRM's within the organization (Figure 2). Noting this gap, this quality improvement (QI) project aimed to implement a HFRM screening process among older adults on a medical-surgical

unit by utilizing section K of the Screening Tool for Older Person's Prescriptions (STOPP) tool during rounds to mitigate unnecessary polypharmacy and decrease the incidence of falls.

Specific Aims and Available Knowledge

An extensive literature review and synthesis were conducted to identify the best evidence-based practice in the context of fall prevention and medication review (Table 1 and 2). The evidence search and retrieval process is displayed in Figure 3. Alshammari et al. (2021) and Earl et al. (2020) demonstrated that screening patient medications using the STOPP in combination with deprescribing potentially inappropriate medications (PIM's) identified from this tool are efficient in reducing polypharmacy, adverse drug reactions, and falls. Marvin et al. (2017) found that 65% of older adults were found to be on one or more fall risk medications during a medication screening. Several studies support the notion that extensive medication review should be carried out in all patients with the goal of deprescribing or adjusting dosages to mitigate risk of harm to patients and reduce potential for falls and injury (Alshammari et al., 2022; Damoiseaux-Volman et al., 2022; Earl et al., 2020; Frankenthal et al., 2014; Hill-Taylor et al., 2016; Marvin et al., 2017; Ming et al., 2021).

Fourteen of the fifteen clinical practice guidelines on fall prevention in older adults recommend reviewing medications for fall-risk increasing drugs as a key component of a multifactorial prevention strategy (Montero-Odasso et al., 2021). Overall, the evidence shows that the STOPP tool, particularly section K, is a valid and consistent tool used to identify and discontinue fall-inducing medications safely (Alshammari et al., 2022; Damoiseaux-Volman et al., 2022; Earl et al., 2020; Frankenthal et al., 2014; Hill-Taylor et al., 2016; O'Mahony et al., 2023).

Rationale

The Promoting Action on Research Implementation in Health Services (PARiHS) framework was utilized for this QI initiative (Figure 4) (Kitson et al., 2008). This theoretical framework suggests that successful implementation of evidence-based practices in healthcare settings occurs when there are positive interactions between three key elements: evidence, context, and facilitation. The evidence supports screening for HFRM's by using the STOPP tool as a guide across many healthcare settings and its importance on a fast-paced and pharmacologically intensive unit. The culture of the medical-surgical unit incorporated a respected nursing leader who supported the initiative publicly and encouraged compliance. Medication usage is not included as part of the Morse Falls Risk or ABC's of harm flowsheet that are utilized every shift. There is also not a designated time or place to screen for medications that can induce falls, so this evidence-based intervention implemented during rounds was aimed to target this gap. Facilitation of the intervention was monitored by both the project lead (PL) and clinical site representative (CSR). The initiative was also supported by a designated project champion and education specialist on the unit who helped to overcome challenges and provide continued teaching and reinforcement throughout implementation.

Methods

Context

When planning the QI initiative, many contextual elements of the unit and institution were considered. The assessment of the unit and organization's culture, climate, and available resources were guided by the Alberta Context Tool (Estabrooks et al., 2009). The medical-surgical unit consists of a fast-paced environment with high acuity adult patients with a variety of complex medical and surgical conditions. There is a strong commitment to continuous improvement, with staff regularly participating in competency trainings. The team for this project included the PL, pharmacists, registered nurses, hospitalists, an education specialist, and

nursing manager. Implementing the screening during daily interdisciplinary rounds in the breakroom was a good fit for this unit, as it leverages an existing afternoon meeting point. An interdisciplinary approach aimed to reduce the perception of added workload for nurses, pharmacists, and hospitalists. Access to the electronic health records (EHR) allowed for real-time medication reviews and easy identification of HFRM's. Resources on fall prevention and medication review were readily available, including policies/procedures, guidelines, and training modules. Nursing leadership was committed to this QI effort and provided both guidance and resources necessary for the project's success. Evaluation of team performance was conducted often to achieve positive outcomes on the unit.

Intervention

Section K of the STOPP tool was used as a guide during interdisciplinary rounds to screen for, identify, and deprescribe PIM's that put hospitalized older adults at risk for falling (Alshammari et al., 2021; Earl et al., 2020; Hill-Taylor et al., 2016). The tool (Appendix A) includes 12 different drug classes that predictably increase the risk for falls in older adults (O'Mahoney et al., 2023). The screening was performed Monday through Friday by a pharmacist in collaboration with the primary nurses, who review patient's medication regimens in the EHR for HFRM's. During interdisciplinary rounds, the findings were presented to the hospitalists, who evaluated each patient's overall condition and medication needs. Based on this assessment, they determined appropriate deprescribing actions to enhance patient safety and optimize therapeutic outcomes. On the weekends, the primary nurse and hospitalists facilitated the screening and deprescribing conversation. The primary nurses were responsible for documenting the screening and deprescribing action. If the attending provider was not scheduled for rounds,

the primary nurse communicated the screening findings via the secure messaging application TigerConnect. The desired process map and project timeline are displayed in Figure 5 and 6.

Various implementation strategies and tactics were employed to achieve the desired goals of the initiative. The PL, education specialist, and project champion held one-on-one and group training sessions with staff nurses during morning huddles to explain the new HFRM screening process. The PL also held several group sessions with pharmacists and hospitalists that included a presentation with slides provided for reference. The training sessions took place from the week before implementation and continued through the first two weeks after it began. All staff were provided adequate time to ask questions. Bulletin boards were created to display the progress of the implementation and feature educational handouts provided to staff on the screening process (Appendix B and C). The handouts included staff roles and responsibilities for the screening process, a copy of the STOPP screening tool, and a pocket reference card highlighting examples of HFRM's from the tool along with a process map. The laminated pocket reference card was created in response to feedback to help clarify the process and provide examples of medications within the drug classes of the screening tool (Appendix D). Recognition was awarded to staff members weekly through the unit's group communication chat on TigerConnect for those that continued to complete screenings. Additional incentives provided to the staff included a gift card being awarded to the nurse at the end of implementation who completed the most surveys. The project lead rounded on the unit weekly to help re-educate staff, answer questions, and provide reminders to continue the initiative. Weekly to bi-weekly reminders were communicated to the nurses through TigerConnect with the goal of increasing compliance. Laminated visual cue cards were placed on every computer station as reminders (Appendix E). Weekly emails were sent to

all stakeholders to communicate updates on progress made. Monthly staff meetings were attended to share progress and gather feedback on any challenges encountered.

Measures

Structure, process, and outcome measures were tracked to monitor the initiative's progress. The PL tracked attendance of education sessions via sign-in sheets. Data for the process measure (medication screening) and first outcome measure (deprescribing/adjustment of medications) were collected weekly by the PL through chart audits and Research Electronic Data Capture (REDCap) submission review (Appendix F and G). Data was collected on fall occurrences (second outcome measure) from a secure spreadsheet updated weekly by a performance improvement data engineer and input into the falls REDCap audit tool by the PL (Appendix H). The night shift charge nurse pulled a report within the EHR for the unit every shift to identify eligible patients for the screening based on inclusion criteria which includes all older adults 65 years of age and older. Pulling the report ensured all eligible populations are included. Patients with comfort care or inpatient hospice orders were excluded. Patients with orthopedic or spine surgeons as their attending provider were also excluded. The charge nurse created the assignment sheets, highlighting each of the eligible patients for every nurse and provided an announcement at morning huddle. The nurses scanned the REDCap secure QR codes after rounds to document the screening outcomes (Appendix I). If documentation of screening outcomes was not completed, verbal and written feedback were provided to the nurses. See Table 3 for the complete measurement plan.

Ethical Considerations

Privacy protection measures included using a side-by-side screen method to collect data during chart audits from the EHR in a private waiting area outside of the unit. The screening

occurred inside the unit's passcode protected staff break room where the patient's care team met during rounds. There were no paper-based forms completed. Confidentiality data protection measures included the QI-PL as the only person to enter data into REDCap, a HIPAA compliant, VPN protected application that is made accessible only to the QI-PL and project faculty. No other applications were used for data storage. The QI project was reviewed by the Institutional Review Board (IRB) through the Human Research Protection Office (HRPO) and was classified as non-human subject's research.

Results and Analysis

Quantitative methods and descriptive statistics were employed to analyze and measure the impact of the QI initiative. Data was collected for 15 weeks from September 2nd, 2024 to December 15th, 2024 on screening compliance, deprescribing rate, and fall incidence. For the staff education structure goal, 100% of pharmacists (n=4), 84% of nurses (n=32), and 86% of hospitalists (n=77) were educated on the process change. The nurses that were not educated were PRN staff who were not available or working the first two weeks when the educational sessions were held. Due to the busy and conflicting schedules of the hospitalists, the PL was not able to meet with all staff. The medical director of the hospitalist group was able to provide education to the remaining staff. A total of 311 patients were eligible to screen. Median weekly compliance with the daily HFRM screening process was 53% (Figure 7). The median weekly deprescribing/adjustment of medications rate was 14.7% (Figure 8).

Pre-implementation data recorded 15 falls over 15 weeks. During the implementation period, 2 falls were recorded on the unit—one in week 4 and another in week 6 (Figure 9). The week 4 fall involved a patient who was ineligible for screening due to age. A chart review conducted by the PL indicated that the patient slipped on a wet floor while in the shower.

Although the patient had been prescribed HFRM's, none were administered in the immediate timeframe preceding the fall. In week 6, the fall occurred in an eligible patient who had been on the unit for 2 days but had not yet undergone screening. A chart review revealed that the patient was admitted due to frequent falls associated with orthostatic hypotension and did not have a bed alarm activated. HFRM's were prescribed but not administered prior to the fall. Notably, screening compliance in week 6 was at its lowest (16.4%), coinciding with the unit manager's absence due to vacation.

At the conclusion of the implementation phase, an analysis of run chart data revealed no discernible trends, runs, or shifts. Screening compliance was observed to decline significantly on weekends when interdisciplinary rounds were informal, and a pharmacist was not present on the unit to assist with medication screening. To address the decreased screening compliance, TigerConnect reminders were sent on weekends to prompt primary nurses to complete screenings. Screening compliance decreased when central pool nurses floated to the unit, as they were unfamiliar with the process. In response, the PL re-educated charge nurses to ensure that floating staff received proper instruction. Nurses initially encountered challenges when entering data for multiple patients due to a limited number of QR codes and the requirement to rescan for each entry. Some nurses also lacked internet access needed to utilize the QR codes. To mitigate these issues, the PL placed QR codes at all computer stations used for documentation and provided a secure REDCap link as an alternative for entering screening data. The adjustments made led to improved screening compliance from week 1 to week 2; however, compliance fluctuated thereafter and did not reach the target of 100%. The deprescribing rate also did not meet the target goal. A primary barrier identified was the necessity of certain medications, such as anti-epileptics and vasodilators, where the clinical benefits outweighed the fall risk.

Provider clinical judgement played a critical role in decision-making, often limiting deprescribing efforts. Many HFRM's were prescribed by patients' primary care providers, and hospitalists were frequently hesitant to modify outpatient prescriptions unless there was a clear and immediate adverse effect on inpatient care. The top three medication classes deprescribed and adjusted were anti-hypertensives, opiates, and benzodiazepines. Opiates and benzodiazepines were either discontinued or doses were reduced to safely provide pain relief and help with anxiety. Benzodiazepines that were prescribed for alcohol withdrawal were maintained the same. Pharmacists also identified and reported a medication error and a near miss that originated prior to the patient's admission to the unit. One patient was inappropriately prescribed and administered Xarelto, despite not having taken it for several years. In a separate case, Norvasc and Donepezil were ordered for another patient; however, the patient's son confirmed that these medications had been discontinued. The two medications were identified by the pharmacist on the unit and discontinued before administration. The prescribing error and near miss highlight the critical importance of conducting thorough medication reconciliation and review, beginning in the emergency department, to prevent medication-related errors from occurring and ensure patient safety.

Discussion

The project's screening compliance goal was not fully achieved. One of the key factors contributing to this outcome was the absence of pharmacist support on weekends. Pharmacists served as primary leaders in the initiative, and their presence was instrumental in driving compliance. In their absence, particularly during weekend shifts, screening rates declined noticeably. Weekday compliance showed variability, often decreasing on days when nurses experienced higher nurse-to-patient ratios, limiting their capacity to perform additional tasks.

Feedback from nursing staff indicated that the screening process, which required accessing a QR code and completing documentation outside of the EHR, was perceived as time-consuming—especially when managing multiple patients with HFRM's. Since the screening tool was not integrated into the routine EHR workflow, completing the tool was frequently overlooked. Future initiatives should focus on embedding the screening tool directly into the facilities EHR system to streamline the process, reduce burden on staff, and enhance long-term sustainability of the initiative. Although the deprescribing rate did not meet the target, it showed that medication adjustments were often limited by the clinical necessity of certain medications. The outcome goal of zero falls was not met, but there was a notable decrease in falls—from 15 falls in the 15 weeks prior to implementation to just 2 falls during the 15-week implementation period. Both falls occurred independently of the prescribed HFRM's, underscoring the fact that while the intervention helped mitigate medication-related fall risks, falls are inherently multifactorial and influenced by various contributing factors.

This project increased engagement with interdisciplinary teams, fostering collaboration and improving the understanding of fall risks associated with medications. The nurses and pharmacists were empowered to participate in medication reviews and deprescribing conversations, thereby enhancing the overall safety culture on the unit. Nurses and pharmacists felt comfortable speaking up to hospitalists regarding potentially unsafe medications that were prescribed, even those outside the screening tool. An unexpected but valuable outcome of this initiative emerged centered around preserving mobility and functional status while also preventing delirium during hospitalization.

There is no direct cost associated with implementing HFRM screening using the STOPP tool. While employing a dedicated pharmacist on each unit to support deprescribing

conversations would involve additional staffing expenses, the potential cost savings from preventing falls, falls-related complications, and longer lengths of stay in this vulnerable population could be significant. The findings of this QI initiative are consistent with other evidence-based publications. The literature supports utilizing medication screening and deprescribing HFRM's as a fall prevention strategy to enhance patient safety. The internal validity of the project may have been influenced by its reliance on voluntary nurse compliance, which could have introduced reporting bias. Inconsistencies in data entry—stemming from the use of both QR codes and direct links—raised concerns about measurement precision. To address these limitations, efforts were made to standardize the data collection process, educate staff on the importance of accurate reporting, and implement real-time reminders to reinforce compliance.

Conclusion

This QI initiative highlights the value of implementing standardized HFRM screening and deprescribing as practical and effective fall prevention strategies that can be utilized on medical-surgical units. These interventions are not only feasible but also have the potential to improve patient outcomes by reducing adverse drug events, fall-related injuries, and associated complications. In the long term, they may contribute to significant cost savings by minimizing extended hospital stays, additional treatments, and rehabilitation needs. These findings emphasize the vital role of through medication review in fall prevention and offer meaningful contributions to nursing practice and interdisciplinary care for high-risk populations. Future directions and spread to other units should focus on refining screening protocols, integrating screening into the EHR, and incorporating a decentralized pharmacist to all units. With continued

optimization, the project has the potential for widespread adoption and long-term positive impacts on patient safety and healthcare costs.

References

Alshammari, H., Al-Saeed, E., Ahmed, Z., & Aslanpour, Z. (2021). Reviewing potentially inappropriate medication in hospitalized patients over 65 using explicit criteria: a systematic review. *Drug, Healthcare and Patient Safety, 13,* 182-210

Damoiseaux-Volman, B.A., Raven, K., Sent, D., Medlock, S., Romijn, J., Abu-Hanna, A., & Van der velde, N. (2022). Potentially inappropriate medications and their effect on falls during hospital admission. Age and Ageing, 51(1), 1-8. doi:10.1093/ageing/afa

Earl, T., Katapodis, N., Schneiderman, S., Shoemaker-Hunt, S. (2020). Using deprescribing practices and the screening tool of older persons' potentially inappropriate prescriptions criteria to reduce harm and preventable adverse drug events in older adults. *Journal of Patient Safety, 16*(3), S23-S35. Doi:10.1097/PTS.0000000000000747

Estabrooks, C.A., Squires, J.E., Cummings, G.C., Birdsell, J.M., & Norton, P.G. (2009). Development and assessment of the Alberta context tool. *BMC Health Services Research, 9*, 1-12. doi:10.1186/1472-6963-9-234

Frankenthal, D., Lerman, Y., Kalendaryev, E., & Lerman, Y. (2014). Intervention with the screening tool of older persons potentially inappropriate prescriptions/screening tool to alert doctors to right treatment criteria in elderly residents of a chronic geriatric facility: a randomized control trial. *The Journal of American Geriatric Society,* 62, 1658-1665. Doi: 10.1111/jgs.12993

Hill-Taylor, B., Walsh, K.A., Stewart, S., Hayden, J., Byrne, S., & Sketris, S. (2016). Effectiveness of the STOPP/START (screening tool of older persons' potentially inappropriate prescriptions/screening tool to alert doctors to the right treatment) criteria:

systematic review and meta-analysis of randomized controlled studies. *Journal of Clinical Pharmacy and Therapeutics, 41* (2), 158-169. doi: 10.1111/jcpt.12372

Kitson, A.L., Rycroft-Malone, J., Harvey, G., McCormack, B., Seers, K., & Titchen, A. (2008). Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implementation Science, 3* (1), 1-12. doi: 10.1186/1748-5908-3-1

LeLaurin, J.H., & Shorr, R.I. (2019). Preventing falls in hospitalized patients: state of the science. *Clinics in Geriatric Medicine, 35*(2), 273-283. Doi: 10.1016/j.cger.2019.01.007

Marvin, V., Ward, E., Poots, A.J., Heard, K., Rajagopalan, A., & Jubraj, B. (2017). Deprescribing medicines in the acute setting to reduce the risk of falls. *European Journal of Hospital Pharmacy, 24*(1), 10-15. doi: 10.1136/ejhpharm-2016-001003

Ming, Y., & Zecevic, A. (2018). Medications & polypharmacy influence on recurrent fallers in community: a systematic review. *Canadian Geriatrics Journal, 21*(1), 14-25. doi: 10.5770/cgj.21.268

Ming, Y., Zecevic, A., Hunter, S.W., Miao, W., & Tirona, R.G. (2021). Medication review in preventing older adults fall-related injury: a systematic review and meta-analysis. *Canadian Geriatrics Journal, 24*(3), 237-250. doi: 10.5770/cgj.24.478

Montero-Odasso, M., Kamkar, N., Pieruccini-Faria, F., Osman, A., Sarquis-Adamson, Y., Close, J., . . . & Masud, T. (2021). Evaluation of clinical practice guidelines on fall prevention and management of older adults: a systematic review. *Jama Network Open*, *4*(12), 1-15. doi:10.1001/jamanetworkopen.2021.38911

O'Mahony, D., Cherubini, A., Guiteras, A.R., Denkinger, M., Beuscart, J.B., Onder, G., . . . Curtin, D. (2023). STOPP/START criteria for potentially inappropriate prescribing in

older people: version 3. *European Geriatric Medicine, 14*(4), 625-632. Doi: 10.1007/s41999-023-00777-y.

Table 1

Evidence Review Table

Citation #1: Damoiseaux-Volman, B.A., Raven, K., Sent, D., Medlock, S., Romijn, J., Abu-Hanna, A., & Van der velde, N. (2022). Potentially inappropriate medications and their effect on falls during hospital admission. Age and Ageing, 51(1), 1-8. doi:10.1093/ageing/afa

Level: III

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
To research the effect of potentially inappropriate medications (PIM) on falls in the hospital and to identify whether PIM's on the STOPP criteria compared to STOPP section K and STOPPFall criteria will have a stronger association to inpatient falls.	A retrospective observational matching study	**Population and setting:** EHR dataset of older patients admitted to a 1,002 bed hospital. The data included 16,687 hospital admissions involving 11,289 patients. **Inclusion criteria:** Patients admitted 70 years and older with minimum length of stay of 24 hours over a 4 year span (November 2015-November 2019). **Exclusion criteria:** Patients admitted to non-clinical departments	-Falls were identified using free text. PIM's were identified using the STOPP, section K [drugs that predictably increase the risk of falls in older people] of STOPP, and STOPPFall criteria. First, the researchers matched admissions with PIMS to those without PIMs on confounding factors. Then, they applied multinomial logistic regression analysis and Cox proportional hazards analysis on the matched datasets to identify effects of PIMS on inpatient falls.	**Primary Outcomes:** -Effects of PIM's on falls in the hospital -The association of inpatient falls to the medications listed on the three different tools.	-The strongest association to inpatient falls was identified for the PIM's within the Section K of the STOPP criteria, compared to the general STOPP and STOPPFall criteria. -PIM's were identified for 55.5% of admissions using STOPP, 85.4% using STOPPFall, and 27.3% for section K of STOPP. -Section K of STOPP may support fall prevention in situations with high work-loads and might be more efficient compared to the comprehensive STOPPFall. -There was a significant association ($p < 0.05$) between PIM use and inpatient falls identified.

Citation #2: Ming, Y., Zecevic, A., Hunter, S.W., Miao, W., & Tirona, R.G. (2021). Medication review in preventing older adults fall-related injury: a systematic review and meta analysis. Canadian Geriatrics Journal, 24(3), 237-250. doi: 10.5770/cgj.24.478

Level: I

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
"To summarize the evidence on the effectiveness of medication review, as either a single intervention or a component included in multifactorial interventions, on preventing fall-related injuries in older adults."	Systematic review and Meta Analysis of RCT's	**Databases searched:** The databases PubMed, CINAHL, EMBASE, and Scopus. **Keyword search:** medication review, fall-related injuries, and older adults **Inclusion criteria:** RCT's and cluster RCT's of older adults 65 years and older living in the community, long term care, and hospitals were included in this review. Fourteen RCT's in total were included in this review **Exclusion criteria:** Three studies were excluded due to poor detail description of medication review process **Sample size:** Ranged from 186 to 3,384 participants	-Four studies used medication review as a single intervention. -Ten studies assessed the effect of medication review as part of multi-factorial interventions -In all of the studies, there was either a physician, geriatrician, pharmacist, or nurse reviewing the patient medications. Only physicians could adjust their medication regimen.	**Primary Outcomes:** -Eight studies: fall-related injuries -Two studies: fractures -Two studies: fall-related hospitalizations -Two studies: falls requiring medical treatment, general practitioner consults, or emergency room visits	-Four studies out of fourteen concluded that compared with standard of care, medication review alone can reduce the risk of fall-related injuries among the older adult population living in the community -Five studies showed that thorough medication screening has a positive impact on decreasing fall-related fractures (Risk difference (RD)= -0.2, 95% CI: [-0.04, -0.01], p=.01]. -This study did not find a conclusion on if medication review was effective in reducing fall-related hospital admissions.

Citation #3: Hill-Taylor, B., Walsh, K.A., Stewart, S., Hayden, J., Byrne, S., & Sketris, S. (2016). Effectiveness of the STOPP/START (screening tool of older persons' potentially inappropriate prescriptions/screening tool to alert doctors to the right treatment) crit
Level: I

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
Assess the efficacy of STOPP and START criteria on prescribing quality, and on clinical, humanistic, and economic outcomes in older adults aged 65 years and up.	Systematic review and meta analysis of RCT's	**Databases searched:** MEDLINE, EMBASE, CINAHL, and ISI Web of Science. **Keyword search:** STOPP criteria, START and STOPP, START criteria **Inclusion criteria:** Four RCT's (n=1925 older adults) from four countries (Republic of Ireland, Belgium, Spain, and Israel) were included in the review. All RCT's involving the application of the STOPP and/or START criteria on medication charts of adults 65 years of age or older were eligible. **Exclusion criteria:** 179 were excluded due to ineligible design, not related to STOPP or START criteria, research not published in peer-reviewed journal, duplicates found, ineligible participant age, ongoing research, and not published in English. **Sample size:** Varied from 158 participants at a single site in Belgium to 1,018 participants living in 37 private nursing homes in Spain. The majority of the participants were female.	-In two studies, the STOPP and START criteria were used to review medication profiles of patients on 1) transfer to an acute care hospital setting and 2) upon discharge. The remaining two studies used the criteria to assess the prescribing quality for patients in long term care settings. -Both tools have inter-rater reliability amongst both pharmacists and physicians.	**Primary outcomes:** -Quality of medication prescribing, falls, delirium episodes, hospital length of stay, readmission to the hospital, primary care visits, emergency department visits, quality of life, and mortality.	-The STOPP criteria reduced PIM rates in all four studies, but study heterogeneity (I^2= 86.7%) prevented the calculation of a statistical summary. -One study identified a trend to lower primary care visits in the intervention group. -Another study the incidence of falls, delirium episodes, hospital length of stay, and visits to the emergency room all increased in the control group, whereas in the intervention group is showed either a decrease or no significant change -Two studies reported cost efficiencies in medication choices within the intervention group compared to the control group. -The studies did not demonstrate evidence of improvements in mortality or quality of life. -All interventions produced improvements in medication prescribing appropriateness

Citation #4: Alshammari, H., Al-Saeed, E., Ahmed, Z., & Aslanpour, Z. (2021). Reviewing potentially inappropriate medication in hospitalized patients over 65 using explicit criteria: a systematic review. Drug, Healthcare and Patient Safety, 13, 182-210. Doi: 10.2147/
Level: III

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
Explore the PIM review process for different screening tools used, health care providers involved, and stage of hospitalization and resources utilized during it. The review focused on hospitalized adults 65 years of age or older whose medications were reviewed using explicit tools.	Systematic review of quantitative studies (RCT's, nonrandomized RCT's, pilot study, pre/post implementation, and observational)	**Databases searched:** PubMed, OVID, CINAHL, PsycINFO, Scopus, Web of Science, Open Grey **Keyword search:** multiple keywords were used in various databases; see article for reference **Inclusion criteria:** Studies either qualitative or quantitative, patients 65 years of age and older, study should use an explicit tool to review PIM's, and conducted in a hospital setting **Exclusion criteria:** Studies conducted in nursing homes, emergency rooms, and primary care offices; studies focused on terminal illness or palliative care patients; non-English studies **Eligible articles:** There were 27 quantitative studies included in this systematic review. **Sample size:** 15,500 patients	-A variety of explicit tools were used to perform a review of PIM's; mostly noted to be various versions of the STOPP/START criteria and the Beers criteria. Other tools used less frequently include: PRISCUS, RASP, NORGEP, and GheOP3S. -Physicians, pharmacists, geriatricians, nurses, physical therapists, occupational therapists, speech therapists, and psychologist dieticians were involved with implementation of intervention. -Ten studies applied tools on admission, nine during the hospital stay, several did not report the stage of hospitalization in which the providers used the tools -After PIM's were identified, recommendations were communicated verbally, in written form, or through a computerized alert system to the attending providers.	**Primary outcomes:** -PIM reduction **Secondary outcomes:** -PIM reduction and activities of daily living (ADL's) -PIM reduction and falls -Impact on hospital stay, in-hospital mortality, emergency room visits, and readmissions.	-The reduction in PIM ranged from 3.5% up to 87%. -Three articles measured the association between PIM reduction and ADL's. Two of the three found a statistically significant relationship between a decrease in inappropriate medications prescribed and an improvement in ADL's. -Three articles also documented the effects of reducing PIM on falls. They were lower in all three intervention groups, however none of these reported a statistical significance. -There was no statistical significance found in the intervention groups on PIM's impact on hospital stay, in hospital mortality, emergency room visits, or readmissions. -Medication screening was led by geriatricians, nurses, physical therapists, pharmacists, and other advanced practiced providers

Citation #5: Marvin, V., Ward, E., Poots, A.J., Heard, K., Rajagopalan, A., & Jubraj, B. (2017). Deprescribing medicines in the acute setting to reduce the risk of falls. European Journal of Hospital Pharmacy, 24(1), 10-15. doi: 10.1136/ejhpharm-2016-001003

Level: III

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
"Identify patients affected by falls and find whether medication review in the acute setting led to deprescribing of falls risk medicines."	Cohort study	**Setting:** Chelsea and Westminster Hospital in London **Inclusion criteria:** Patients admitted for falls during the two month study period aged 70 years or older **Exclusion criteria:** Patients that did not meet the age range or have a documented fall as admission reason **Sample size:** 126 out of 1,020 patients admitted over the study period met the inclusion criteria. 26 of those were lost to follow up, so the remaining 100 were included in the analysis.	-Admissions coding data, inpatient charts, pharmacy notes, and emergency room discharge summaries were reviewed to identify any falls-risk drugs ordered for patients and if a medication review took place and whether changes were made because of the review. -Pharmacists played the role in performing the comprehensive medication review -Data was collected by research assistant and pharmacist on: -Reliable medication reconciliation upon admission -Medication review documentation completed -Pharmacist role in medication review or changes made -Any changes to doses or formulations made -New medications prescribed and why they were indicated -Meds deprescribed or held, and whether they could contribute to risk of falls.	**Primary Outcomes:** -Reduction and deprescription of fall risk medications -Medication review -Polypharmacy occurrence (the amount of patients that were prescribed 6 or more medications)	-Medication review led by a pharmacist revealed a significant decrease in the number of high fall risk drugs per patient after being discontinued for being inappropriately prescribed (p=0.002) -Polypharmacy was found in 62% of patients, and of those patients, 92% of them were found to be taking at least one medication identified as potentially inappropriate. -65% of patients were found to be on one or more falls-risk medications. -Medication review occurred in 86% of patients and 8.5% of those were deprescribed

Citation #6: Earl, T., Katapodis, N., Schneiderman, S., Shoemaker-Hunt, S. (2020). Using deprescribing practices and the screening tool of older persons' potentially inappropriate prescriptions criteria to reduce harm and preventable adverse drug events in older adult
Level: III

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
Examine deprescribing as an approach to reduce polypharmacy and its adverse side effects and the use of the STOPP criteria to reduce PIM's.	Systematic review of various studies conducted between 2008 and 2018. Various studies included RCT's, feasibility, prospective pilot, cluster RCT, and pragmatic cluster RCT.	**Databases searched:** CINAHL and MEDLINE for peer-reviewed literature published from 2008 to 2018. **Keyword search:** multiple keywords were used in various databases; see article for reference **Inclusion criteria:** studies published in English, focused specifically on deprescribing, polypharmacy, use of STOPP criteria, and focusing on older adults 65 years and up. The studies also had to examine the effectiveness of deprescribing and the STOPP criteria on PIMs and preventable adverse drug reactions. **Exclusion criteria:** Study out of scope, not an interventional study, focus on children or pediatric care, and outcomes not reported **Eligible articles**: 27 articles; 26 studies and 1 systematic review met inclusion criteria and either evaluated deprescribing interventions (14 studies) or use of STOPP criteria to reduce PIM's (12 studies) **Sample size:** A range from 40-490 participants	-The studies evaluated a variety of interventions including protocols, patient education, clinical decision support tools, and medication reviews. The deprescribing interventions were implemented by pharmacists as a consultant or in collaboration with a provider or conducted by a provider alone. The use of the STOPP tool was evaluated during this review to assess for PIM's ordered for older adults.	-The outcomes varied amongst the studies, but both clinical and process outcomes were measured. **Clinical outcomes:** -Number of falls, frailty score, ER visits, hospitalizations, number of adverse medication reactions, and mortality. **Process outcomes:** -Number of medications prescribed or polypharmacy	-Two studies showed that discontinuing multiple medications simultaneously was significantly associated with a reduction in number of falls reported and frailty scores for older adults. The number of drug adverse reactions was reduced after 6 months by 4.24 ($P<0.05$). -Provider-led medication review led to a decrease of total medications from 16.64 to 15.53 ($P<0.001$) and a reduction of high-risk medications from 5.33 to 4.56 ($P<0.001$). -One study implementing a medication review panel found no significant difference in mortality ($p=0.226$) or frequency of hospital transfers ($p=0.213$). -Educational interventions using and 8-page booklet led to a 27% deprescribing of benzodiazepines among older adults 65 years of age and older. -The STOPP criteria were used in many interventions, and no matter how or who used the criteria, resulted in significant reduction in PIM's.

Citation #7**:** Frankenthal, D., Lerman, Y., Kalendaryev, E., & Lerman, Y. (2014). Intervention with the screening tool of older persons potentially inappropriate prescriptions/screening tool to alert doctors to right treatment criteria in elderly residents of a chronic
Level: I

Purpose or Hypothesis	**Type of Evidence and Research Design**	**Sample (population, size, setting)**	**Intervention Procedures**	**Primary Outcome/Measures**	**Results Conclusions**
"Evaluate the effect of screening medications according to STOPP/ START criteria on the number of hospitalizations and falls, functioning, quality of life, and medication costs of residents in a geriatric facility."	Parallel-group randomized trial.	**Setting:** Geriatric facility-Chronic care patients **Inclusion criteria**: Residents 65 years of age and older with at least one medication prescribed daily **Exclusion criteria:** Terminally ill residents and those staying at the facility less than 3 months **Sample size:** 359 residents were randomized into the control or intervention group **Control group**: Started with 176 residents; 17 died and 13 left the facility during the trial period, with 146 remaining to be analyzed **Intervention group**: Started with 183 residents; 15 died and 8 left the facility during the trial period, with 160 remaining to be analyzed. Both control and intervention groups were homogeneous. **Power analysis:** 134 residents were required per group with a 5% significance level and 90% power.	**Intervention**: Medication review by the study pharmacist for all residents at start of study, at 6 months, and then again at 12 months. The STOPP/START criteria were applied to identify PIM's and potential prescribing omissions (PPO's). **Control:** Routine medication reconciliations per facility policy **Randomization:** A doctor who was not part. Of the study randomized participants. Fixed stratification randomization was conducted according to three types of residents: ADL-dependent, ADL-independent, and primarily cognitively impaired.	**Primary outcomes:** -Number of hospitalizations and falls -Functional Independence Measure (FIM) -Quality of life -Number of medications and cost	-There was a significant reduction in PIM's and PPO's in the intervention group (P<.001) but not the control group (P=0.10) at the 6 month and 12 month follow ups. -Significant reduction in the average number of medications in the intervention group throughout the follow up period (P<.001) and an increase was seen in the control group. -Falls dropped significantly during the follow up period in the intervention group (P=.006). -There was no significant difference seen between the intervention and control group with the number of hospitalizations, FIM score over time, and quality of life. -The application of the STOPP/START criteria reduced the number of prescribed medications and falls while also lowering medication costs in a geriatric facility.

Citation #8: Montero-Odasso, M.,Kamkar, N., Pieruccini-Faria, F., Osman, A., Sarquis-Adamson, Y., Close, J., Hogan, D.B., Hunter, S.W., . . . Masud, T. (2021). Evaluation of clinical practice guidelines on fall prevention and management for older adults: a systematic
Level: I

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
To perform a systematic review of clinical practice guidelines for falls prevention and management for adults 60 years or older in all settings (eg, community, acute care, and nursing homes)	Systematic review and meta-analysis	**Databases searched:** MEDLINE, PubMed, PsycINFO, Embase, CINAHL, the Cochrane Library, PEDro, and Epistemonikos. **Keyword search:** falls, clinical practice guidelines, management and prevention, older adults **Inclusion criteria:** outcome of guidelines: fall reduction, prevention and management; study type: clinical practice guidelines for preventing or managing falls; target population of guidelines: older adults **Exclusion criteria:** articles that did not meet inclusion criteria were excluded **Eligible articles:** 15 high quality clinical practice guidelines were eligible of 159 records fully reviewed and assessed.	-Three independent reviewers examined full text guidelines to see if they followed evidence and consensus-based processes and assessed guideline quality using the Appraisal of Guidelines for Research & Evaluation II (AGREE-II) tool. Each reviewer was also blinded. Agreement for guidelines regarding specific recommendations was assessed using the Fleiss K statistic.	-Quality of evidence-based/clinical practice guidelines -Evaluate agreement in recommendations of guidelines	-14 out of 15 guidelines strongly recommended medication review for HFRM's, environmental modification, and use of multifactorial prevention interventions in all settings -13 recommend vision assessments, referrals to physiotherapist for balance and gait training -12 guidelines recommended footwear evaluation -Recommendations to evaluate and manage risks related to HFRM's varied from deprescribing of psychotropic and cardiovascular medications to performing a comprehensive medication review, although resources and tools for providers to deprescribe were lacking

Table 2

Evidence Synthesis Table

Project Title: Standardized Medication Screening to Decrease Fall Rates in Hospitalized Older Adults			
JHNEBP Model Level	**Total Number of Sources**	**Author and Quality Rating of each study**	**Synthesis of Findings**
Level 1 Experimental study · Randomized Controlled Trial (RCT) · Systematic review of RCTs with or without meta-analysis	3	Frankenthal et al. - A Hill-Taylor et al. - B Ming et al. - A	All three studies found that medication review and deprescribing PIM's can reduce the incidence of falls which ultimately improves patient safety. Frankenthal et al (2014) and Hill-Taylor et al. (2016) found that performing a medication review with the utilization of STOPP criteria can efficiently decrease PIM use.
Level II Quasi-experimental studies · Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis			
Level III Non-experimental study · Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis · Qualitative study or systematic review of qualitative studies with or without meta-synthesis	4	Alshammari et al. - B Damoiseaux-Volman et al. – B Earl et al. - B Marvin et al. - A	Alshammari et al. (2021) and Earl et al. (2020) demonstrated that screening patient medications using the STOPP criteria and deprescribing PIM's are effective in reducing polypharmacy and adverse drug reactions. Marvin et al. (2017) explored the prevalence of polypharmacy amongst older adults. Both Earl et al. (2020) and Marvin et al. (2017) showed how successful provider-led medication review is in reducing high-fall risk medications by deprescription.
Level IV Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence			
Level V Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports · Opinion of nationally recognized expert(s) based on experiential evidence			

Overall Quality Rating w/rational and Recommendation: The overall quality rating is "B"; finding good and consistent evidence that supports implementing the STOPP criteria, particularly section K, to screen for and deprescribe potentially inappropriate medications that pose a high risk for falls.

Table 3

Measurement Plan for STOPP Falls Initiative

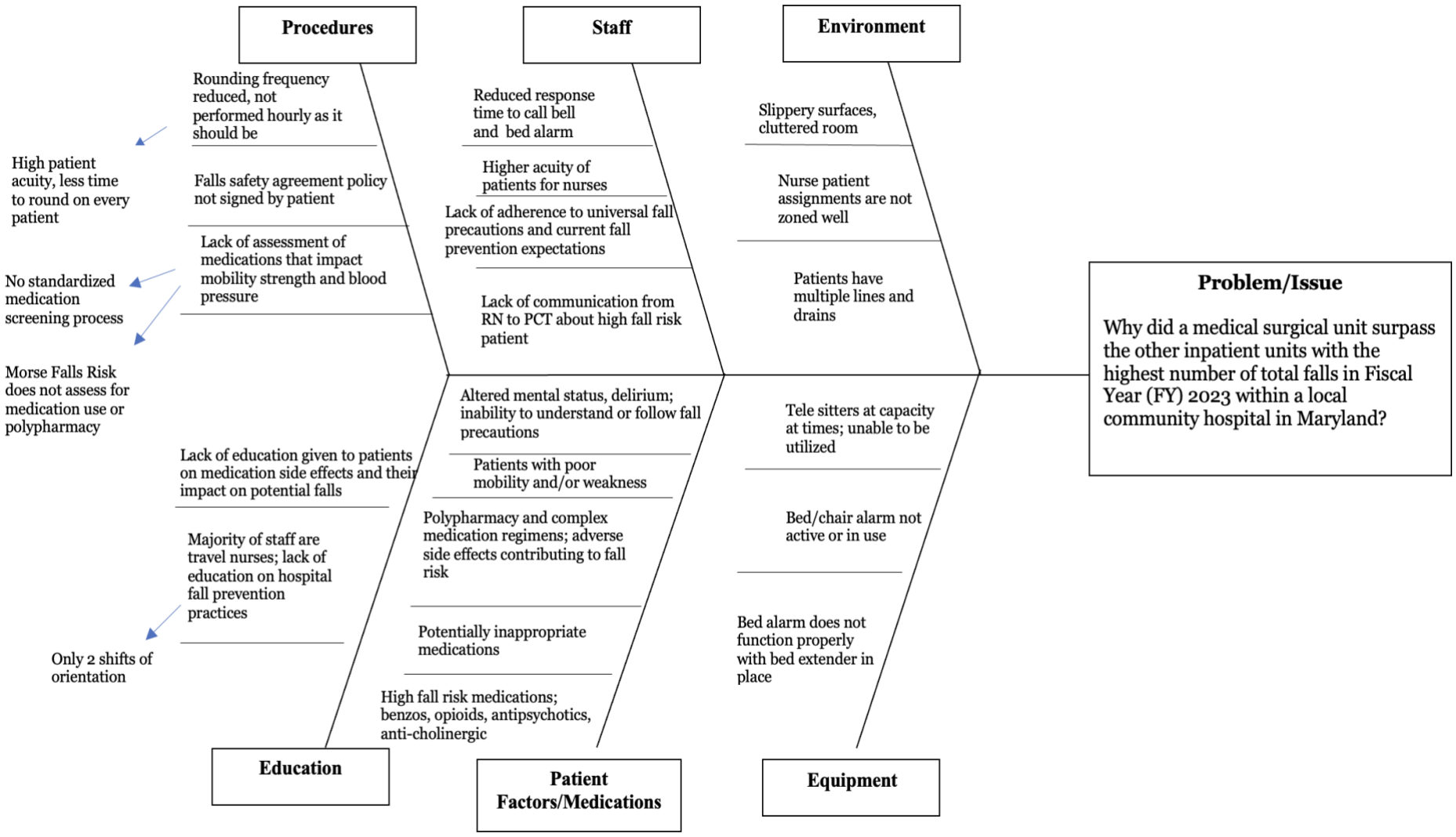
Inclusion criteria for medication screening with the STOPP tool includes all older adult patients 65 years of age or older under the care of the hospitalist team. **Exclusion criteria** include patients with comfort care/palliative care orders.

The charge nurses will write down eligible patients on morning huddle sheet and highlight them on nursing assignment sheets after generating report from EHR. The night shift charge nurse will give report to the day shift charge nurse on patients that are eligible for screening for the shift. Night shift charge nurse will also announce what patients are eligible for screening at the morning huddle so that the primary nurses will be aware of what patients need screened for the shift.

Project Structure, Process, Outcome Goals	Measurement Procedures (who will collect data, when, how, from where)
By September 2nd, 2024, 100% of staff participating in the QI initiative will be educated on new medication screening intervention by PL.	PL will bring sign in sheets to every educational session for staff to sign. The education sessions will occur in person on the unit in the break room. Additional one on one meetings will be held to educate providers and pharmacists. Upon completion of educational sessions, the number of staff that signed the sheets compared to the number of staff employed on the unit will be measured to get the total percentage of staff educated. PL will collect this data from the sign in sheets to determine who attended the education session. This will occur at the beginning of the implementation period.
By December 15th, 2024, 100% of eligible patient's medication records on a medical surgical unit will be screened for HFRM's.	PL will perform daily chart audits of the EHR of all patients on the unit to verify who is eligible for screening during the implementation period. PL will collect the age of the patient and mark 'yes/no' if they were on comfort/palliative care. The PL will look at the data collection survey results submitted by the nurses to compare them to the chart audits to see if those that were deemed eligible were in fact screened for HFRM's.
By December 15th, 2024, 100% of screenings that identified HFRM's will lead to deprescribing or adjustment of medication.	Along with performing the daily chart audits for eligible patients to be screened, PL will complete daily audits of the QR code surveys that were submitted to track the number of screenings that led to deprescribing/adjustments of medications. PL will perform these audits by utilizing REDCap system where data will be entered. The QR code will be created and displayed along the unit for which nurses can scan to pull up survey questions to fill in answers and submit or input via link provided. This will occur for the entire duration of the implementation period.
The fall incidence on the unit will be tracked throughout the duration of the project implementation.	Falls are reported into a secure database by the nurse of the patient that fell. Every week, a performance improvement data engineer collects the data from the organization's database and enters it into a secure spreadsheet that is updated weekly for the PL to access and input into REDCap. The PL then performs a chart audit to review the falls dot-phrase note that is generated by the primary nurse when a patient falls. This note has auto-generated sections to fill in regarding the timing and circumstances surrounding the fall. Fall risk numbers are generated in the EHR status board daily to remind staff of patient's fall risk score throughout the shift.

Figure 1

Fishbone Analysis of Falls on a Medical-Surgical Unit



Note. Blue arrows linked to sub-causes

Figure 2

Current Falls Prevention Process on Medical Surgical Unit

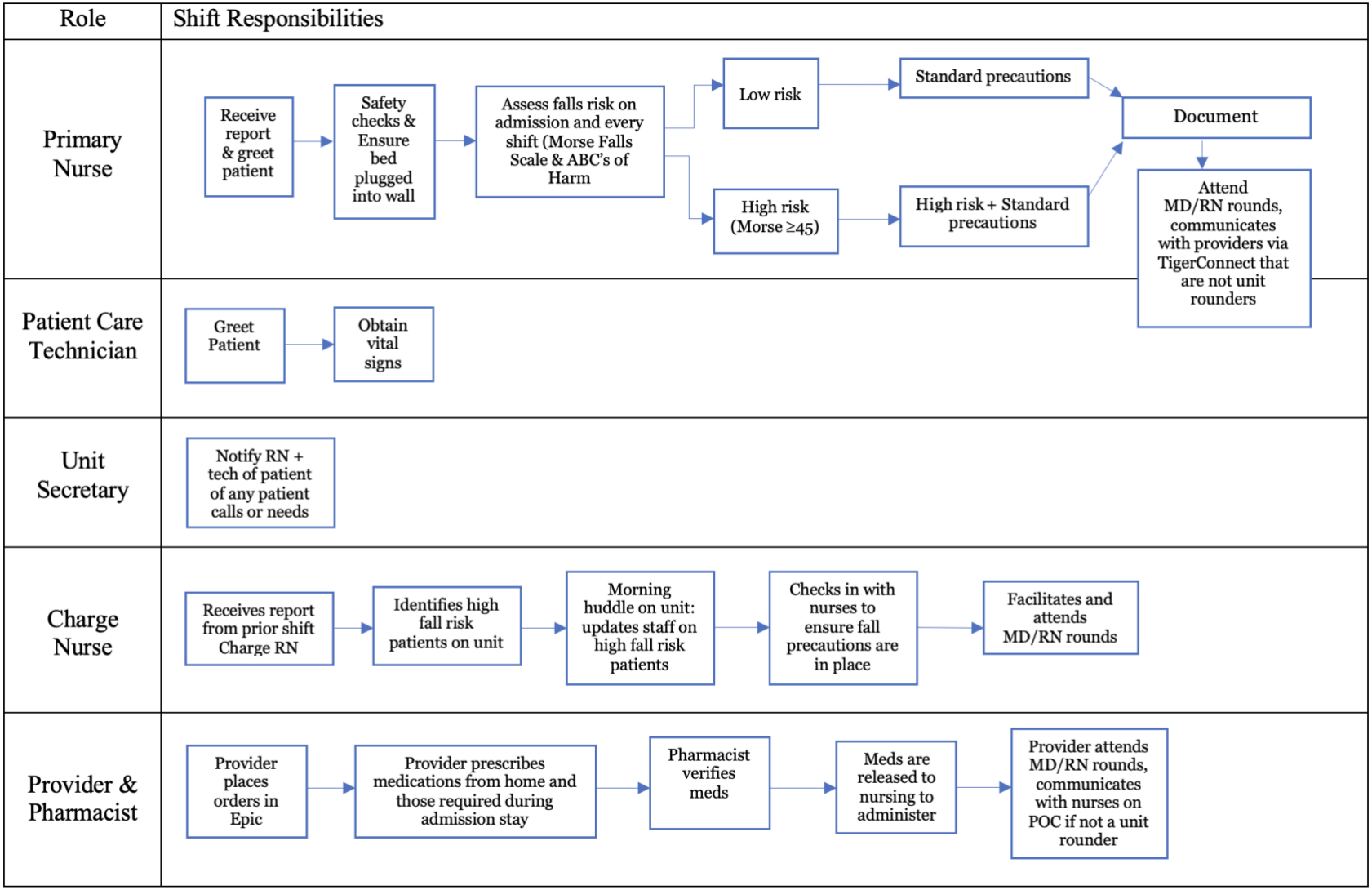


Figure 3
PRISMA Evidence Selection Flow

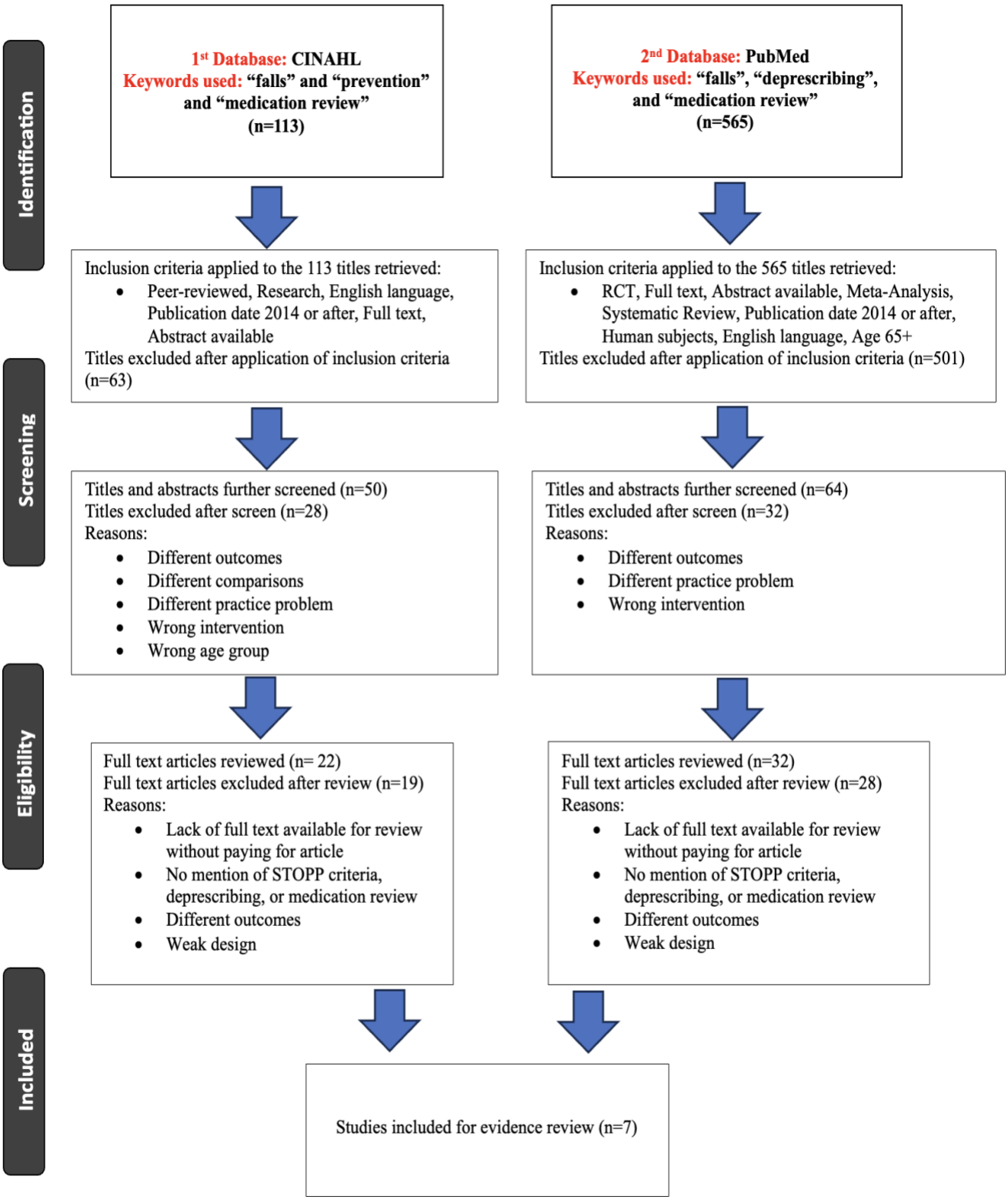
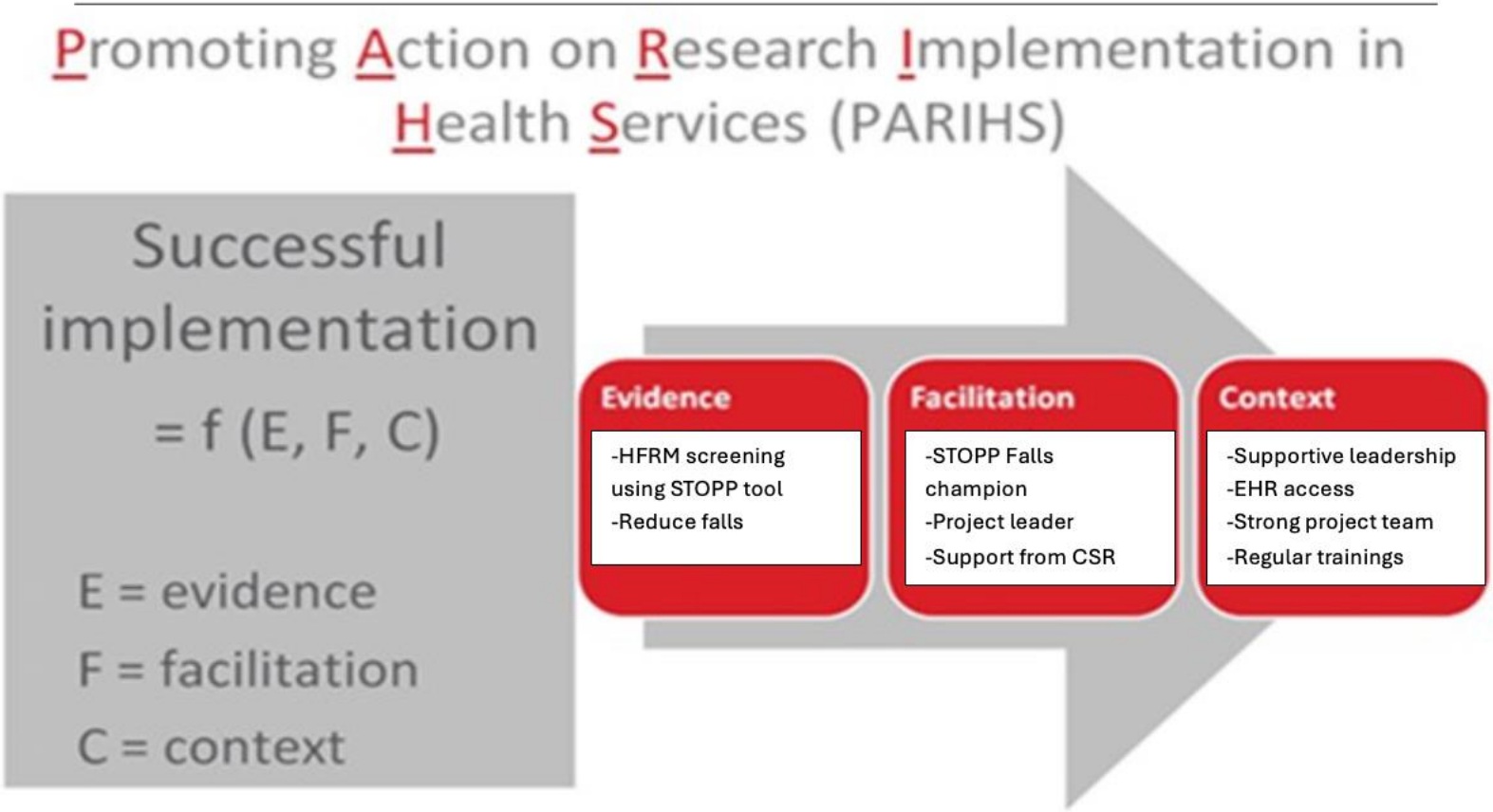


Figure 4
Theoretical Framework to Support Quality Improvement Initiative



Note. Adapted from Kitson et al., 2008.

Figure 5

Desired Fall Prevention Process on Medical Surgical Unit

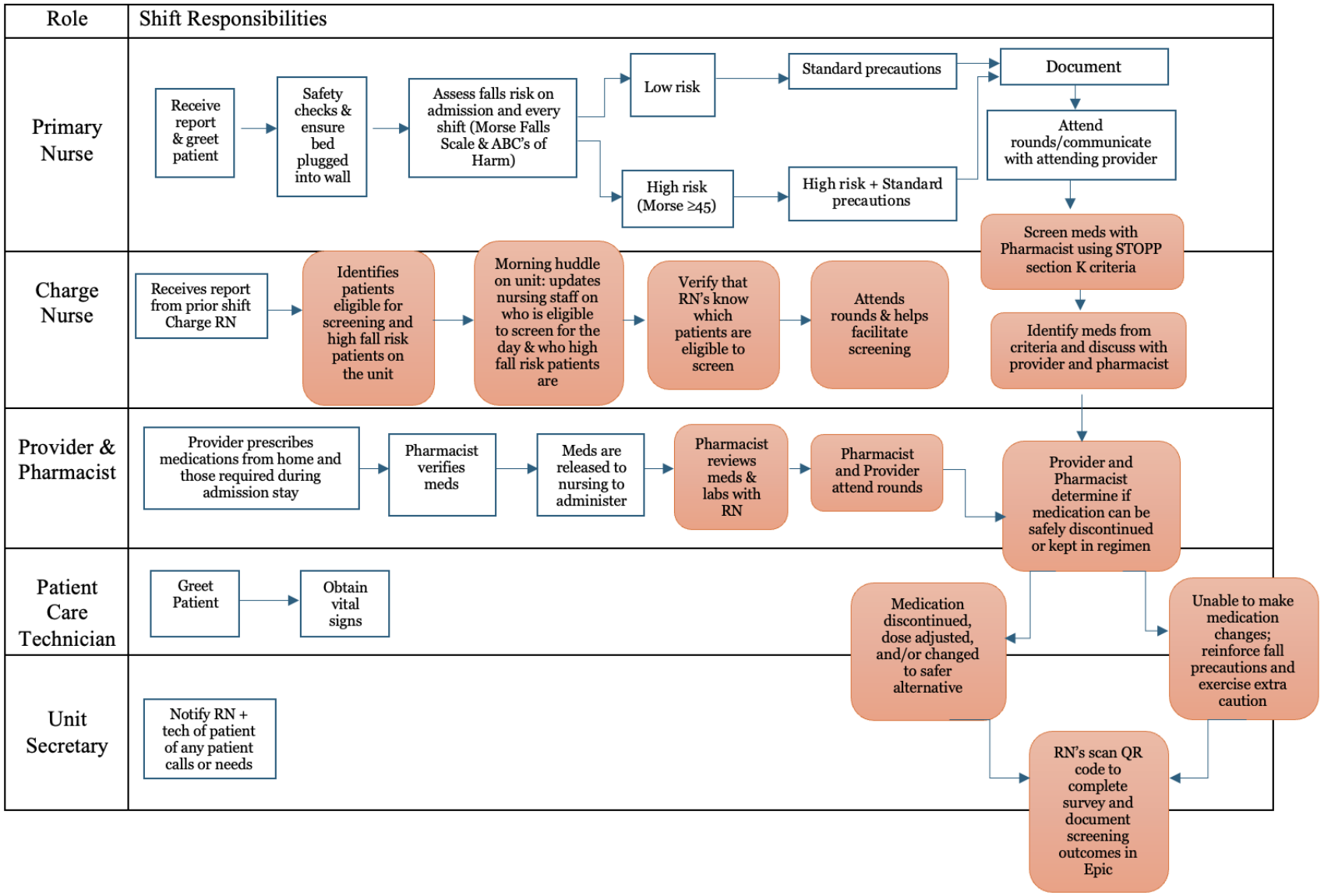


Figure 6

GANTT Chart: DNP Project Timeline

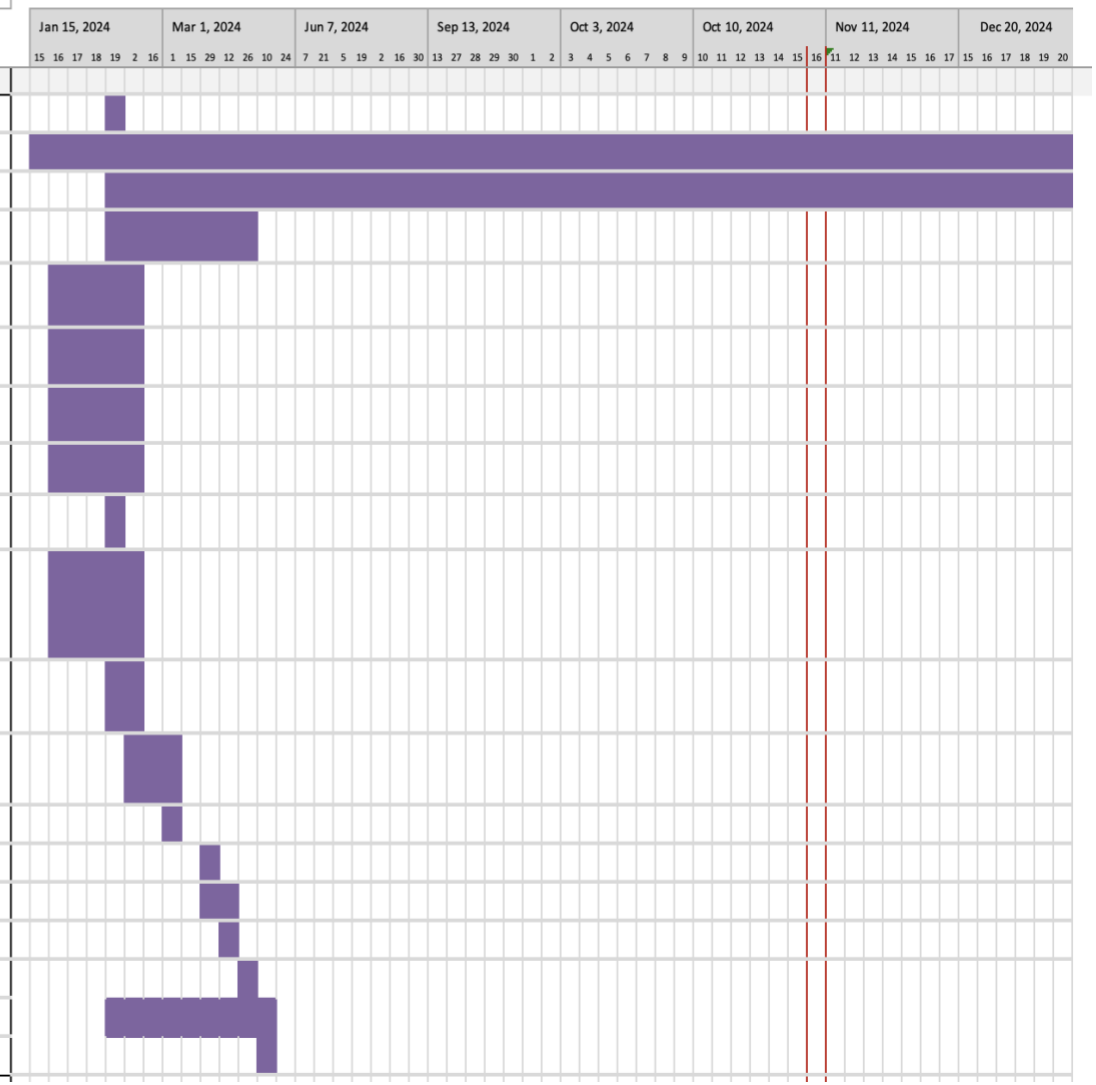
DNP Project Title: Standardized Medication Screening to Decrease Fall Rates in Hospitalized Older Adults

Student: Lauren Spalt

Project Start: Tue, 1/16/2024

Display Week: 1-Jan

Project Identification (NDNP810)	Responsible	START	END
Start of Spring Term		1/22/24	1/22/24
CITI (enter renewal date as end)	Project Lead	8/30/23	8/30/26
HIPAA (enter renewal date as end)	Project Lead	1/22/24	5/15/25
Gain access to REDcap software to create project shell, data collection, and auditing tools	Project Lead	1/24/24	5/6/24
Identify stakeholders/team: gain support from management, falls champions, CSR, charge RN's, senior clinical nurses, and nursing team members on the unit	Project Lead	1/16/24	2/12/24
Identify roles/responsibilities of team members including charge nurses, staff nurses, IT, falls champions, and unit management	Project Lead	1/16/24	2/12/24
Identify practice problem of increased falls and root causes of frequent falls including no formal medication screening process on a med-surg unit	Project Lead	1/16/24	2/12/24
Context Assessment: assess the unit and organization's culture, context, and vision and how it applies to the project	Project Lead	1/16/24	2/12/24
MILESTONE: Submit RCA Fishbone Assessment	Project Lead	1/29/24	1/29/24
Identify scope/goals of project, process improvement/practice change, and scope of team members im project planning and implementation including fall champions and charge nurses to help with initial education and continuined re-education throughout the implementation period	Project Lead	1/16/24	2/12/24
Synthesize Evidence by creating an evidence review table and synthesis table to support implementation of medication screening utilizing STOPP criteria during rounds	Project Lead	1/29/24	2/12/24
Development of project plans to include project structure, process, and outcome goals, implementation techniques, auditing and data collection tools, and measurement plans	Project Lead	2/13/24	3/11/24
MILESTONE: Submit Project Charter	Project Lead	3/11/24	3/11/24
MILESTONE: Submit project proposal	Project Lead	4/1/24	4/1/24
Revise and submit reviewed project proposal for second reviewer	Project Lead	4/2/24	4/15/24
Post Site IRB Inquiry to discussion board	Project Lead	4/22/24	4/22/24
MILESTONE: Submit Final Project Proposal	Project Lead	5/6/24	5/6/24
90 hours of practicum completed		1/22/24	5/10/24
End of Spring Term		5/10/24	5/10/24



Project Development (NDNP811)			
Start of Summer Term		6/3/24	6/3/24
Develop implemenation plans		6/3/24	7/14/24
Develop teaching plan		6/3/24	7/14/24
MILESTONE: Site Presentation and Approval		7/16/24	7/16/24
MILESTONE: IRB Determination		7/16/24	7/16/24
End of Summer Term		7/26/24	7/26/24
Project Implementation (NDNP812)			
Start of Fall Term		8/26/24	8/26/24
MILESTONE: Project go-live (implement)		9/2/24	9/2/24
Educaton/Training		8/26/24	9/9/24
Monitor tactics and progress		9/2/24	12/8/24
Communicate with stakeholders		9/2/24	12/8/24
Data Collection		9/2/24	12/8/24
Dissemination Plan		12/20/24	12/20/24
MILESTONE: Manuscript		11/11/24	11/11/24
End of Fall Term		12/20/24	12/20/24
Project Evaluation and Dissemination (NDNP813)			
Start of Spring Term		1/27/25	1/27/25
Analyze, synthesize & evaluate results		1/28/25	1/28/25
Sustainability Plan		1/27/25	1/27/25
MILESTONE: Develop Poster		3/3/25	3/24/25
MILESTONE: Site Presentation		4/23/25	4/23/25
MILESTONE: Extremal Dissemination		4/16/25	4/17/25
MILESTONE: Final Manuscript		4/7/25	4/7/25
MILESTONE: UMSON Poster Day		5/5/25	5/5/25
Project Closure w/site		4/23/25	4/23/25
End of Spring Term		5/21/25	5/21/25

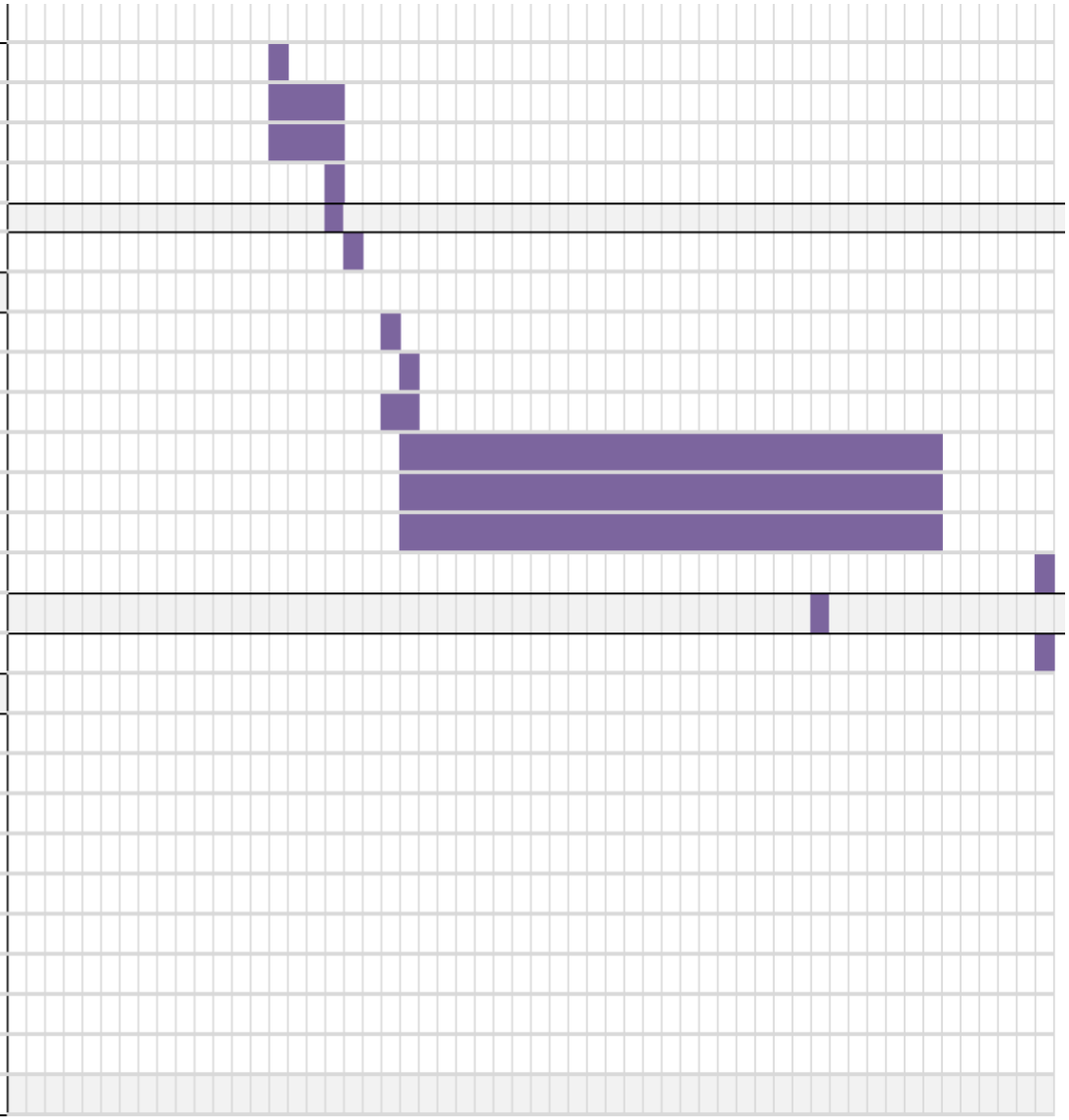


Figure 7
Medication Screening Compliance Run Chart

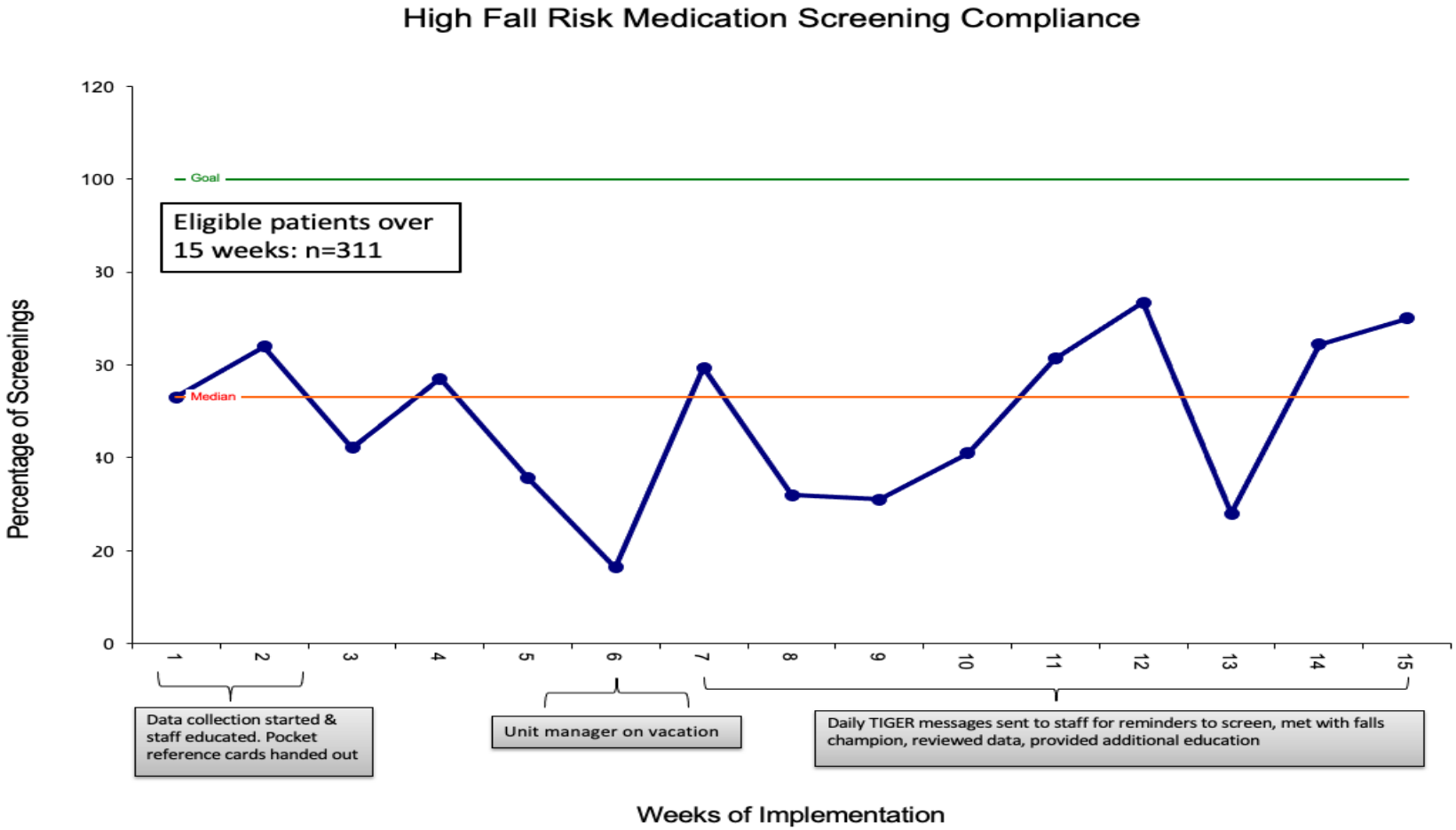


Figure 8

Screenings Resulting in Deprescribing or Adjustment of Medications Run Chart

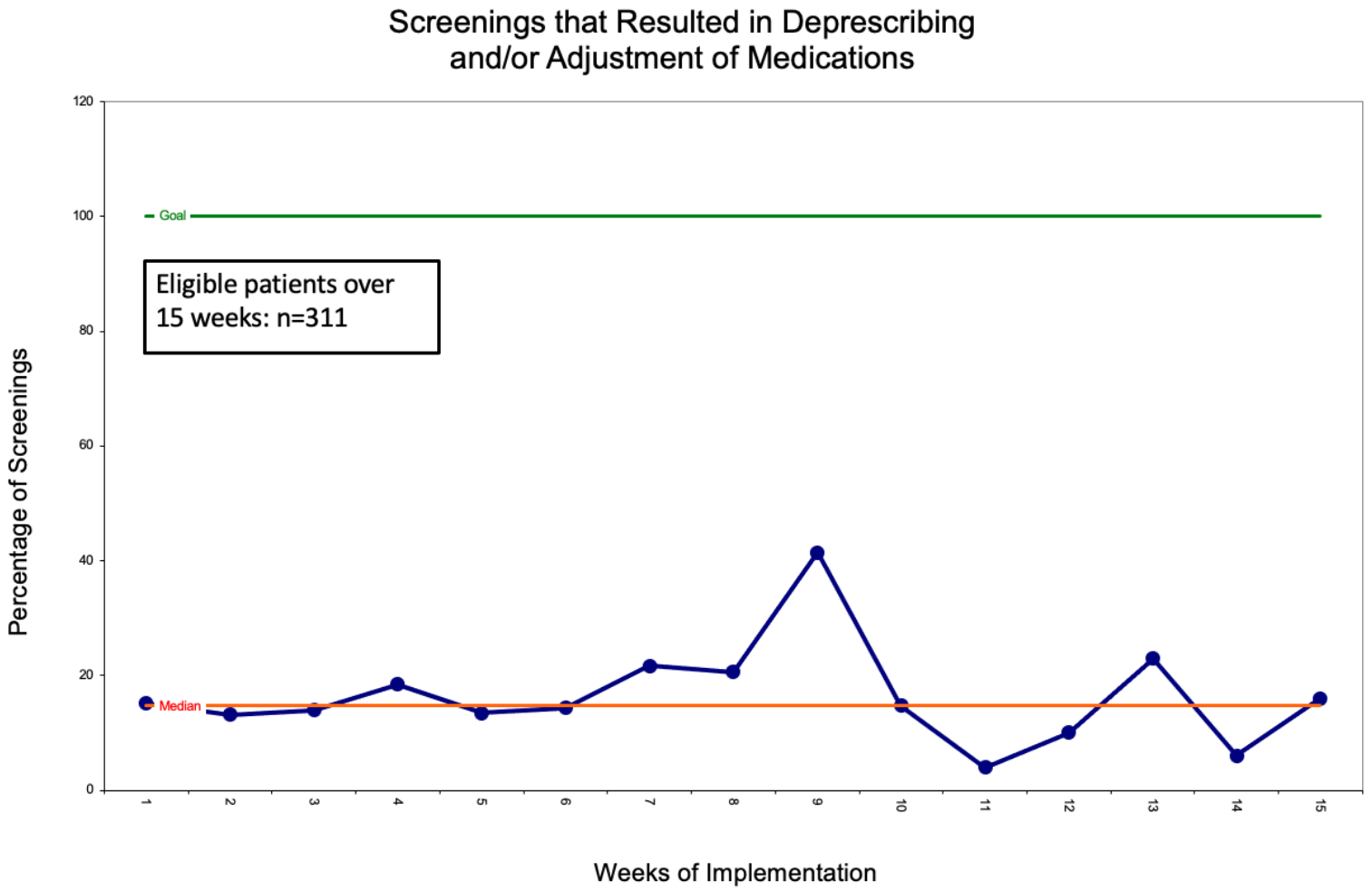
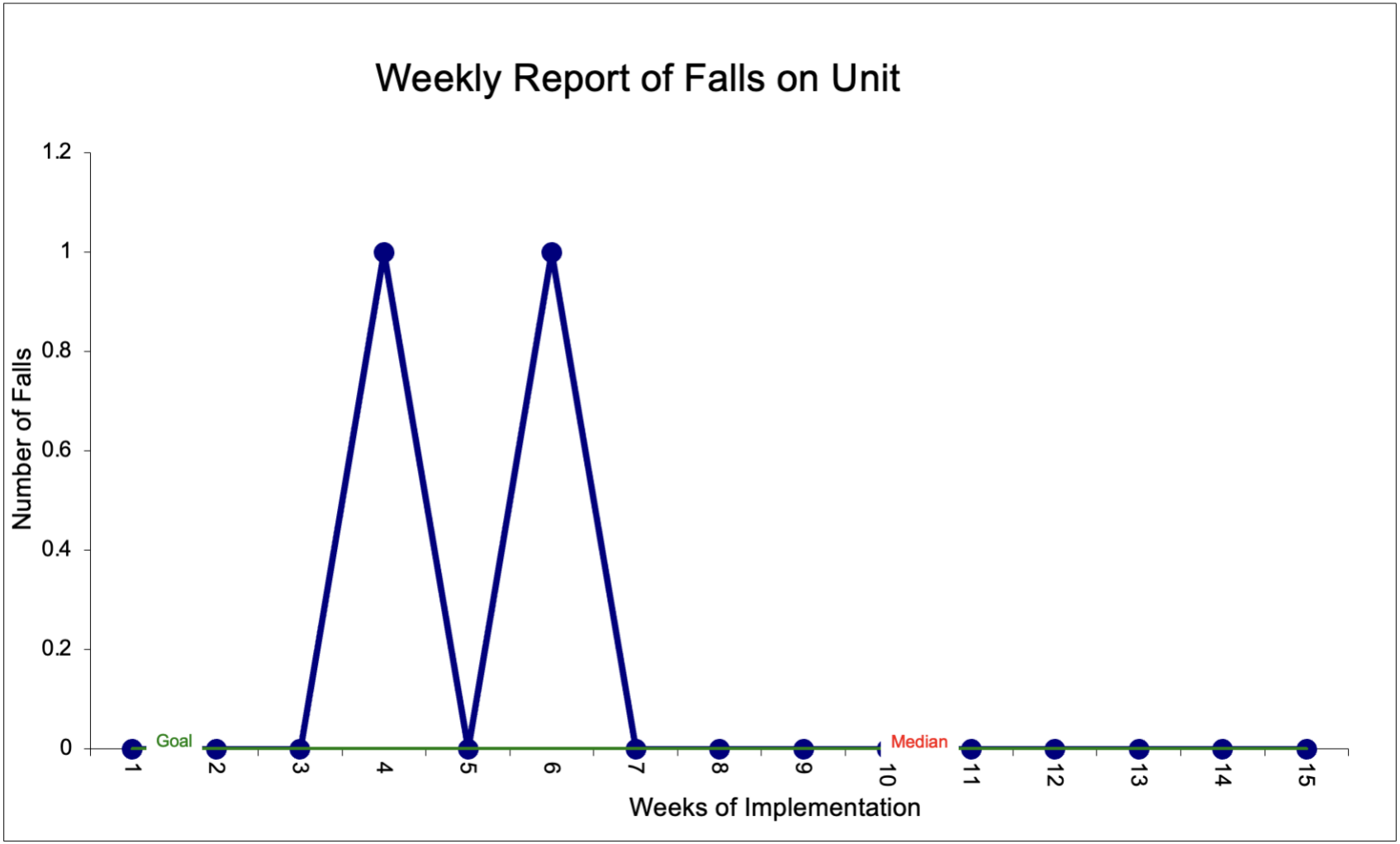


Figure 9
Fall Incidence on Medical Surgical Unit Run Chart

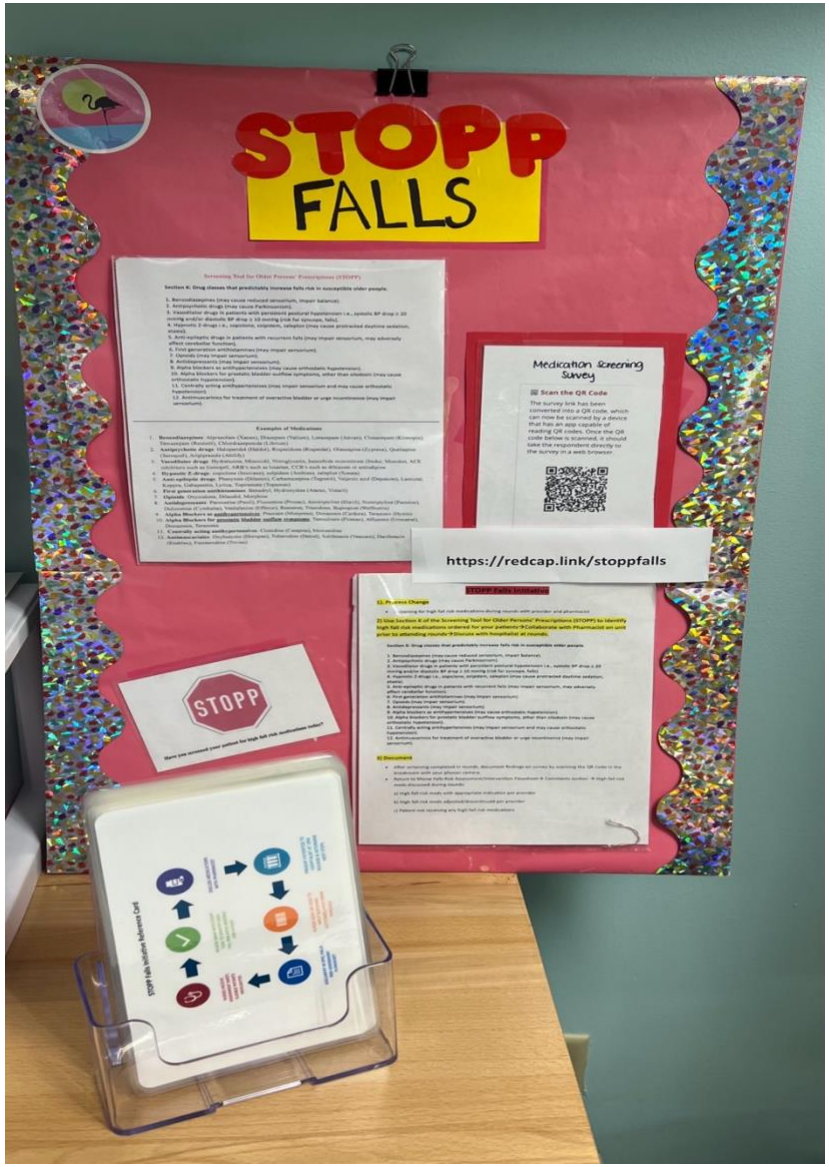


Appendix A—STOPP Tool

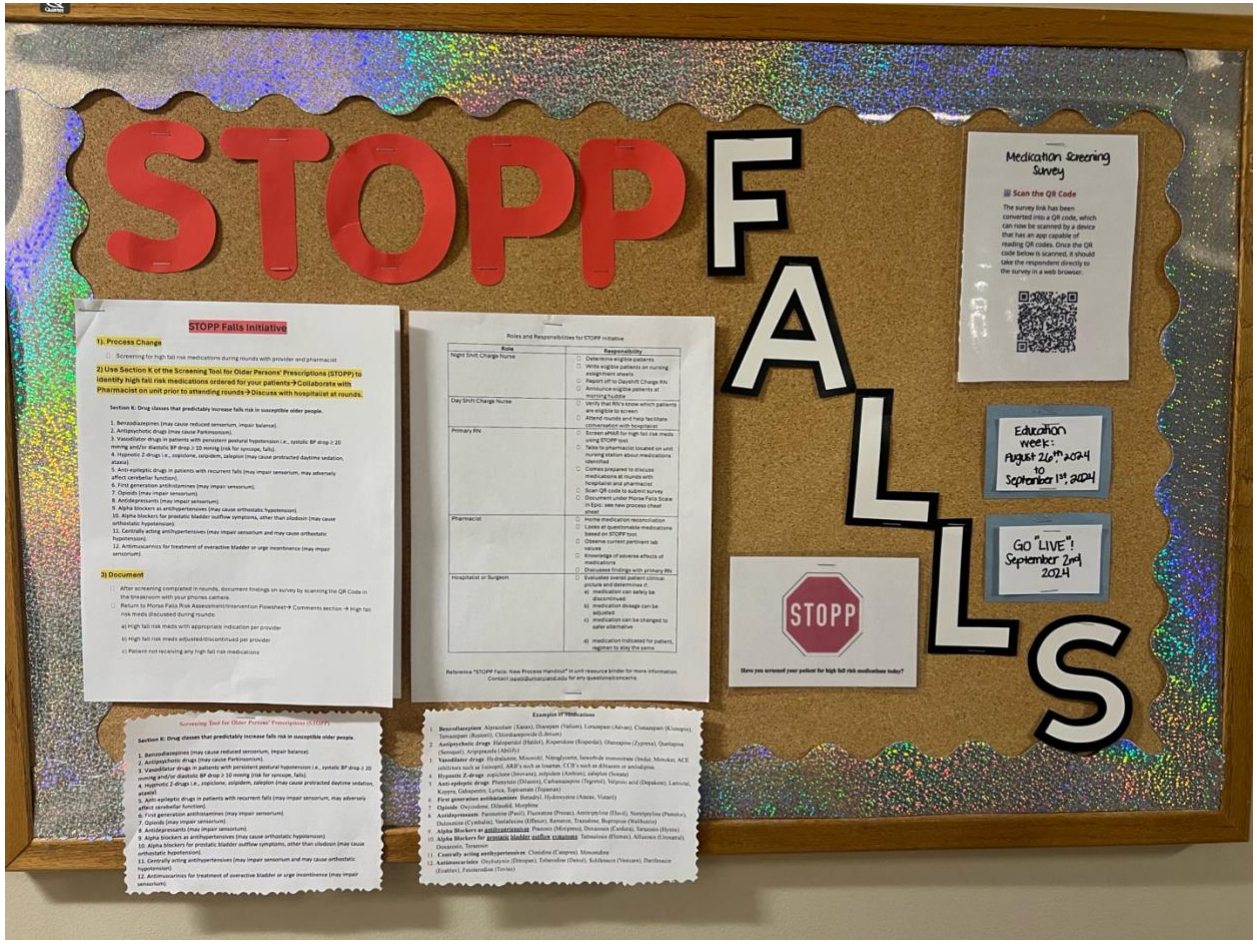
Section K: Drug classes that predictably increase falls risk in susceptible older people.

1. Benzodiazepines (may cause reduced sensorium, impair balance).
2. Antipsychotic drugs (may cause Parkinsonism).
3. Vasodilator drugs in patients with persistent postural hypotension i.e., systolic BP drop ≥ 20 mmHg and/or diastolic BP drop ≥ 10 mmHg (risk for syncope, falls).
4. Hypnotic Z-drugs i.e., zopiclone, zolpidem, zaleplon (may cause protracted daytime sedation, ataxia).
5. Anti-epileptic drugs in patients with recurrent falls (may impair sensorium, may adversely affect cerebellar function).
6. First generation antihistamines (may impair sensorium).
7. Opioids (may impair sensorium).
8. Antidepressants (may impair sensorium).
9. Alpha blockers as antihypertensives (may cause orthostatic hypotension).
10. Alpha blockers for prostatic bladder outflow symptoms, other than silodosin (may cause orthostatic hypotension).
11. Centrally acting antihypertensives (may impair sensorium and may cause orthostatic hypotension).
12. Antimuscarinics for treatment of overactive bladder or urge incontinence (may impair sensorium).

Appendix B—STOPP Falls Bulletin Board #1

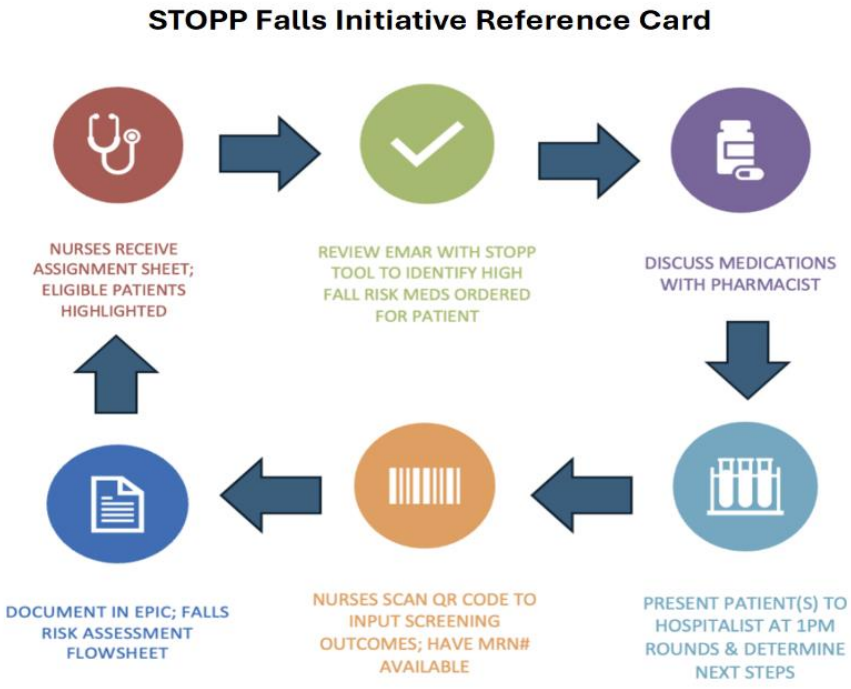


Appendix C—STOPP Falls Bulletin Board #2



Appendix D—Front and Back of Pocket Reference Card

Front



Back

Benzodiazepines: May cause reduced sensorium, impair balance.
Examples: Alprazolam (Xanax), Diazepam (Valium), Lorazepam (Ativan), Clonazepam (Klonopin), Temazepam (Restoril), Chlordiazepoxide (Librium)
Antipsychotic drugs: May cause Parkinsonism.
Examples: Haloperidol (Haldol), Risperidone (Risperdal), Olanzapine (Zyprexa), Quetiapine (Seroquel), Aripiprazole (Abilify)
Vasodilator drugs: In patients with persistent postural hypotension i.e., systolic BP drop ≥ 20 mmHg and/or diastolic BP drop ≥ 10 mmHg (risk for syncope, falls)
Examples: Hydralazine, Minoxidil, Nitroglycerin, Isosorbide mononitrate (Imdur), Monoket, ACE inhibitors such as lisinopril, ARB's such as losartan, CCB's such as diltiazem or amlodipine.
Hypnotic Z-drugs: May cause protracted daytime sedation, ataxia.
Examples: zopiclone (Imovane), zolpidem (Ambien), zaleplon (Sonata)
Anti-epileptic drugs: In patients with recurrent falls. May impair sensorium, may adversely affect cerebellar function.
Examples: Phenytoin (Dilantin), Carbamazepine (Tegretol), Valproic acid (Depakote), Lamictal, Keppra, Gabapentin, Lyrica, Topiramate (Topamax)
First generation antihistamines: May impair sensorium.
Examples: Benadryl, Hydroxyzine (Atarax, Vistaril)
Opioids: May impair sensorium.
Examples: Oxycodone, Dilaudid, Morphine
Antidepressants: May impair sensorium.
Examples: Paroxetine (Paxil), Fluoxetine (Prozac), Amitriptyline (Elavil), Nortriptyline (Pamelor), Duloxetine (Cymbalta), Venlafaxine (Effexor), Remeron, Trazodone, Bupropion (Wellbutrin)
Alpha Blockers as antihypertensives: May cause orthostatic hypotension.
Examples: Prazosin (Minipress), Doxazosin (Cardura), Terazosin (Hytrin)
Alpha Blockers for prostatic bladder outflow symptoms, other than silodosin: May cause Orthostatic Hypotension.
Examples: Tamsulosin (Flomax), Alfuzosin (Uroxatral), Doxazosin, Terazosin
Centrally acting antihypertensives: May impair sensorium and may cause orthostatic hypotension.
Examples: Clonidine (Catapres), Moxonidine
Antimuscarinics: For treatment of overactive bladder or urge incontinence. May impair sensorium

Appendix E—Visual Cue Card Reminder

Have you screened your patient for high fall risk medications today?

Appendix F—Audit Tool for Medication Screening

Patients Screened using STOPP Tool

Record ID	_____
MRN Number	_____
Date of Encounter	_____
Was the patient eligible to be screened for high fall risk medications?	◯ Yes ◯ No
Was the patient screened for high fall risk medications using the STOPP tool?	◯ Yes ◯ No

Appendix G—Audit Tool for Deprescribing Medications

Screenings That Led to Deprescribing/Adjustment of Medications

Record ID	_____
MRN #	_____
Date of Encounter	_____
Was this patient screened for high fall risk medications using the STOPP tool?	◯ Yes ◯ No
Did the screening lead to deprescribing, adjustment of medication dose, or change to safer alternative medication?	◯ Yes ◯ No
What action specifically was performed?	☐ Deprescribe ☐ Adjustment of dose ☐ Change to safer alternative medication ☐ Medication regimen kept the same
Was the medication regimen kept the same?	◯ Yes ◯ No
Why was the medication kept the same?	_____

Appendix H—Audit Tool for Falls

Falls Audit

Record ID	_____
MRN Number	_____
Did the patient fall?	◯ Yes ◯ No
Date and Time of Fall	_____
Why did the patient fall?	_____
Was the patient given a high fall risk medication prior to their fall?	◯ Yes ◯ No
Was the patient ordered any high fall risk medications?	◯ Yes ◯ No
What medications were they on?	_____

Appendix I—Medication Screening Completion Survey

High Fall Risk Medication Screening Audit Tool

Please complete the survey below based upon your medication screening conversation and actions taken from the provider.

Thank you!

MRN #	_____
Age of Patient	_____
Date and Time of Encounter	_____
What is the patient's Morse Falls Risk level?	◯ Standard/Low risk ◯ High Fall Risk
Was the patient screened for high fall risk medications using the STOPP tool?	◯ Yes ◯ No
If no, why?	_____
Were high fall risk medications identified for this patient?	◯ Yes ◯ No
List the medications that were identified.	_____
Were any of these medications ones that they take at home?	_____
What action was performed by the provider after the high risk medications were identified?	☐ Medication discontinued ☐ Medication dosage adjusted ☐ Medication changed to safer alternative ☐ Medication regimen kept the same
If medication regimen kept the same, briefly explain why.	_____
Nurse who completed survey (*Nurse who completes most entries will win a prize)	_____