

DEVELOPING AND IMPLEMENTING A FALL PREVENTION ALGORITHM TO
IMPROVE PATIENT SAFETY: A QUALITY IMPROVEMENT PROJECT

by

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of the requirements for the degree

of

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in

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ABSTRACT

Statement of the problem: Approximately one million falls occur in U.S. hospitals every year. Inpatient falls are the leading cause of preventable hospital-acquired adverse events, accounting for 70% of all accidents reported by hospitals. Inpatient falls have significant impact on healthcare costs, due to increased patient morbidity, mortality and limited reimbursement. Fall prevention clinical practice guidelines lack consensus regarding effective fall prevention interventions. Inpatient falls continue to be a major concern across the globe despite extensive prevention efforts.

Methods: A scoping literature review was conducted to explore the body of evidence available regarding known causes, impact, fall prevention strategies and interventions. A database search was conducted across multiple databases using keyword terms related to inpatient falls. Results were screened for inclusion eligibility based on several factors to produce a current, comprehensive, evidence-based review of the known literature.

Results: The evidence within the literature is extensive regarding known causes and impacts but variable regarding effective solutions and prevention strategies. Inpatient falls are multifactorial, complex and often caused by non-modifiable risk factors. Implementation, interventions and risk assessment tools vary dramatically across and within organizations, making comparison of research findings difficult. Clinical practice guidelines offer vague and varying recommendations for fall prevention programs. There is emerging evidence that multifactorial approaches that incorporate evidence-based risk assessment tools, risk stratification and tailored interventions are the most effective strategy currently being utilized.

Conclusions: Inpatient falls continue to be a concern due to the dramatic impact for both patients and organizations. The lack of consensus in evidence and guidance perpetuates this complex problem. Multifactorial approach fall prevention programs have emerged as the most effective strategy at reducing and preventing inpatient falls. Quality improvement projects which utilize multifactorial approaches are supported by the evidence within the literature as a cost-effective strategy to prevent and reduce inpatient falls.

CHAPTER ONE

REVIEW OF LITERATURE

Introduction

In the United States an estimated one million falls occur in hospitals annually (Mulkey et al., 2023). It is estimated that anywhere from 2% to 7% of hospitalized patients will fall during their hospital stay, and more than one third of these falls results in an injury (Taylor et al., 2020). Inpatient falls are the leading preventable hospital-acquired adverse event, accounting for approximately 70% of all accidents reported by hospitals (Scheindenhelm et al., 2020). Hospitalized patients are at increased risk of falling due to multiple risk factors including prolonged hospitalization, polypharmacy, high fall risk medications, impaired cognition, fluctuating mental status, neurological deficits, impaired gait or balance, altered mobility, delirium, elimination dysfunction, orthostatic hypotension, and often advanced age (Alvarado et al., 2023 & Cooper et al., 2020). Considerable efforts are undertaken by healthcare organizations to identify and implement the most effective interventions and strategies to prevent inpatient falls.

The most widespread fall prevention strategy used by healthcare facilities are fall risk assessment tools. These tools categorize patient risk from low to high based on identified risk factors. Fall prevention programs typically implement a standardized set of interventions based on risk category identified by these tools. Fall risk assessment tools when used as the sole prevention strategy have been shown to have limited effectiveness as they have weak predictive value especially among the elderly. Elderly patients typically fall within high fall risk categories due to non-modifiable risk factors identified in these assessment tools. The lack of discrimination

of these tools makes identification of patients at most risk indistinguishable reducing their value in practice (Alvarado et al., 2023). Research indicates that these tools vary in effectiveness between different countries and patient populations as well (Satoh et al., 2021). Global and national fall prevention clinical practice guidelines lack consensus on strategies and the utilization and implementation vary across facilities and organizations (Mulkey et al., 2023). Multifactorial approach fall prevention programs appear to be effective at reducing fall rates. However, there is wide variation in implementation of risk stratified interventions making generalizability of research findings limited (Alvarado et al., 2023). Despite the widespread efforts of health care facilities to mitigate risks of falls and injury, falls among hospitalized patients remain a pervasive problem (Taylor et al., 2020 & Woltsche et al., 2022).

Background and Significance

Inpatient falls dramatically increase both human and financial cost (Dykes et al., 2023 & Woltsche et al., 2022). Falls can result in increased patient morbidity and mortality, as approximately one third of falls in the hospital result in injury and can result in death. Patients that experience a fall while hospitalized may also experience decreased quality of life and emotional distress (Mulkey et al., 2023 & Scheindenhelm et al., 2020). The emotional impact is not limited to patients, according to Woltsche (2022), healthcare staff have reported emotional distress when caring for a patient that has fallen while under their care due to feelings of guilt, worry and self-doubt.

The economic impact of inpatient falls is substantial, deemed by the Centers for Medicaid and Medicare Services as a “never event,” they are the leading cause of non-reimbursable hospital-acquired adverse events (Mulkey et al., 2023 & Scheindenhelm et al., 2020). Inpatient

falls lead to an additional week of hospitalization on average, which adds an additional \$14,000 in healthcare costs. Injurious falls results in even longer hospitalizations and higher incurred costs (Dykes et al., 2023; Stockwell-Smith et al., 2020 & Taylor et al., 2020). The Joint Commission now considers hospital-acquired injurious falls that result death as Sentinel events which can have consequences to the healthcare facility beyond financial impacts (Mulkey et al., 2023).

Many healthcare organizations make reducing falls a high priority for quality improvement efforts due to the dramatic impacts both in human and financial costs. Hospitals are graded on safety and quality measures which incentives organizations to invest in efforts to reduce falls. Safety and quality measure goals can be a struggle for many organizations to meet, as there is a lack of clear, concise, and standardized guidelines. This lack of guidance leaves facilities and organizations effectively on their own to determine the best approach.

Purpose

The purpose of conducting this literature review was to identify the existing knowledge base relevant to the issue of falls among hospitalized patients. A comprehensive, concise summary of this critical issue was synthesized through analysis of the relevant and reliable evidence within the known literature. Through comprehensive analysis of the known literature base, it was imperative to not only identify effective strategies and interventions to mitigate risks but to also to explore what strategies have shown to not be effective. Conducting scoping literature reviews can aid in better understanding of the bigger picture of how others have sought to solve a problem that is daunting and seemingly insurmountable. Attempting to solve a problem with multiple known causes, multiple contributing factors and variable evidence of

effective strategies requires in-depth analysis and extensive thorough research. Identification of gaps in the literature through scoping literature review was invaluable and imperative as this issue lacks a consistent clear well understood solution. To uncover new and innovative strategies to continue quality improvement efforts, it was important to not solely focus on the evidence for strategies most utilized. As the evidence revealed, current practices utilized by most organizations are not achieving intended goals of reducing harm and supporting better patient outcomes. The goal of this literature review was to focus on understanding not only causes of inpatient falls but also to explore barriers in prevention efforts, to chip away at this complex problem with no known tried-and-true proven solution.

Methods

Databases searched related to inpatient falls included MedLine®/PubMed®, and CINAHL Ultimate®, Web of Science®, Journals@OVID Complete®, ProQuest Central®, Gale Academic OneFile®, EBSCOhost Academic Search Complete®, DOAJ Directory of Open Access Journals®, Elsevier ScienceDirect Journals Complete®, Wiley Online Library®, and SAGE Journals®, using the following MESH terms: Inpatient fall prevention*, inpatient fall prevention AND interventions*, Inpatient fall prevention strategies*, Inpatient fall prevention AND strategies AND interventions, and Hospital fall prevention AND strategies AND interventions*. Database searches were conducted in August and September 2023. Citations were managed in EndNote.

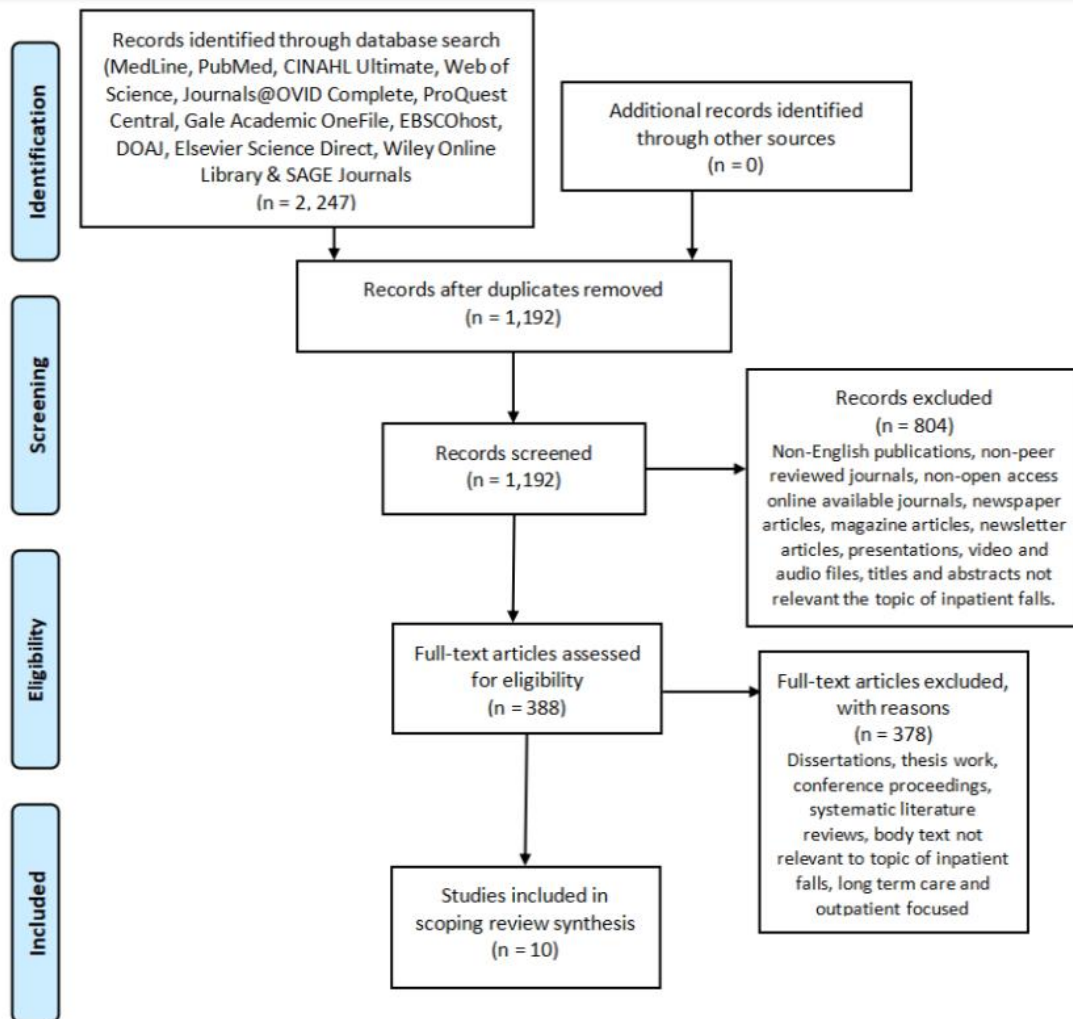
Eligibility

Eligibility criteria for inclusion included full text research articles published within peer reviewed journals, open access journals available online, publication date within the past 5 years, and printed in the English language with titles and abstracts relevant to the topic of inpatient falls. Exclusion criteria included publications such as newspaper articles, magazine articles, newsletter articles, dissertations, thesis work, conference proceedings, presentations, video and audio files, duplicate records, systematic literature reviews and titles not relevant the topic of inpatient falls.

Study Selection

Initial database search utilizing keywords or terms yielded 2,247 results. The first round of exclusions included filtering results to remove duplicate records which yielded 1,192 records. The second round of exclusion removed results according to the exclusion criteria as listed above in the eligibility section which yielded 388 records. The third round of exclusions assessed full text records which were screened, and records removed based on several factors including, topic not consistent with aim of review, wrong setting or patient population (not inpatient or long-term care facility). The third round of exclusion removed 378 records, resulting in 10 records for inclusion in this literature review (See Figure 1).

Figure 1. Prisma Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Discussion

Through review of the literature an extensive amount of information was revealed, as this issue is pervasive and research efforts have been long standing. Despite the immense amount of information available and research conducted, one common pattern became immediately glaringly apparent, there is little to no agreement on a tried-and-true proven solution to reduce inpatient falls. More questions than answers remain when attempting to examine this issue through a lens that was solely solution focused. Little agreement or consensus exists regarding if specific strategies are effective and if so to what degree. The literature revealed not only a massive variability in research results in efficacy of strategies but a lack of consistent implementation of strategies making comparison between results impractical. The problem focused approach however did yield an abundance of consistent results regarding information about causes of falls. Armed with the knowledge of what causes falls one would surmise that just simply tackling the causes or risk factors for falls would produce effective results. However, the literature reveals that causes of falls are complex, multifactorial, and often non-modifiable. A predominant theme emerged among the evidence suggesting that no one intervention was more effective in isolation, instead multifactorial approaches that incorporated multiple interventions in unison are the most effective strategy in the tool kit for fall prevention.

Finding the right combination of interventions with the right implementation, at the right time emerged as a theme in the literature. Exploring multifactorial approaches, it was essential to examine individual intervention strategies to better understand what has worked, what has not worked and identify gaps in knowledge. Implementing a multifactorial approach that incorporates multiple interventions that are not effective will in turn not be effective. To organize

this immense amount of information themes were developed based on intervention strategies, grouped together, and then results of multiple studies were then complied together to better organize the research in the known literature.

Fall Risk Assessment Tools

Hospitalized patients are at higher risk of sustaining a fall than the general population. Through extensive research efforts it has been identified that being hospitalized itself increases the risk for falls. Understanding and appropriately identifying risk factors is important when attempting to mitigate these risks and reduce the impact of these events. Unfortunately, there is little that can be done to mitigate certain risk factors such as age and gender, however identifying these risk factors remains important. Identifying non-modifiable risk factors is critical as there is often a correlation between risk factors, for example, impaired gait and mobility and age positively correlate in occurrence. Age is non modifiable, but impaired gait and mobility to a degree are modifiable. Risk factors such as impaired gait and mobility can be modifiable, and risk mitigated through proper use of assistive devices and physical rehabilitation.

Current primary efforts to prevent inpatient falls focus on risk identification and there are several well-established Fall Risk Assessment Tools. Fall risk assessment tools vary in the assessment items included both in number of items and types and vary in the use of risk stratification as well (Alvarado et al., 2023). The Hester Davis fall risk assessment tool is a well-established fall risk tool that has been shown to be valid and reliable to identify risk factors for falls. This assessment tool incorporates age, date of last fall, incontinence, fluid and electrolyte status, behaviors, medications, and mental status (Mulkey et al., 2023). The Morse Fall scale incorporates comorbidities, use of ambulatory devices, history of falls, mental status, and gait,

but does not incorporate continence status, footwear, medication, or vision status (Alvarado et al., 2023). The St. Thomas Risk Assessment Scale or also commonly known as STRATIFY, is a tool that does incorporate vision status as an assessment item, however this tool was specifically designed to be used in the elderly population (Satoh et al., 2023). The FallSafe program is a comprehensive tool that incorporates risk factors such as fear of falling and unsafe behavior (attempting to ambulate alone when unsteady), but is limited to application of the elderly population making standardized use among hospitalized patient population ineffective (Stockwell-Smith et al., 2019). The John Hopkins Fall Risk Assessment Tool categorizes scores into low, medium and high fall risk and does not limit application to any age group making application in hospitals more feasible compared to assessment tools limited to the elderly population (Taylor et al., 2020).

Fall Risk Assessment Tools assign individuals a score, which helps guide healthcare professionals to identify those most at risk for falls. However, there is mixed research on the efficacy of these tools, with some evidence showing weak predictive value. Despite long standing usage of fall risk assessment tools within healthcare facilities, falls persist as a major concern (Alvarado et al., 2023 & Satoh et al., 2023). Fall risk assessment tools which categorize risk into categories have been shown to not be reliable in predicting falls. Findings from several studies show almost half of patients that fell were at the time designated a low fall risk (Satoh et al., 2023).

Sitters

When patients are identified as being at high risk for falls or have already sustained a fall within the hospital, often sitters are utilized as a preventative measure. These sitters typically are

an assigned staff member that remain within arm's reach of the patient at all times. This strategy enables both verbal and physical redirection in the event a patient attempts to ambulate or participate in unsafe behaviors. This strategy, though widely implemented, has variable evidence of efficacy at preventing falls and does have some drawbacks. The utilization of sitters can comprise and slow the discharge and transfer process. Many receiving facilities will not accept patients that require one on one observation or have been on one on one monitoring within the previous calendar day (Woltsche et al., 2022). Sitters can be difficult to implement as an intervention due to limited available staff and are expensive to organizations. A sitter is double the cost compared to patient video monitoring (Woltsche et al., 2022).

Video Monitoring

There has been recent emerging usage of patient video monitoring systems within hospitals as a fall prevent intervention. Most patient video monitoring systems are comprised of a camera that is audio and Wi-Fi enabled, is placed in the patient room and a video monitor in another location that is continuously monitored by a staff member. Research indicates this intervention strategy can be effective at reducing falls and has been shown to be more cost effective than sitters. Video monitoring is impacted less when staffing shortages occur, compared to sitters as patient video monitoring for multiple patients can be conducted by one staff member (Woltsche et al., 2022).

Alarms and Sensors

There are several alarm systems currently widely utilized throughout healthcare facilities. Bed alarms are used to detect when a patient is attempting to get out of bed, and chair alarms are used when patients are seated in a chair. These interventions have limited efficacy as they often

cause alarm fatigue for staff and are dependent on the ability for staff to immediately respond to prevent a fall. There are several wearable sensors that have recently emerged, which are less utilized as standard practice. Alarms are limited in efficacy but are low cost measures in fall prevention that are widely used in healthcare facilities (Schoberer et al., 2022). Research in the use of bed and chair alarms reveals that the use of these devices had no significant effect on fall rates in hospitalized patients (Schoberer et al., 2022 & Woltsche et al., 2022).

Medication Review

Polypharmacy and usage of medications such as psychotropics, benzodiazepines, sedatives, insulins, antiepileptics and certain heart medications have been identified as increasing the risk for falls in hospitalized patients (Taylor et al., 2020). Research indicates that routine and frequent medication reviews can help mitigate fall risk if these reviews identify inappropriate medication usage. This is a cost-effective measure as it is typically incorporated into well-established workflows and does not require extensive staff time utilization or materials (Schoberer et al., 2022).

Environmental Modification

Most fall prevention guidelines recommend several environmental modifications including fall risk bracelets, fall risk signs, keeping rooms clutter free with adequate lighting, bathroom handrails, bed rails, and call bells. These interventions have limited efficacy at reducing falls as there is mixed research results on impact to fall rates. These measures are cost effective to implement but despite being widely implemented across the spectrum of facilities fall rates have not significantly improved over time (Taylor et al., 2020).

Education

Patient and staff education regarding fall risk and fall prevention strategies are interventions commonly implemented in current practice. Evidence is mixed on the effectiveness of patient and staff education in isolation as an intervention strategy for fall prevention. Several studies showed staff education had no significant effect on fall rates (Schoberer et al., 2022). However, this intervention is rarely utilized in isolation and is typically incorporated within evidence-based fall prevention programs (Schoberer et al., 2022). Engaging families in fall prevention and risk factors education has shown to have some impact on reducing falls especially in the presence of cognitive impaired patients (Stockwell-Smith et al., 2019). Research indicates that when patients and family members are educated on functional limitations the risk of falling decreases (Taylor et al., 2020). When included in a multifactorial approach, standardized nursing education has been shown to have an effect on reducing falls in the hospital setting by reducing variation in care (Mulkey et al., 2023).

Multifactorial Approaches

There are several multifactorial approaches that have shown encouraging evidence at reducing inpatient falls. Multifactorial approaches incorporate multiple interventions in conjunction, typically include the usage of evidence-based fall risk assessment tools and risk stratification with accompanying patient and risk specific interventions. Intentional rounding, medication review, environmental modifications, exercise, and mobility promotion are interventions typically included. Some multifactorial approaches also include strategies such as appointment of staff as unit fall champions and the formation of unit falls committees (Mulkey et al., 2023). This approach does appear to be more effective than any other intervention in

isolation, however implementing these programs has been shown to be time consuming, variable across organizations, and some research indicates variable sustainability as well. Implementing multifactorial approach fall prevention programs incrementally has been shown to be a cost-effective strategy at preventing falls (Alvarado et al., 2023 & Mulkey et al., 2023).

Practice and Policy Implications

The existing literature reflects a lack of clear guidelines and conflicting evidence of the efficacy of prevention strategies. Sporadic and variable implementation of fall prevention programs remains a hurdle to effecting change on a broad scale. Fall prevention programs are required for hospitals but each organization independently establishes their programs. The available research investigating the efficacy of fall prevention programs is variable and provides no clear evidence pointing towards the most effective tools and interventions. The key takeaways that will inform clinical practice is the growing body of evidence that supports multifactorial approaches. Multifactorial approaches that incorporate standardized fall prevention practices, medication review, risk stratification, specific interventions based on patient risks, and include increased levels of observation interventions are supported by the emerging evidence of efficacy.

Implementing an effective fall prevention strategy institution wide could have positive impacts on reimbursement, quality of care, as well as patient and provider satisfaction scores. Effective and sustainable implementation of a multifactorial approach or bundle requires periodic auditing, as well as support from leadership, staff and patients. Changes in policy may be required when implementing interventions and procedures not previously used in an organization which can be time consuming and require systems level changes. When implementing a new assessment tool or a bundle organizations must establish clear staff education, guidance, and

expectations regarding use. Implementing any change whether that be on a facility or organizational level, it is a daunting and an expensive endeavor. However, implementing an effective strategy that reduces falls has many benefits with reducing human and financial costs, improvements in quality and safety indicators and improved patient outcomes (Dykes et al., 2023).

Conclusion

Falls among hospitalized patients is a complex issue involving multiple factors that make effective solutions difficult to identify and isolate. Despite long standing efforts to decrease fall rates, inpatient falls continue to remain a widespread issue that is costly to patients and facilities. There is considerable variability in evidence found in the available research regarding effective fall prevention strategies. As inpatient falls are a complex multifactorial issue it is intuitive that solutions are also complex and multifactorial. There is a need for further quality improvement efforts to explore effective strategies to improve the human and economic impacts of inpatient falls. Quality improvement projects aimed at decreasing incidence of inpatient falls can lead to strides in achieving better patient outcomes and reduced health care costs.

CHAPTER TWO

QUALITY IMPROVEMENT PROPOSAL

IntroductionBackground

Inpatient falls are the leading preventable hospital-acquired condition worldwide. In the United States an estimated 1 million inpatient falls occur annually (AHRQ, 2019). It is estimated that up to 7% of patients will sustain a fall during hospitalization, with one third of those falls resulting in an injury (Taylor et al., 2020). Falls often result in increased patient morbidity and mortality, and can result in longer hospitalizations which increases costs for both patients and healthcare facilities (Taylor et al., 2020 & Scheindenhelm et al., 2020). The Centers for Medicaid and Medicare Services have deemed inpatient falls as a “never event” and now limit reimbursement to healthcare facilities for associated costs. This designation is a strong incentive for organizations to invest in efforts to prevent falls (Scheindenhelm et al., 2020). Hospitals across the globe have implemented fall prevention programs and continue to make fall prevention a priority for quality improvement efforts. The most recent national data on falls released by the Agency for Healthcare Research and Quality on hospital acquired conditions revealed that between 2014 and 2017 there was a 5% reduction in falls nationally. This suggests that fall prevention efforts are a worthy endeavor that can have a positive impact on patient outcomes (AHRQ, 2023). According to safety reporting, Montana hospitals rank 21st in the nation for safety, with only 30% of hospitals in the state receiving an “A” ranking for safety (The Leapfrog Group, 2023). Inpatient falls have a dramatic impact both in terms of human (increased

mortality and morbidity, decreased quality of life, and emotional distress) and financial costs (increased length of stay and limited reimbursement). These impacts affect both patients and healthcare organizations. making efforts to reduce incidence a priority for healthcare organizations (Woltsche et al., 2022).

Local Problem

The pilot facility, according to national hospital ratings, carries an overall “A” safety rating. However, patient safety and injuries category it performs below the national average (The Leapfrog Group, 2023). Stakeholder and site representative needs assessment interviews revealed that fall prevention efforts are a top priority for this facility. Stakeholders indicated strong interest and support for quality improvement efforts aimed at reducing inpatient falls.

There are multiple factors that contribute to the high fall rates of the pilot unit including advanced aged population, impaired gait and mobility, impaired cognitive functioning, and neurological deficits. The pilot unit persistently ranks among one the highest for fall rates in the facility. Observations and needs assessment interviews conducted at the site location revealed several system and process factors present on this unit that contribute to high fall rates. Multiple staff expressed frustration regarding the lack of a clear and concise standardized process for the escalation of fall prevention interventions. The lack of clear guidance was noted to be a contributing factor in delays in appropriate initiation of prevention strategies, especially in the event of abrupt changes in patient condition. Several staff expressed confusion regarding what patient criteria and circumstances indicate the need to escalate fall prevention strategies. Nursing staff reported they often face difficulty determining the best course of action to ensure patient safety which causes frustration. The implementation of increased levels of patient observation

including video monitoring and 1:1 sitters are the interventions which were most notably delayed because of lack of a standardized process. Currently nursing staff report that they primarily rely on guidance from the charge nurse on duty for guidance on decision making in the escalation of interventions. The pilot unit has a low ratio of experienced nurses to new graduate or temporary nurses, this imbalance in staffing experience contributes to heavy reliance on charge nurses for decision making support required when abrupt changes in patient condition occurs. This guidance can be inconsistent, and the initiation of prevention strategies can be delayed due to charge nurse availability.

This organization utilizes standard universal fall precautions for all inpatients, these interventions include keeping beds in lowest position, keeping the environment clutter free, call light and personal belongings within reach, locked wheels, night lights, non-slip footwear and patient/family education. The John Hopkins Fall Risk Assessment tool (JHFRA) is currently utilized to assess every patient every shift for risk of falls. The JHFRA is used to identify high fall risk patients. Patients deemed high fall risk receive the universal precautions with additional interventions including a yellow fall risk bracelet, yellow non-slip socks, patient specific education and high fall risk room signage. This organization utilizes increased levels of observation strategies for fall prevention as well, including patient video monitoring systems called AvaSys/AvaSure and 1:1 sitters.

In an effort to reduce falls this organization established a committee dedicated to fall prevention over a decade ago. This committee tracks and reports fall data for all inpatient units, conducts and reviews root cause analyses of fall events. This committee works closely with the Quality Improvement Department with the aim of continuous improvement in fall prevention

efforts within the organization. They meet monthly to explore ways to prevent and reduce inpatient falls. This organization recently implemented intentional hourly rounding on all inpatients with one of the aims being reducing falls. This facility also recently expanded the patient video monitoring (AvaSys/AvaSure) department with the acquisition of 12 additional patient video monitoring machines and hired additional patient video monitoring staff, which doubled the machines available for inpatient units.

The pilot unit utilizes standard universal fall precautions with additional interventions for every patient regardless of risk category to reduce falls. These expanded universal interventions include the inclusion of a gait belt, walker, bed and chair alarms in every patient room. This unit also has a committee dedicated to fall prevention comprised of unit staff that meet quarterly to review fall data, review root cause analyses of unit fall events, and plan ways to reduce unit falls. Fall prevention efforts remain a priority for this facility and unit due to the dramatic impacts on patient outcomes, quality safety scores and the financial impacts on the organization.

Intended Improvement

The purpose of this quality improvement project is to improve the process for initiation and appropriate escalation of fall prevention interventions to prevent inpatient falls. The approach that will be taken is guided by evidence-based recommendations revealed through literature review. Multifactorial approaches to fall prevention are more effective than any one intervention in isolation, particularly when they incorporate fall risk assessment tools and risk stratification to guide patient and risk specific interventions (Mulkey et al., 2023). This approach is intended to aid nursing staff in decision making to escalate fall prevention interventions especially when patient condition changes abruptly.

The proposed plan is to implement a fall prevention intervention escalation algorithm that is intended to aid nursing staff in appropriate selection of interventions that correspond with patient condition based on already established assessment criteria that is integrated into normal workflow. This algorithm will guide nurses to tailor interventions for fall prevention strategies specific to assessment findings including acute changes in behavior, the John Hopkins Fall Risk Assessment Tool (JHFRA) score, and mental status using The Confusion Assessment Method (CAM). This quality improvement project aims to build on the existing fall prevention program in place and investigate if adding into workflow an algorithm with specific risk stratified interventions improves patient outcomes by reducing the incidence of fall events.

Methods

Organizational Microsystem

The setting for this proposed project is a 35-bed med/surg unit in a regional hospital located in Montana. The pilot hospital for this proposed project had a total of 3.861 inpatient falls per 1,000 patient days so far this calendar year, seeing a 1% increase, or 40 more falls compared to the previous reporting year. Based on hospital compare data, this healthcare facility performs lower than average in safety regarding patient falls (The Leapfrog Group, 2023). The site unit where this project implementation will take place has the second highest rate of falls among all the inpatient units within this facility. This unit maintains a consistent near full census with a patient population that are for a variety of reasons at high risk for falls. Patient population consists of many individuals that are elderly, have mobility limitations or cognitive impairments. This facility utilizes The John Hopkins Fall Risk Assessment Tool which is integrated into workflow and is a required component of the nursing assessment in the EHR system currently

being used. This fall risk assessment gives a numeric value that flags at a level deemed high and notifies the nurse. There is a protocol in place to apply several interventions for patients considered high fall risk. The high fall risk interventions include fall risk bracelet, door signage and application of anti-slip socks (all of which are yellow in color, specific to high fall risk status). This unit utilizes standard universal precautions for fall prevention for all patients but also in addition to standard interventions each room is equipped with a 4 wheeled walker and admission room set up requires a gait belt, chair alarm and anti-slip socks be placed in the patient room before arrival. The average patient to nurse ratio is 5:1, acuity level is moderate to high on average and the ratio of experienced nurses to new graduate or temporary nursing staff is low.

Observations and Ethical Considerations

Observations. Observations at site location revealed the patient population is generally comprised of elderly patient population, patients with limited mobility, and cognitive impairments. This unit specializes in the care of multiple vulnerable patient population groups. The majority of patients are moderate to high risk for falls. This unit has one of the highest rates of utilization of patient video monitoring systems, 1:1 sitters, and despite the current fall prevention program in place and efforts to decrease falls this unit has higher than average fall rate. The nursing staff is comprised of experienced nurses, and a high ratio of new graduate nurses and temporary travel nurses. Needs assessment interviews revealed staff frustration with the current process regarding fall prevention, specifically regarding lack of guidance on when to initiate increased interventions. Several new graduate nurses and temporary nurses providing care on this unit expressed lack of confidence in decision making in regard to when it would be

appropriate to request a patient be escalated in level of observation with patient video monitoring system or a 1:1 sitter.

Privacy and Confidentiality. Privacy and confidentiality will be ensured by maintaining only the minimum necessary data, de-identifying patient and participating nurse information, all observation-based staff interviews, surveys and issues log will be anonymous. All information stored electronically will be kept on the lead investigator's Microsoft 360 one drive through the organization which is secure and encrypted. The issues log which will be in paper form will be kept in a clearly marked distinguishable folder in a secure location at the charge nurse station, which will ensure access is limited to individuals involved in the project.

Ethical Considerations. Ethical consideration will be addressed by ensuring all staff are informed that participation in surveys, in-service, and project are voluntary, non mandatory and decisions to opt out of participation will not result in any repercussions or reprimand. Mitigation strategies including staff education and preparation will be implemented prior to project initiation to minimize staff distress due to the introduction of new processes and the possibility of disruption or increase in normal workflow, which can feasibly be anticipated through implementation of this QI project. The algorithm and instructions will be distributed to the nursing staff prior to implementation. LMS training will be available prior to and throughout implementation to encourage nursing staff to become familiarized with the new process to mitigate distress. An in person in-service presentation will be held prior to start date as well to allow staff the opportunity to learn about the new process and ask questions. The issues log will also serve as a strategy for nursing staff to anonymously express their questions or concerns. The

unit leadership and QI department leads will be involved to assist in addressing any ethical concerns that may arise.

Quality Improvement Framework

The PDCA or otherwise known as The Deming cycle was developed in Japan in the 1950's by W. Edwards Deming, it is a strategic improvement cycle using the scientific method in a four step process to implement change, measure the results, take appropriate action, and continuously improve processes (AHRQ, 2023). This method will be used as it is easy to use, intuitive, standardized and effective. A proposed process map was created to outline the plan for project progression through the PDCA cycles (See Appendix A). The PDCA cycle was originally created with the intention to improve assembly line processes, it is structured with the intention of testing changes and quickly learning how a change in process effects the overall system and then make adjustments in the process to improve and sustain that improvement.

The PDCA cycle will benefit this QI project because there is a short intervention time frame requiring a framework that can allow for rapid assessment of intervention impact and allow for adjustments to be made and then be assessed within a short time interval. The PDCA cycle offers a mechanism to observe failure and mistakes, encourages the opportunity to learn from what does not work, and adjust in the quickest way possible with least disruption to the overall system. The PDCA cycle is intended to be conducted in small portions of a system allowing for minimal disruption to the overall system. This QI project will be implemented on a small scale and requires a framework such as The PDCA cycle for this reason, as attempting to implement a change across an entire healthcare organization that has not been tested could cause a significant disruption, comprise patient care, outcomes and compromise the health of the

organization itself. The PDCA cycle allows for small scale testing that can then be adjusted, improved and then applied on a wider scale, retested and adjusted until the intended improvement is reached. The PDCA cycle also includes a plan to sustain those improvements over time (AHRQ, 2023).

Implementation

'Plan' Phase

Algorithm Development. An implementation team will be formed to develop a decision making algorithm that will guide nursing staff in the appropriate implementation of fall prevention interventions based on patient specific risk stratification. The team will identify risk stratification factors, fall prevention strategies to be used, and what factors will influence implementation of specific prevention strategies. Unit leadership and QI department will be involved in the development and approval of final algorithm and process change. The algorithm will consist of top entry components including high fall risk status upon admission or subsequent assessment, previous inpatient fall, impaired mobility, and cognitive impairment. If any of these criteria apply, progression down to the next level of the algorithm should be followed and corresponding risk stratification assessments should be conducted. For example, if a patient is identified as having cognitive impairment this would initiate entry into the algorithm, following the pathway down to the next component which will ask if cognitive impairment has abruptly declined, results in impulsivity, decreased awareness of physical limitations, inability to follow safety precautions or instructions. If any of these apply it would elicit a yes response and progression down to the next component would be indicated. Mid components will comprise of

associated assessments and interventions to consider and criteria for further pathway progression based on assessment findings or failed intervention status. The mid components include JHFRA score of ≥ 13 , positive CAM delirium assessment score, failed attempted interventions, inappropriate use of equipment (walker, non slip foot wear, etc.), symptomatic orthostatic hypotension, new onset changes in behavior, mental status or mobility. End components will include suggested interventions such as increased patient rounding intervals, patient video monitoring utilization, obtain order for 1:1 sitter, provider notification and pharmacist medication review.

Electronic Health Records Components. The IT and QI departments will aid in the development of EHR components. The implementation team includes an IT Nursing Informaticist which has committed to assisting in the process of developing EHR builds and incorporating the algorithm components into the EHR charting platform. When final project approval has been obtained this team member projects an estimated 2-3 week time frame to complete the EHR builds. Preliminary planning conducted in conjunction with the IT team member, has projected good feasibility and functionality of the proposed EHR components, with no known or anticipated barriers for implementation at this time.

The proposed EHR components will include hyperlinks to the algorithm in the Nursing assessment I-view tab under the JHFRA band (See Appendix B1), Post Fall Evaluation band (See Appendix B2) and the CAM band (See Appendix B3). A trigger for EHR task list item will fire when assessment scores of the JHFRA fall in the high category with a score > 13 and when the CAM assessment is charted as positive for delirium and will notify nurses to refer to the algorithm (See Appendix B4). IT will develop a EHR build on the nursing assessment tab

directly below the JHFRA and CAM assessment sections, that will have a hyperlink to the algorithm for reference. A run chart will be developed to track data measures including number of fall incidence and midnight to midnight daily patient census using de-identified data.

Issues Log. An issues log was developed by lead investigator to aid in the reporting and identification of problems encountered during the implementation stage as a means to resolve issues in subsequent PDCA cycles (See Appendix C1). Issues log will be kept at the charge nurses station in a clearly marked folder which will also contain a copy of the algorithm and the Issues log instruction sheet (See Appendix C2).

Learning Modules. LMS (Learning Management System) training will be developed by lead investigator in conjunction with implementation team members including the unit Nursing Professional Development Practitioner Clinical Educator, QI department nursing manager and specialist, and unit leadership. Education module will contain information about project purpose, goals, the algorithm, Issues log, instructions and screenshots of the EHR components and where components are located in the EHR. The unit educator who is a committed and invested implementation team member indicated the proposed implementation is feasible and anticipates a completed LMS training module in a 3-4 week time frame from project approval to Go live date, with no known or foreseen barriers at this time. LMS training will be completed by site unit nursing staff prior to intervention initiation to be completed a week before implementation date. A knowledge check quiz will be completed at the end of the module and scores tracked through the LMS survey program.

Surveys. A pre and post implementation survey that utilizes a semantic differential response scale with responses ranging from strongly disagree, neutral, to strongly agree will be sent out to staff nurses. This survey will be created using the survey function of the organizations LMS platform and will be sent out to unit staff via employee email a week before implementation of the proposed intervention (See Appendix D).

In-Service Sessions. An in service information session will be held on the unit 3 days before implementation, all staff will be notified via employee email with date, time and location. In service presentation will include information in regard to project goals, purpose, timeline, instructions on how to use the algorithm, where in the EHR the algorithm can be located and the staff will be given paper copies of the instruction sheet and the algorithm to keep at that time. Staff will be informed about the issues log, its purpose and where it can be located and stored. Staff will be reminded to complete the LMS training if not already completed. A knowledge check quiz will be conducted at the end of the in service to assess the effectiveness of the education provided during in service (See Appendix E).

'Do' Phase

The Algorithm implementation will be introduced into work flow January 29, 2024 and will run until March 11, 2024 on site unit (See Figure 2). Daily patient census will be tracked by lead investigator and safety net reporting of falls will be collected by unit manager, de-identified and distributed to lead investigator biweekly. Daily census and fall incident data will be collected biweekly and entered into an excel sheet kept on OneDrive and issues log entry data will be collected biweekly and stored in an Excel spreadsheet.

The pre-implementation survey data will be used as baseline data to compare to data collected from the post-implementation survey. Each will be sent out to nursing staff, via LMS survey platform through employee email. Pre and post implementation survey response data will be compiled into an Excel spreadsheet. LMS training completion rates will be obtained from unit leadership be de-identified and supplied to lead investigator. In service knowledge check quiz data will be entered into an Excel spreadsheet.

‘Check’ Phase

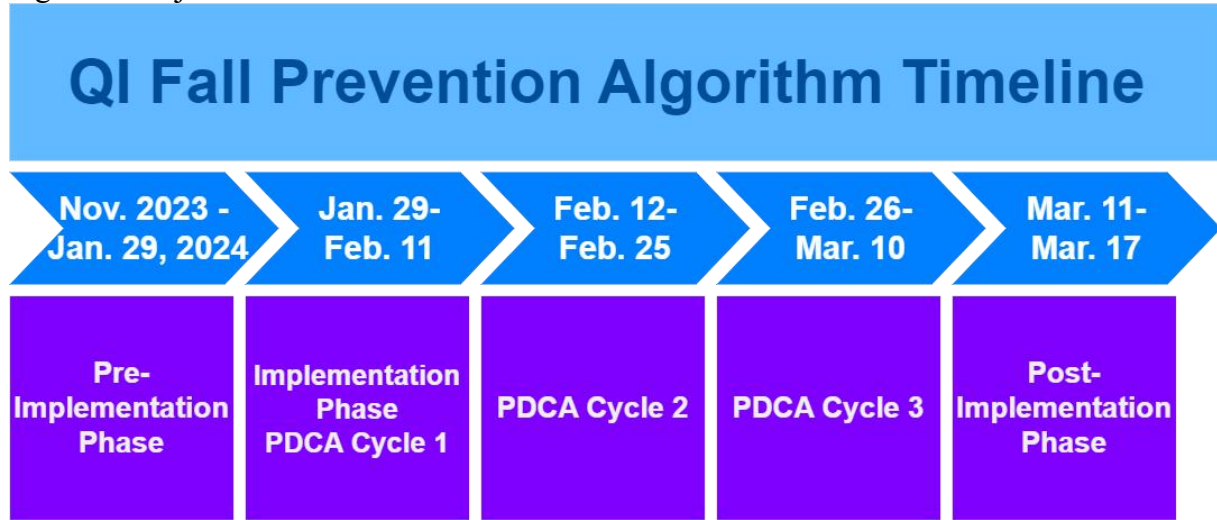
At the end of the each 2 week intervention cycle the biweekly data from the daily patient census and the safety net reporting system for falls will be evaluated using descriptive statistics. Biweekly falls reporting in the safety net reporting system will be counted, then for each day of the 14 days of the biweekly cycle the patient census will be counted, the number of falls will be divided by the census number and multiplied by 1,000, giving a rate of falls per occupied bed days for the unit. This rate will be graphed on a run chart with each biweekly cycle. The run chart will give a visual representation of any changes in fall rates observed during the trial. The lead investigator will analyze data entries from the issues log using qualitative data analysis approach, the log entries collected and entered into the one drive document will be analyzed using thematic Inductive coding and grouped into themes identifying similarities and differences and determine connections and interpret meaning to identify any issues or weaknesses to plan for improvements that can be implemented in subsequent cycles. Survey response data entered into Excel will be analyzed using descriptive statistics, standard deviation of responses will be calculated using the Excel function STDEV.S which will calculate the standard deviation (SD) of the sample, each response SD will reveal unevenly distributed responses which then can be

interpreted, if low SD is found it suggests there is agreement in response patterns and high would indicate a high disagreement in response patterns, this data analysis will compare the pre- and post-implementation data sets which will reveal if nursing staff found benefit to the implementation of the algorithm.

‘Act’ Phase

Conclusions will be drawn on whether the algorithm was beneficial at the end of the trial. The Fall rate run chart, Issues log qualitative data analysis conclusions, LMS training statistics and in service knowledge check quiz statistics and any other key findings or take aways. Results, findings, observations, issues that arose and strategies that were used to overcome barriers and setbacks will be presented to stakeholders, QI department, and unit staff to explore adaptations for future cycles. Feasibility of sustained implementation on pilot unit, feasibility and benefit of broader implementation to other floors or hospital wide will be explored at the end of this project. Through collaboration with stakeholders, unit and organizational leadership discussion and planning for future policy development would ensure sustainability of improvement on a broader scale.

Figure 2. Project Timeline



Evaluation

Evaluation of this QI project will hinge more significantly on clinical significance verses statistical significance, as just one less fall is an improvement that can be measured in both human and financial impact on part of the patient and the facility. SMART goals with specific, achievable, measurable goals was developed to aid in the evaluation process of this project (See Appendix F). Analysis of fall rates will be calculated using descriptive statistics with data calculated from daily patient census and safety net reporting of fall incidence, number of falls will be divided by the census number and multiplied by 1,000 giving the fall rate per occupied bed date. This statistical data can then be compared to historical calculations of unit fall rates. Using descriptive statistics to compare historical unit fall rates with trail period fall rate will determine if there was a statistically significant improvement in falls.

Pre- and Post- implementation survey response data will be analyzed using descriptive statistics, standard deviation of responses will be calculated using the excel function STDEV.S which will calculate the standard deviation of the sample. Evaluating the deviation of responses

overtime will give insight into if the implementation of the algorithm was found to be beneficial to the nursing staff. This information can then be used to guide future implementation efforts by providing insight into nursing staff perception and attitudes toward the intervention and implementation.

Knowledge check quiz data that will be obtained during the in-service will be calculated using descriptive statistics to determine if the provided education for implementation is adequate and aid in identifying barriers prior to implementation. This data will also help guide any future efforts for implementation as a major factor influencing success of this project is the nursing staff understanding how to use the algorithm, where to find it for reference when needing to use it and knowing when it is appropriate to use.

Qualitative data analysis approach will be used to interpret data collected during observations and the issues log entries. Thematic Inductive coding of the data into similar themes then compared and contrasted and interpreted into overarching meaning will yield insight into the strengths, weaknesses, and barriers encountered during the project. Observational data analysis will aid in identifying any changes observed in staff habits and perceptions throughout the process as well. Information garnered from these insights can then be applied to future implementation efforts to further improve and refine the process.

CHAPTER THREE

QUALITY IMPROVEMENT MANUSCRIPT

Contribution of Authors and Co-Authors

Manuscript(s) in Chapter(s) [3]

Author: Tera Ann Doyle

Contributions: As sole author; conceived and designed the analysis; collected the data; contributed analysis tools, performed the analyses and wrote the manuscript.

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Tera Ann Doyle

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Wolters Kluwer

Abstract

Background: Falls are the leading cause of preventable hospital-acquired adverse events, approximately one million falls occur in U.S. hospitals annually, one-third resulting in injury. Fall prevention clinical practice guidelines lack consensus, however evidence within the literature indicates multifactorial approaches are effective at reducing falls.

Local Problem: Despite an overall “A” Leapfrog Hospital Safety Grade, the pilot facility performs lower than national average in patient safety and injury category. The pilot unit has the second highest fall rate within the facility.

Methods: To reduce unit fall rate and improve the process for escalation of fall prevention interventions, an algorithm was developed and implemented over a 6 week period utilizing, Plan Do Check Act (PDCA) cycles in 2 week intervals, total of 3.

Interventions: A fall prevention algorithm was developed and implemented. Accompanying electronic health record (EHR) components were introduced in the second PDCA cycle. EHR components included risk assessment criteria specific task list alert and a DocSet that contained a hyperlinked digital copy of the algorithm and the charted risk assessments.

Results: There was an overall decrease in fall rate and fall events during the intervention period. Survey results indicate staff perception of utility, process improvement and benefit of the algorithm implementation.

Conclusions: Findings indicate clinical significance. Implementing a multifactorial fall prevention algorithm may improve the process of decision making for the escalation of fall prevention strategies and may prevent and reduce the incidence of inpatient falls.

Keywords: fall prevention, algorithm, inpatient falls, multifactorial, quality improvement, PDCA

Clinical Problem

Inpatient falls are the leading preventable hospital-acquired adverse event, accounting for approximately 70% of all accidents reported by hospitals nationwide (Scheindenhelm et al., 2020). The financial impact can be substantial, as on average a fall while hospitalized results in an additional \$14,000 in healthcare costs (Dykes et al., 2023; Stockwell-Smith et al., 2020 & Taylor et al., 2020). The Centers for Medicaid and Medicare Services have deemed inpatient falls as a “never event,” limiting reimbursement to health care organizations (Mulkey et al., 2023 & Scheindenhelm et al., 2020). Inpatient falls are a complex problem, as there are multiple causes and risk factors that make effective solutions difficult to identify and implement. Efforts to mitigate risks for falls are widespread, yet despite these efforts inpatient falls remain a serious concern (Taylor et al., 2020 & Woltsche et al., 2022).

Fall prevention clinical practice guidelines are vague and lack consensus regarding recommendations for specific interventions and standardized assessments. Hospital and facilities are independently responsible for developing, implementing, and maintaining fall prevention programs within their organizations. The lack of clear clinical practice guidance has resulted in variable utilization and implementation of fall prevention programs among facilities and organizations (Mulkey et al., 2023).

According to 2023 safety reporting data only 30% of Montana hospitals hold an “A” rating in safety, ranking 21st in the nation for hospital safety. The pilot facility for this quality improvement (QI) project holds an “A” rating for overall safety, however it performed below national average for patient safety and injury (The Leapfrog Group, 2023). The pilot unit consistently ranks among one the highest for fall rates within the facility. The site organization

makes improvements in patient safety and falls one of its top priorities for quality improvement efforts. Falls being an inherently complex and multifactorial problem may require a solution that is in turn complex and multifactorial. There is a growing body of evidence that multifactorial approach fall prevention programs are cost effective strategies at reducing inpatient falls (Mulkey et al., 2023).

Review of the Literature

A review of the literature revealed an abundance of evidence that causes of falls are complex, multifactorial and often non-modifiable. A predominant theme within the known literature emerged indicating that multifactorial approach fall prevention programs are an effective strategy for fall prevention and reduction. There are several multifactorial approaches that are supported by evidence for efficacy in reducing falls. Multifactorial approaches vary in implementation strategy, risk assessment tools, risk stratification and specific interventions utilized (Mulkey et al., 2023). Multifactorial approaches that incorporate evidence-based fall risk assessment tools and risk stratification with accompanying targeted patient and risk interventions appear to have the most efficacy. Evidence supports implementation of a multifactorial approach fall prevention program incrementally. Building on an existing fall prevention program to incorporate a multifactorial approach is a cost effective, feasible and sustainable strategy to prevent and reduce falls (Alvarado et al., 2023 & Mulkey et al., 2023).

Conceptual Framework

The Plan Do Check Act (PDCA) Cycle, otherwise known as the Deming Cycle, was the framework utilized to guide this QI project. The PDCA Cycle was originally designed with the

intention of improving assembly line processes. The structure and function of The PDCA Cycle enables for efficient implementation, information and insight gathering throughout the process and incorporates a plan for sustainability, making it well suited for this QI project. The PDCA Cycle is structured in a way to allow for quick learning with observation of small changes in a process and the effect on the overall system. The cycles are implemented in short intervals allowing for rapid adjustment and reassessment with the least amount of disruption to the overall system. This framework offered the opportunity to learn from successes, as well as observe and learn from failures and mistakes. (AHRQ, 2023). Utilization of the PDCA cycle was beneficial to this QI project as it was easy to use, intuitively structured, and effective for the rapid assessment of intervention impact. This framework allowed for observation and learning from both what worked and what did not work through the standardized process of assessment, reassessment, and evaluation. The PDCA cycle incorporates a plan for sustainability which make it especially well suited for QI projects. A process map was created to outline the implemented project steps and illustrate the progression through the PDCA cycles (See Appendix G).

Aims/Purpose

The aim of this QI project was to develop and implement a multifactorial approach algorithm that incorporates multiple risk assessments, risk stratification, and specific correlating interventions to improve the process for escalation of fall prevention interventions. The intention of the algorithm was to aid nursing staff in decision making to escalate fall prevention interventions based on risk stratification and assessments findings. The purpose of this QI project was to improve and build on the existing fall prevention program by incorporating a multifactorial approach strategy to prevent and reduce inpatient falls.

Methods

Context

The setting of this QI project was a 35 bed med/surg unit in a Montana regional hospital. This facility has an overall “A” hospital safety rating, however performance in the category of patient safety and injury is below than national average (The Leapfrog Group, 2023). The pilot unit has the second highest fall rate among inpatient units within the facility. Patient, staff and process factors contribute to the high fall rate on this unit. The patient population consists of patients of advanced age, impaired gait or mobility, cognitive impairment, and/or neurological deficits, with the majority having at least one or more risk factors for falls. Staff-related factors include frequent short staffing and a low ratio of experienced nurses to inexperienced nurses.

Observations and needs assessment interviews revealed several system and process factors that contribute to falls on this unit. Multiple staff expressed frustration regarding the lack of a standardized process with clear and concise guidance for the escalation of fall prevention interventions. Abrupt changes in patient condition were noted as being an especially critical circumstance that lacked adequate guidance. Nursing staff reported having difficulty at times determining the best course of action to take to ensure patient safety. New grad and temporary nurses expressed confusion and a lack of confidence in decision making in regard to what patient criteria and circumstances indicated the need to escalate fall prevention interventions. Initiation of patient video monitoring (AvaSure/AvaSys) and contacting a provider for a 1:1 sitter order were identified as being interventions that lacked specific guidance. The lack of a clear process was noted to be a contributing factor in delays in appropriate initiation of prevention strategies.

The site organization established a fall reduction committee over a decade ago, which works closely and in conjunction with the Quality Improvement Department. This committee tracks and reports fall data for all inpatient units, conducts and reviews root cause analyses of fall events with the aim of continuous improvement in fall prevention efforts. This facility also recently expanded the patient video monitoring department with the acquisition of 12 additional patient monitoring machines and additional staff to monitor video feeds, doubling the number of machines available for inpatient units.

Ethical Considerations

Ethical considerations were addressed by ensuring all staff were informed that participation in this project was voluntary, non-mandatory and decisions to opt out of participation would not result in any repercussions or reprimand. Verbal consent was obtained prior to implementation. Mitigation strategies to minimize staff distress related to process change and increased or disrupted workflow included staff education and preparation prior to project implementation. Privacy and confidentiality was ensured by maintaining only the minimum necessary data, all patient and participating staff information was de-identified. All information stored electronically was kept on the lead investigator's organization associated Microsoft 360 account OneDrive, which is secure and encrypted. The information in paper form was kept in secure locations ensuring access was limited to individuals involved in the project. The Issues Log was kept in a clearly marked distinguishable folder at the charge nurse station, completed quizzes and surveys (those that were returned in paper form) were kept in a file cabinet in a locked area which was limited to staff only access. Approval through the Montana State University Internal Review Board was obtained prior to initiation.

Intervention/Practice Change

An implementation team was formed to plan and develop this QI project. This interdisciplinary team consisted of lead investigator, representatives from the QI Department, members of the pilot facility falls prevention committee, pilot unit leadership and self-governance committee, an Information Technology (IT) Department Nursing Informaticist and several other stakeholders. A multifactorial approach algorithm aimed at guiding decision making and appropriate escalation of fall prevention interventions was developed as the primary intervention in this project (See Appendix H). The IT informaticist team member and lead investigator developed electronic health records (EHR) components that allowed the algorithm to be incorporated into the charting system (See Appendix I).

The Fall Prevention Algorithm is a flow chart comprised of multiple level components with decision branching. Top entry components are based on assessment criteria the facility already had established in routine nursing assessments tools that evaluate mobility status, mental status and history of high risk for falls. If criteria are met in the top entry components progression to the next level is indicated on the flow chart to the corresponding downstream mid-level component. Mid-level components either suggest specific interventions, focused assessments, or pose a question with the decision guiding a branch to the next downstream component. End components branch from two decision pathways. If the suggested assessments and interventions suggest the patient has a reduced ability to maintain safety the end components offer suggested interventions to escalate fall prevention precautions or offer guidance for appropriate notifications and follow up. If the decision pathway from previous assessments indicate that the patient can maintain safety with the interventions being utilized the end

components offer guidance on re-assessment, notifications and follow-up that is appropriate for the patient status.

Top entry components include high fall risk status (due to history of falls or designation of high risk based on John Hopkins Fall Risk Assessment score ≥ 13), acute change in patient condition, and status of confusion or cognitive impairment with a positive bCAM (The Brief Confusion Assessment Method) Delirium Screening score. Intervention mid-level components suggest interventions including placing the patient on high fall risk precautions and utilization of bed and chair alarms. Assessment mid-level components suggest appropriate focused assessments including mobility and functional activities of daily living, safe use of assistive devices, neurologic, orthostatic hypotension, medication review, and fall risk reassessment. Decision branching Mid-level components include questions such as, is the acute change in patient condition related to a change in mental status or mobility status and did the assessment findings indicate reduced ability to maintain safety.

The end component that branches from no reduced ability maintain safety with current interventions terminates with suggested interventions including high fall risk precautions if not already initiated, notifications of patient condition and assessment findings to provider and charge nurse and reassessment as indicated. The end components that branch from reduced ability to maintain safety outline the process for escalation of fall prevention interventions. These interventions include patient video monitoring (component box contained contact information to the video monitoring clerk and notice that no provider order is necessary), 1:1 sitter observation, and suggested notifications to provider and charge nurse of patient condition and intervention

utilized. Decision branches on these end components include questions such as, was a video monitoring machine available and was the intervention successful (See Appendix H).

The Fall Prevention Algorithm was implemented into workflow on the pilot unit January 29, 2024. The intervention period spanned over 6-weeks, with 2 week PDCA cycles, total of 3. The last PDCA cycle concluded on March 11, 2024. In the first cycle, the algorithm was printed in paper form and posted at charting stations. Digital copies of the algorithm were distributed to all unit staff, sent through the organization associated email. The EHR components were implemented in the second PDCA cycle (See Appendix I). A rule was created with the EHR charting system that looked at both the John Hopkins Fall Risk Assessment score and the bCAM score. If either criterion were met the rule created a onetime task that displayed on the patient chart task list to alert nursing staff to review the Fall Prevention Algorithm. The task had a hyperlink to a digital copy of the algorithm that could be displayed for review by the nurse. The task also linked to the assessment score bands and the charted interventions within a DocSet in the Activity View Band of the EHR system. The DocSet allowed for all documentation elements to be viewed in one place.

Measures

Multiple measures were used throughout this project to collect data for both quantitative and qualitative analysis. Observation data were collected throughout every phase of the project through informal interviews and on-site observations. Surveys were created using the forms function within the organization associated lead investigators's Microsoft 360 account, were anonymous and voluntary. All digital data gathered from measures were de-identified and stored within the organization associated lead investigators's Microsoft 360 account in either a Word

document or an Excel spreadsheet. All paper data were de-identified and stored in a secure location with access limited to individuals involved in the project.

Census and Falls Data. The Healthcare Informaticist team member collected site unit daily patient census data from the pilot facility electronic bedboard system and falls data gathered from the safety net reporting system. All data was de-identified and then compiled into an Excel spreadsheet, which was shared with the lead investigator's organization associated account. These metrics were gathered to calculate fall rate and fall event occurrences from historical data to intervention period data for analysis.

Electronic Health Record Data. The IT Nursing Informaticist gathered data from the EHR system during the intervention period, this data included patient FIN, date, and time of every task list alert firing, as well as the completion status of the task. Completion status of the task was determined by if they nurse checked an icon indicating the fall prevention algorithm was reviewed. Data were compiled into an Excel spreadsheet, which was then shared with the lead investigator's organization associated account. The data were de-identified and tallied into a separate Excel spreadsheet for analysis. This metric was gathered to measure staff responsiveness to the EHR task list alerts.

Surveys. During the planning phase, a pre- and post- implementation survey was created which contained 5 statements with 3 Likert type semantic differential scale response options including strongly disagree, neutral, to strongly agree (See Appendix J) using the forms function within the lead investigator's organization associated Microsoft 365 account. The pre-implementation survey was sent out to nursing staff via organization email the week prior to

implementation and all were collected by the end of the first week of PDCA cycle 1. All responses were anonymous and voluntary. The survey was aimed at gauging staff perception of current fall prevention practices on the unit. The first survey item, “I feel confident in my decision making when considering obtaining an AvaSys for patients at high risk for falls”, was aimed at gauging staff perception of their confidence level and familiarity with this fall prevention intervention prior to intervention. The second survey item was aimed at gauging staff perception of their confidence level for obtaining a provider order for a 1:1 sitter. The third survey item was aimed at gauging staff perception of adequate guidance readily available to escalate fall prevention interventions. The fourth survey item was aimed at gauging perception of adequate process in place to escalate fall prevention interventions. The final survey item was aimed at gauging perception of falls being a major concern for the pilot unit prior to algorithm implementation. The post implementation survey, which was identical to the pre-implementation survey, was then sent out to the unit nursing staff 1 day after the intervention period concluded. Pre and post-implementation survey data were utilized to compare staff perceptions before and after algorithm implementation.

The stakeholder observation survey was created using the forms function of Microsoft 365 and was sent out to all unit staff via email after the intervention period concluded. This post-project survey contained 2 survey items, the first was a question that asked, “Did you find the Fall Prevention Algorithm useful?”, with 3 Likert type semantic differential scale response options including yes, did not utilize, and no. This survey item was aimed at gauging staff perception of algorithm utility. The second survey item had a free text box asking for any feedback pertaining to the project in general. This survey item was aimed at gathering any

additional data that may have been missed through other measures and offered the staff an opportunity to openly communicate their perception of the project anonymously.

In-Service Education Sessions. Several in service education sessions were held on the pilot unit throughout the project. Sessions were held during the pre-implementation phase immediately prior to the first PDCA cycle and between PDCA cycles during the intervention period. Sessions included information on project goals, purpose, timeline, algorithm information and instructions, updates on issues, barriers, resolutions and intended improvements with each PDCA cycle. Each in-service education session was presented by lead investigator using both verbal and visual methods. PowerPoint presentations were updated throughout the cycles to remain current with PCDA improvements. Sessions were typically held during evening shift change huddles, as this time ensured presence of both day and night shift staff. These sessions were open to all staff members.

An in-service post education quiz was developed, all responses were anonymous and voluntary. This quiz contained 5 multiple choice questions, was in paper form, and was distributed and collected at the end of every session (See Appendix K). In-service post education quiz data were collected and kept in a secure location until entered into an Excel OneDrive document.

Issues Log. An issues log and accompanying instruction sheet were developed by lead investigator to aid in the identification, reporting and tracking of problems, barriers and resolutions of issues encountered by staff during the project to facilitate improvements in PDCA cycles (See Appendix L1). Issues log entry data were collected at the end of each PDCA cycle, compiled in an Excel document and stored in a Word document. An issues log instruction sheet

was also developed to inform staff of purpose and proper usages of the issues log, were to locate and store the binder and reminded staff to not include identifying information (See Appendix L2).

Analysis

Quantitative Data Analysis

Census and Falls Data. Daily patient census and fall event data were analyzed using descriptive statistics. Fall rate was calculated using the standardized calculation used by the National Database of Nursing Quality Indicators (NDNQI) to report and compare fall rates of organizations (AHRQ, 2023). Fall rate was calculated using the following formula: number of patient fall events divided by census number and then multiplied by 1,000, giving a rate of falls per occupied patient bed days. Census was calculated midnight to midnight. Fall rates were calculated from historical and intervention period data. Historical data included, the 30 days to the intervention period and data from the same calendar days of the intervention period from the previous year. Fall rates were then compiled and a stepped bar chart was created for visual analysis and comparison (See Figure 3). Fall events (actual number of fall occurrences) data from same calendar days as the intervention period the previous year and the intervention period were compiled and a bar chart was created for visual analysis and comparison (See Appendix M).

Electronic Health Record Data. EHR task list alert data were analyzed using descriptive statistics. Data from each task list alert that fired during the intervention period were compiled. Systems check entries were accounted for and excluded from data set prior to analysis. Each task list trigger incident was added together to calculate the total number of times during the intervention period the task list alert fired in the EHR system. The number of task list trigger

alert incidents charted as completed by staff was calculated and then divided by the total number of task list trigger alert incidents to give the percentage of alerts that were responded to by staff. Task list trigger data was compiled and a pie chart was created for visual analysis (See Figure 4)

Survey Data. Pre and post-implementation survey response data were analyzed using descriptive statistics. The number of responses (strongly disagree, neutral, strongly agree) for each survey item from the pre-implementation survey were tallied in Excel spreadsheet during the second PDCA cycle. A week after the intervention period the post-implementation survey data were compiled then tallied and entered into a separate column of the Excel spreadsheet for analysis and comparison. Two vertical stacked bar waterfall charts were created one for each survey and aligned side by side for visual analysis and comparison (See Figure 5). Standard deviation (SD) of responses were calculated using the Excel function STDEV.S, for each survey item and compared within the sample. SD was used to analyze, compare and contrast response patterns and interpret the level of agreement among the responses of each survey item. A data table was created containing the standard deviations of survey items from pre and post-implementation survey responses aligned side by side for visual analysis and comparison (See Table 1).

The stakeholder observation survey contained two items. The first survey item was a question with Likert type semantic differential scale response options of yes, did not utilize, and no. The number of each response option (yes, did not utilize and no) were tallied and analyzed using descriptive statistics. A bar chart was created for visual analysis and interpretation (See Figure 6). The second item was an open-ended free text response, analysis will be discussed further in the qualitative data analysis section.

In-Service Post Education Quiz Data. In-service education session post quiz data were analyzed using descriptive statistics at the end of each education session. Responses for each quiz question were tallied and compiled in an Excel spreadsheet. The question identified as having the highest number of incorrect responses was noted in the running Excel spreadsheet and marked as a focus point for improvement efforts in the subsequent PDCA cycle. At the conclusion of the final in-service education session, all of the quiz data were compiled, and a stacked bar chart was created for visual analysis and interpretation (See Appendix N).

Qualitative Data Analysis

Qualitative data analysis was used to analyze the data obtained from informal interviews, site observations, issues log entries, and the stakeholder observation survey. All data from sources were compiled in a Word document for analysis. Thematic inductive coding was used to formulate themes and organize the results. A thematic map which was created for visual interpretation (See Appendix O). Data obtained during PDCA cycles were analyzed to identify themes, issues, barriers, and were used to guide improvement planning for subsequent cycles and future recommendations.

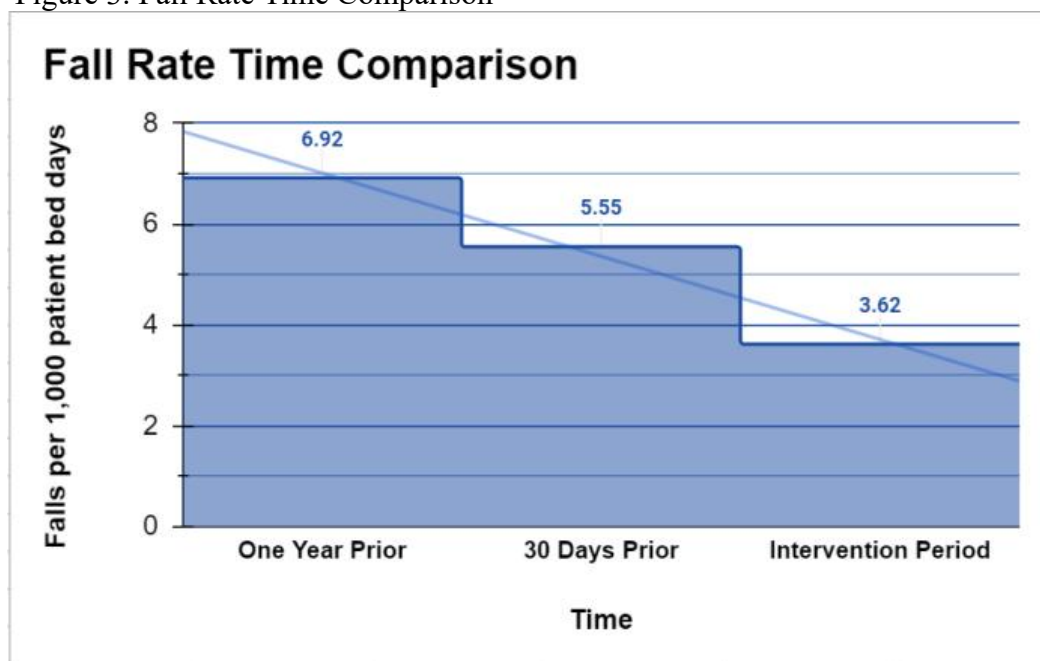
Results

Quantitative Data Results

Fall Rate Results. There was an overall decrease in fall rate and fall events on the unit during the intervention period when compared to historical data. The fall rate during the intervention period was 3.62 falls per 1,000 patient bed days. The fall rate the previous year during the same calendar days as the intervention period was 6.92 falls per 1,000 patient bed

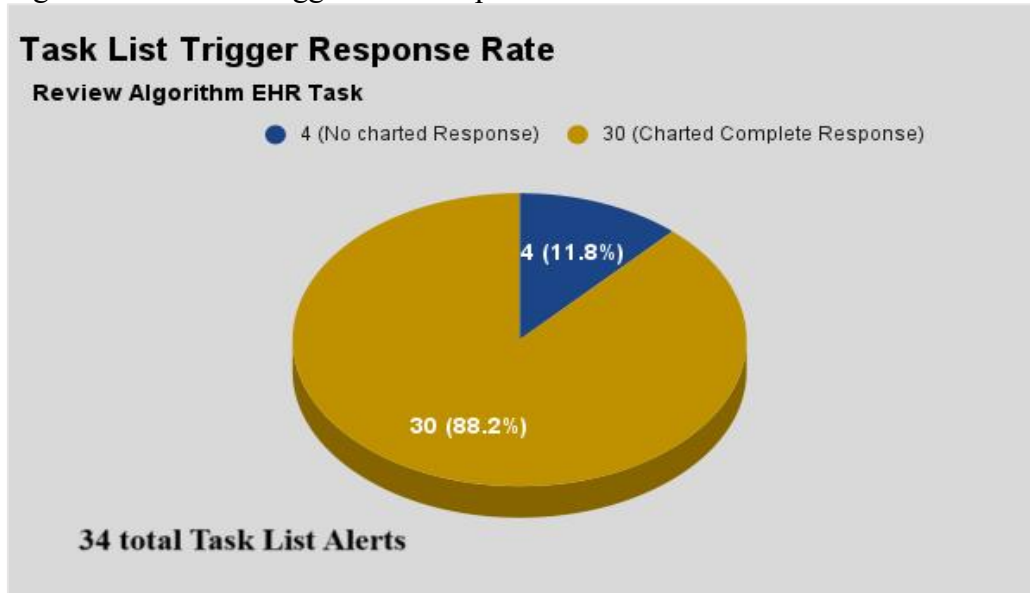
days. The fall rate during the 30 days prior to intervention implementation was 5.55 falls per 1,000 patient bed days (See Figure 3). There were four fall events on the pilot unit during intervention period and eight fall events during the same time period the previous year. Revealing half as many fall events during the intervention period with 4 less fall events when compared to the same time period the previous year (See Appendix M).

Figure 3. Fall Rate Time Comparison



Electronic Health Records Results. The task list alert fired 34 times during the intervention period when data entries from systems checking were accounted for and excluded. Staff marked the reviewed fall prevention algorithm task as completed in the EHR system 30 times out of the 34 times the alert was fired. There were 4 task list alerts that fired that were not marked as completed by staff. Staff selected the completed icon of the task list alert to review the fall prevention algorithm when prompted by the EHR component a majority of the time the alert fired with a response rate to task list trigger of 88.2% (See Figure 4).

Figure 4. Task List Trigger Staff Response Rate Results



Survey Results. There were 11 responses out of a total of 48 pre-implementation surveys sent out. Survey item 1, which was aimed at gauging staff perceived confidence in obtaining a patient video monitoring machine, had a high level of agreement in response pattern (0.67 SD, n=11), with 8 strongly agree, 2 neutral and 1 strongly disagree responses. Item 2, aimed at gauging staff perception of their confidence obtaining a 1:1 sitter order from a provider had a moderate level of agreement in response pattern (0.69 SD, n=11), with 7 strongly agree, 3 neutral and 1 strongly disagree responses. The third item which was aimed at gauging staff perception of guidance available in current process for escalation of fall prevention interventions, had a moderate level of agreement in response pattern (0.67 SD, n=11), with 5 strongly agree, 5 neutral and 1 strongly disagree responses. The pre-implementation survey revealed the highest level of disagreement in response pattern (0.89 SD, n=11), with the fourth survey item (See Table 1). Item 4 was aimed at gauging perception of an adequate process in place for escalation of fall prevention interventions and had responses as evenly distributed as possible considering an odd

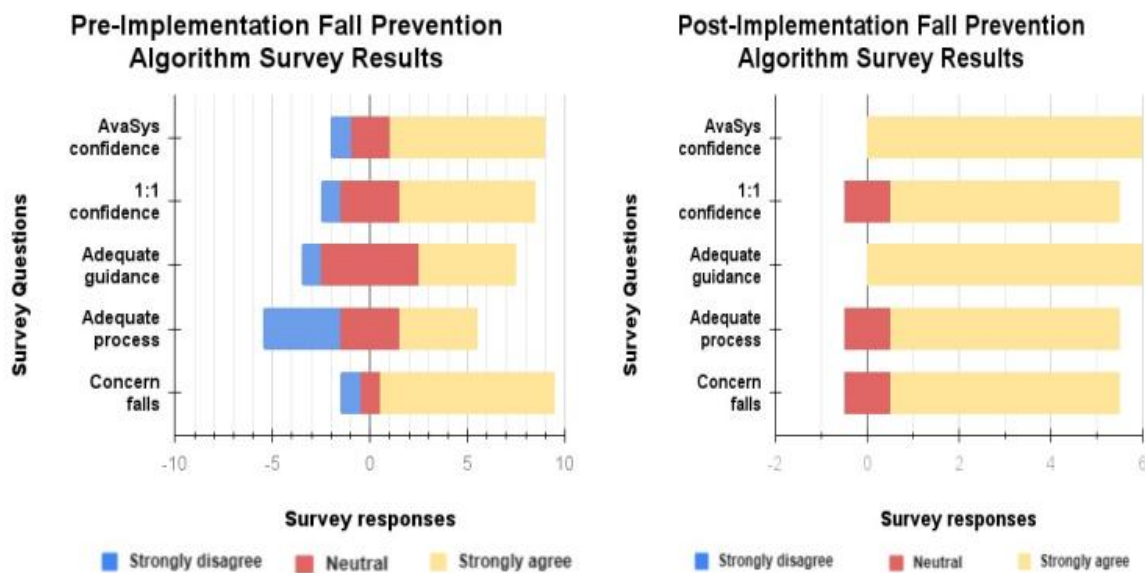
number of total responses, with 4 strongly agree, 3 neutral and 4 strongly disagree. The survey with the highest level of agreement in response pattern (0.65 SD, $n=11$) was the fifth item which was aimed at gauging if falls are a major concern for the unit, with response strongly agree having the overwhelming majority, 9 strongly agree, 1 neutral and 1 strongly disagree (See Figure 5).

The post-implementation survey contained identical survey items as the pre-implementation survey and was sent out to the same email list (See Appendix J). There were 6 responses out of a total of 48. Post-implementation survey results showed a high level of agreement in response pattern of all survey items and revealed a marked shift in level of agreement in response pattern across all survey items compared to pre-implementation survey results (See Table 1). The first item (AvaSys confidence) response pattern was (0 SD, $n=6$) with 6 strongly agree, 0 neutral, and 0 strongly disagree responses (See Figure 5). The second item (1:1 confidence) response pattern was (0.41 SD, $n=6$), with responses of 5 strongly agree, 1 neutral and 0 strongly disagree post intervention. The third survey item (adequate guidance) response pattern was (0 SD, $n=6$), with responses of 6 strongly agree, 0 neutral and 0 strongly disagree. Item 4 (adequate process) response pattern was (0.41 SD, $n=6$), responses consisted of 5 strongly agree, 1 neutral and 0 strongly disagree. Item 5, (Fall unit concern) response pattern was (0.41 SD, $n=6$), with responses consisting of 5 strongly agree, 1 neutral and 0 strongly disagree.

Table 1. Pre-Post Implementation Survey Response Pattern Comparison

Pre-Implementation Survey Results		Post-Implementation Survey Results	
Survey Question Focus	SD (n=11)	Survey Question Focus	SD (n=6)
AvaSys confidence	0.67	AvaSys confidence	0
1:1 confidence	0.69	1:1 confidence	0.41
Adequate guidance	0.67	Adequate guidance	0
Adequate process	0.89	Adequate process	0.41
Fall unit concern	0.65	Fall unit concern	0.41

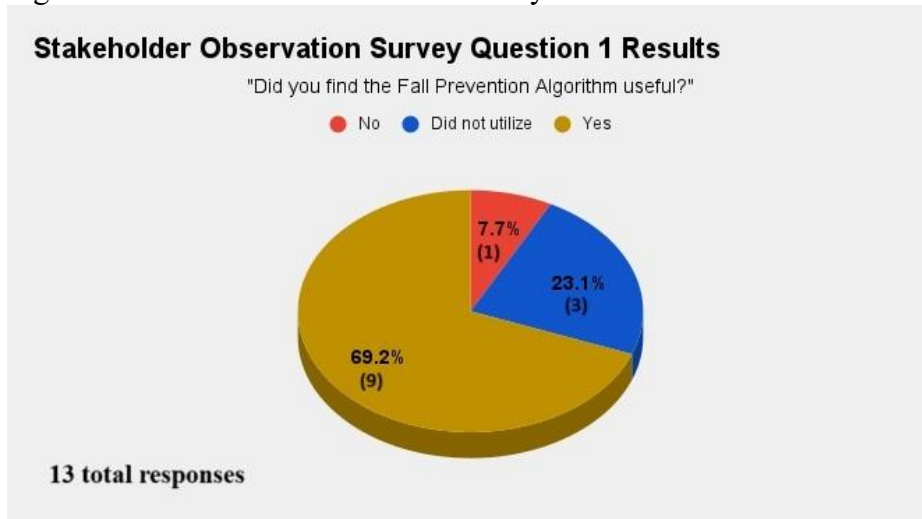
Figure 5. Pre-Post Implementation Survey Results Comparison



The Stakeholder observation survey contained two survey items. The first survey item was a question that asked, “Did you find the Fall Prevention Algorithm useful?”, with 3 Likert type semantic differential scale response options including yes, did not utilize, and no. The second survey item was an free text box that asked for any feedback pertaining to the project in general, the results to this survey item will be discussed further in the qualitative results section. There were 13 responses out of a total of 48. The first survey item showed a moderate level of agreement in response pattern (SD =0.65, n=13). With 9 responses of yes, 3 for did not utilize

and 1 for no (See Figure 6). Revealing 69% of responses were yes, did find the fall prevention algorithm useful (See Figure 6).

Figure 6. Stakeholder Observation Survey



In-Service Post Education Quiz Results. The first in-service post education sessions in PDCA cycle 1 had 39 quizzes returned for scoring, there were no quizzes with omitted question responses. There was a total of 16 errors within the scored quizzes. Results for question 1 (Issues log location) had 1 incorrect response out of the total of 39, showing an error rate of 2.6%. Question 2 (AvaSys provider order) had 2 incorrect with an error rate of 5.1%. Question 3 (EHR hyperlink) have 4 incorrect with an error rate of 10.3%, question 4 (EHR issues reporting location) had 5 incorrect with an error rate of 12.8%, and question 5 (Task list) had 4 incorrect responses with an error rate 10.3%.

In the second round of in-service education sessions in PDCA cycle 2 there were a total of 12 returned quizzes, no quizzes returned had any omitted responses. Questions 1, 3 and 4 each had 1 incorrect response with an error rate of 8.3%. Question 2 had 0 incorrect with an error response rate of 0%. Question 5 had 2 incorrect with a 16.7% response error rate.

In the third round of in-service education sessions in PDCA cycle 3, there was 10 returned quizzes with a total of 2 response errors, no quizzes returned had any omitted responses. Questions 4 and question 5 each had one incorrect with an error rate of 10%, questions 1, 2, and 3 had 0 errors with a 0% error rate (See Appendix N).

Qualitative Data Results

Qualitative data obtained from site observations, informal interviews, issues log and the stakeholder observation survey were analyzed, and results developed into themes using thematic coding with a total of 23 data entries contributed. Themes that emerged from the data with the highest frequency were perceived process improvement and algorithm utility. There were 15 responses or log entries that contributed to the theme development for process improvement and algorithm utility accounting for 65% (n=23) of total data entries included in theme development. Notable quotes that guided the development for the theme of process improvement included, “it provides a pathway for nurses to use when implementing fall precautions,” “gives us the process when there is a fall”, and “clear outline for the process”. The development for the theme of utility or usefulness was guided by some notable quotes including, “I can see if a new nurse is flustered with a crumpling patient, how having this could help them decide what to do next, remind them what to check” and “helpful” (See Appendix O).

Difficulty with EHR functionality, no change in practice, and did not utilize the algorithm were themes that also emerged but with less frequency. EHR functionality theme development arose from 6 responses or log entries accounting for 26% (n=23) of total qualitative data entries. The EHR functionality theme arose from notable quotes including “I think it’s a really good idea to have it pop up in chart” and “Difficulty finding/ Not triggering”. There were 2 responses that

contributed to theme development of no change in practice, which was 9% (n=23) of total qualitative data entries. Notable quotes highlighting theme development of no change in practice included, “did not use” and “I made no practice changes.” The issues log entries allowed for identification of issues and barriers with the algorithm which contributed to theme development and facilitated several improvements throughout the PDCA cycles. The Thematic map can be reviewed in its entirety in Appendix O.

Discussion

Evaluation of this QI project was based on clinical significance. The results of this project suggest there was perceived improvement in the process, guidance and staff confidence in escalation of fall prevention interventions with the implementation of the fall prevention algorithm. This QI project appears to have achieved the goals originally set forth during the project proposal phase. The SMART goals were achieved with only marginal deviation (See Appendix F). The only goal not completely achieved was the goal of 75% of staff responding in surveys affirmatively for perception of algorithm aiding in decision making for escalation of fall prevention interventions. However, this is a marginal deviation as the stakeholder observation survey results showed 69% of staff responded that the algorithm was useful.

Comparison of the pre and post implementation surveys revealed that after implementation of the algorithm there was collective agreement in response patterns in all categories and the perception of strongly disagree following the implementation of the algorithm was no longer representative within the sample. The post-implementation survey also revealed that not only was there more agreement in response patterns, but that agreement coincided with increased response rate of strongly agree in all categories. This indicates that post

implementation of the algorithm there was perceived improvement in process, guidance, and confidence in obtaining a patient video monitoring machine and 1:1 sitter provider order. Qualitative results reflected similar findings in response pattern when compared to survey results analyzed using descriptive statistics. The majority of qualitative responses contributed to theme development of process improvement and algorithm utility.

There was one notable aspect of the algorithm that may be attributed to the increase in confidence to obtain a patient video monitoring machine. A small blurb noting the extension number for the patient video monitoring clerk and no provider order needed was included within the mid-level intervention component suggesting patient video monitoring (AvaSys/AvaSure). This was intentionally included in the algorithm flow chart based on planning phase needs assessment findings which indicated that several staff were not familiar with the process of placing a patient on video monitoring, informal interviews revealed several staff did not know who to call or where to obtain a patient video monitoring machine and were unaware that a provider order was not necessary to utilize this intervention. The inclusion of these two important pieces of information within the algorithm flow chart may have increased the level of confidence staff had in utilizing this intervention when considering escalating fall prevention interventions.

The pilot unit did see a reduction in both fall rate and fall events during the intervention period and not only met but exceeded the quality scorecard goal of less than 3 falls per month. An improvement with just one less fall is beneficial for patients and the organization. However, reduction in fall rate and fall events cannot be conclusively attributed to the implementation of the fall prevention algorithm. This reduction could be attributed to multiple other factors including increased fall prevention education and awareness.

A significant factor that may have had an impact on fall rate within the pilot facility was the acquisition of 12 additional patient video monitoring machines within the preceding months prior to project implementation. The doubling of available machines may have contributed to the reduction in falls during the intervention period as there was a pattern of reducing fall rates in the months leading up to implementation. The plan for data collection shifted in the planning phase to include not only historical data from the previous year, but to also to include data from the month prior of implementation for comparison due to the additional machines in the preceding months and the observed reduced fall rates. The inclusion of data from 30 days prior was thought to be a more comparable sampling as opposed to one year prior, due to the change in available resources. The additional patient video monitoring machines may have contributed to reduced falls as the pattern of fall rate data suggests. If this is in fact the case, this information further supports the utility of the fall prevention algorithm as project findings indicate staff felt more confident utilizing this intervention after implementation and contact information to acquire the machines was included in the algorithm. The fall prevention algorithm could have contributed to reducing falls as a supportive factor by increasing the utilization of the patient video monitoring machines.

There is evidence that the inclusion of the EHR components aided in process improvement through ease of access to the algorithm and alerts to staff when risk stratification criterion were met. The EHR data results revealed that staff were highly responsive to the alert and qualitative data findings from the stakeholder observation survey revealed a notable quote that contributed to theme development for EHR functionality which was, “I think it’s a really good idea to have it pop up in the chart” (See Appendix O).

In-service education sessions appear to have been effective at conveying the necessary information for the utilization of the algorithm and its associated components. The in-service post education quizzes revealed the highest number of response errors to questions related to EHR components. The percentage of errors decreased over time with subsequent PDCA cycles. The questions identified as having the highest number of incorrect responses were noted and during subsequent in-service education sessions those questions were focused on within PowerPoint presentation and explained in more detail by lead investigator (See Appendix N). The results indicate that the education was effective overall as the error rates were low even during the first session but also indicate efficacy of the improvements to education sessions made throughout the cycles.

Limitations

There were several limitations and barriers throughout this project implementation. There was a delay in implementation of the EHR builds, which were not able to be implemented until the second PDCA cycle and the EHR task list trigger alert rule was initially set to only fire on the first occurrence of charting a risk stratified criteria, however this was adjusted during the third PDCA cycle to fire with every charted occurrence of met criterion. The development and utilization of the proposed learning management system education modules was not feasible in the short intervention period, as this capability is limited to only a very small number of staff within the organization and staff availability within the intervention period was a constraint. There is limitation to generalizability of results to units or settings that have lower fall risk patient populations as the need for escalation of fall prevention interventions may not be as common of an occurrence. Units or setting that have a higher percentage of experience nursing

staff versus inexperienced nursing staff may find less utility or necessity for a tool like this as most of the staff would be more familiar with the process of escalating fall prevention interventions, more confident in their assessment skills related to changes in patient condition, more familiar with where and how to access equipment and familiar with the process for obtaining orders for 1:1 sitters. Low response rates to surveys was a limitation, however the qualitative data results did reflect similar response rates for developed themes when compared to pre-post implementation survey questions with similar themes. This indicated despite low response rates to surveys the quantitative data results were congruent with the qualitative data results. The short intervention timeframe was also a limitation to this project. A larger timeframe would have allowed for more time for staff to respond to surveys, more time to dedicate to staff education, and more data collection from EHR components, and fall rates and events.

Recommendations

Planned sustainability with site unit extension, wider unit expansion, and further evaluation of algorithm impact on falls and process improvement over time using quantitative data collection/analysis through a Six Sigma yellow belt project are recommendations in the planning phase at the conclusion of this project. The pilot unit has opted to extend algorithm implementation and other units within the facility have expressed interest in adopting and/or building on this project for implementation. Recommendations for future implementation include the incorporation of an electronic learning management system module to broaden the reach and access of education as well as provide more data collection which could aid in improvement efforts for future implementations. Future implementations may benefit from improvements with EHR capabilities, components, and functionality. EHR component improvement

recommendations include more frequent task list trigger alerts on all patients deemed high fall risk to ensure more consistent reminders to review the tool.

Recommendations also include the urge for facility consideration to develop a policy for algorithm usage if widespread implementation is anticipated. A facility policy may facilitate improvements in EHR capabilities, as a policy would allow the EHR components be visible in the charting system organization wide. Visibility of EHR components was isolated to the pilot unit during this QI project. This was not considered a limitation for the QI project as functions on the pilot unit were not limited, but facility wide policy development should be considered with broader implementation to allow HER functions to be visible across the facility. Success with future implementations with findings of efficacy using qualitative data analysis within Six Sigma projects could warrant recommendations to inform and advise evidence-based practice clinical practice guidelines to incorporate multifactorial fall prevention algorithms within fall prevention programs in the future.

Conclusion

The Fall Prevention Algorithm appears to have benefited staff, aided in decision making and improved the process of escalation of fall prevention interventions. The existing literature reflects the findings of this project with a growing body of evidence which supports the utilization of multifactorial approaches to improve fall prevention strategies. Future development of QI projects aimed at multifactorial fall prevention algorithms could greatly impact patient outcomes, decrease costs both human and financial and benefit patients and organizations. Implementing a multifactorial fall prevention algorithm may aid in decision making and improve the process for escalation of fall prevention interventions and may potentially reduce the

incidence of inpatient falls. The literature reveals evidence that there is a lack of clear fall prevention clinical practice guidelines. Success with future projects similar to this QI project could provide further evidence to inform clinical practice guidelines to include multifactorial fall prevention algorithms in recommendations for fall prevention programs. Improvements that reduce inpatient falls can have a substantial impact for patients and organizations by reducing healthcare costs and improving patient outcomes.

CHAPTER FOUR

ADVANCED NURSING ESSENTIALS REFLECTION

The Essential Core Competencies

As I reflect on my education through the Montana State University Doctor of Nursing Practice Family Nurse Practitioner program, many courses, assignments, projects, and clinical experiences have contributed to my development and demonstration of core competencies that are essential for a comprehensive advanced nursing education and preparation. This program has provided a breadth of knowledge and skills within the coursework and clinical experiences that contributed to achieving my competency, far too many to mention, however I will highlight some of the most influential examples from each domain.

Domain 1: Knowledge for Nursing Practice

The first AACN essential, knowledge for nursing practice has been demonstrated by my completion of multiple courses within the DNP curriculum. NRSG 691: Writing for scholarly project in particular enabled me to translate evidence, apply theory and research-based knowledge from nursing science as well as a multitude of other sciences. NRSG 675: DNP Scholarly Project enabled me to synthesize current and emerging evidence to influence practice through the successful completion of a scoping literature review which guided and informed the development of a quality improvement project. NRSG 675: DNP Scholarly Project also enabled me to apply systematic and defensible approach to nursing practice decisions through my successful development and defense of a Quality Improvement Project Proposal.

Domain 2: Person-Centered Care

The second domain, person-centered care was demonstrated through my completion of several clinical experiences and DNP courses. The clinical experiences I had in a rural emergency department located 3 miles from the border of the Crow reservation and a mobile health clinic on the Blackfeet Reservation enabled me to demonstrate my ability to practice person-centered care with respect for diversity, individual differences, preferences, values, needs, resources, and social determinants of health unique to individuals. These experiences allowed me to provide care to a diverse population, establish a caring relationship and rapport, demonstrate comprehensive assessment, diagnose actual or potential health problems and needs, develop a plan of care, demonstrate accountability for care delivery, and evaluate outcomes of care. I demonstrated effective communication with individuals by facilitating difficult conversations and disclosure of sensitive information using advanced communication skills and techniques using a variety of modalities with diverse audiences, through many clinical experiences. One clinical experience in particular that exemplifies my competency was at an outpatient Endocrinology department which offers specialized services to individuals who identify as transgender and are seeking gender affirming hormone therapy. This experience allowed me to demonstrate my ability to provide person centered care with respect and dignity to individuals diverse and unique in their personal preferences, values, and needs.

Domain 3: Population Health

I have demonstrated the third domain, Population Health through the successful completion of DNP curriculum of NRSG 614: Vulnerability & Health Care in Diverse Communities and several clinical experiences. Through the completion of curriculum

expectations, I demonstrated competency in the use of established and evolving methods to determine populations-focused priorities for care. I also demonstrated this domain by ascertaining collaborative opportunities for individuals and organizations to improve population health, by participating in a clinical opportunity on the Blackfeet Reservation. This clinical opportunity was a mobile health clinic that offered pediatric health screenings, dental screenings, and preventative dental procedures through collaboration with Smiles Across Montana at a Head Start in Browning, MT. This opportunity allowed me to demonstrate competency in this domain through first-hand experience working to improve population health of an underserved population and community.

Domain 4: Scholarship for Nursing Practice

I demonstrated the fourth domain, scholarship for nursing practice through the successful completion of NRSG 604: Evidence Based Practice I and NRSG 605: Evidence Based Practice II. These courses enabled me to demonstrate my ability to discern appropriate applications of quality improvement, research, and evaluate methodologies. NRSG 675: DNP Scholarly Project also allowed me the opportunity to demonstrate competency through the successful completion of my DNP QI project, with the use of diverse sources of evidence to inform practice, and address opportunities for innovation and change in practice.

Domain 5: Quality and Safety

I demonstrated quality and safety, the fifth domain, through the successful completion of NRSG 675: DNP Scholarly Project to advance improvement practices through dissemination of outcomes, as my quality improvement project focused on improving safety and outcomes within a fall prevention program. The completion of my DNP project allowed me to demonstrate

integration of outcome metrics to inform change, make recommendations for further implementation and policy change. I also demonstrated this domain by fostering and promoting a just culture reflecting civility and respect while attending clinical opportunities in rural locations with underserved populations and minority groups that face a great deal of discrimination. I ensured all individuals I encountered were treated with dignity and respect, and I did not tolerate when others did not.

Domain 6: Interprofessional Partnerships

Several clinical opportunities and multiple courses through my graduate studies allowed me to demonstrate competency in the sixth domain, interprofessional partnerships. I have demonstrated my ability to role model respect for diversity, equity, and inclusion in team-based communications through successful completion of NRSRG 612: Ethics, Law, and Policy for Advocacy in Healthcare, as well as multiple other classes in which discussion boards and group projects were utilized. I demonstrated competency by fostering positive team dynamics to strengthen desired outcomes when engaging in group discussions and activities by providing thoughtful feedback, offering support and encouragement, and demonstrating flexibility and adaptability when working in teams with shared responsibility to produce deliverables. This was demonstrated most notably during a group project in NRSRG 605: Evidence Based Practice II which spanned the majority of the course and required effort to maintain good team dynamics. All of my clinical experiences offered me the opportunity to demonstrate competency in the evaluation of the impact of team dynamics and performance on desired outcomes as every placement had a workflow heavily reliant on good team dynamics and interprofessional partnerships to ensure desired outcomes. The most notable clinical experience that demonstrated

my ability in this domain was at Endocrinology, which has several specialized interdisciplinary teams that work in conjunction to deliver care, those being Endocrinologists, nurse practitioners, diabetes care specialists, transgender care specialists, dietitians, medical weight management specialists, bariatric surgeons and exercise physiologists.

Domain 7: Systems-Based Practice

I demonstrated my competency in the seventh domain, system-based practice through my successful completion of course work in NRSG 611: Program Planning and Evaluation, Outcomes, and Quality Improvement. The curriculum of this course allowed me to demonstrate my ability and competency to design practices that enhance value, access, quality, and cost-effectiveness. NRSG 608: Design of Healthcare Delivery Systems curriculum also allowed me to demonstrate my competency in system-based practice through the completion of the several projects. The healthcare supply management assignment allowed me to demonstrate my ability to observe a system, identify areas where improvement could be made to enhance value, quality and cost-effectiveness and identify strategies to achieve and sustain those goals. NRSG 613: Financing and Budgeting in Healthcare Systems curriculum included a project that allowed me to demonstrate competency in system-based practice. I successfully completed a project in where I formulated a business proposal, cost benefit analysis, and break-even analysis for the planning of opening and operating a private family practice clinic. I am particularly proud of that project as I went above and beyond the expectations of the assignment in my selection of chosen topic, as it was a massive undertaking, which I took on with careful and thoughtful intention. That particular project served not only the purpose of completing a course requirement but also allowed me the opportunity to learn what is needed and expected to open a private practice but

also the opportunity to receive critical and thoughtful feedback which could only serve to better prepare me for when I do go on to pursue that venture.

Domain 8: Information and Healthcare Technologies

The curriculum within the course, NRS 612: Ethics, Law, and Policy for Advocacy in Healthcare allowed me to demonstrate my competency in the eighth domain, Information and Healthcare Technologies. I demonstrated appropriate use of information and communication technologies and my ability to evaluate the use of information and communication technology to address needs, gaps, and inefficiencies in care. Several clinical experiences have also allowed me the opportunity to demonstrate my ability and competency to use appropriate information and communication technologies to address needs, gaps, and inefficiencies in care. Through the use of telehealth technologies to provide care to rural populations with limited access to care, and the use of technologies to request and access outside facility health records to ensure there are no gaps or needs for patients being seen for initial visits.

Domain 9: Professionalism

I have demonstrated my competency in the ninth domain, professionalism in all clinical experiences and through the successful completion of multiple courses throughout my education. I have demonstrated my ability to model ethical behaviors in practice and leadership roles, especially within the work in my DNP scholarly project which required careful consideration for ethics and demonstration of leadership to ensure successful staff buy in for project implementation. Successful completion of course work within NRS 612: Ethics, Law, and Policy for Advocacy in Healthcare allowed me to demonstrate my ability and competency in analysis of current policies and practices in the context of an ethical framework. Clinical

experiences in every setting allowed me to demonstrate professionalism by modeling leadership and ethical behaviors when interacting with all patients, families, and colleagues.

Domain 10: Personal, Professional, and Leadership Development

I have demonstrated my competency in domain 10, personal, professional and leadership development through all the course work and clinical experiences throughout my DNP experience. Successful completion of course work in NRSG 609: Advanced Nursing Leadership and Roles especially facilitated my demonstration of competency in this domain, through cognitive flexibility in managing change within complex environments. This can also be highlighted through clinical experiences especially those in emergency departments as these environments required me to be resilient, agile, adapt to change and demonstrate leadership skills in times of ambiguity and crisis.

Conclusion

The Montana State University Doctor of Nursing Practice Program has provided me with a well-prepared foundation to be a safe and reliable healthcare provider. The coursework and clinical experiences have broadened my knowledge and skills and have encouraged my development as a confident leader. My quality improvement project, titled “Developing and Implementing a Fall Prevention Algorithm to Improve Patient Safety: A Quality Improvement Project” allowed me to take on the role of lead investigator to pursue knowledge and insights to improve processes with the goal of achieving better patient and community outcomes. This project challenged me to develop effective communication, delegation, and leadership skills to champion a cause, to motivate and to guide a team to reach shared goals. As an emerging Nurse

Practitioner, I will strive to continue my lifelong learning and quality improvement efforts with the goal of providing patients and my community with the best care possible. This program has provided me with the resources, knowledge, and experiences to prepare for this journey ahead and I am proud to have been a part of this exceptional academic community.

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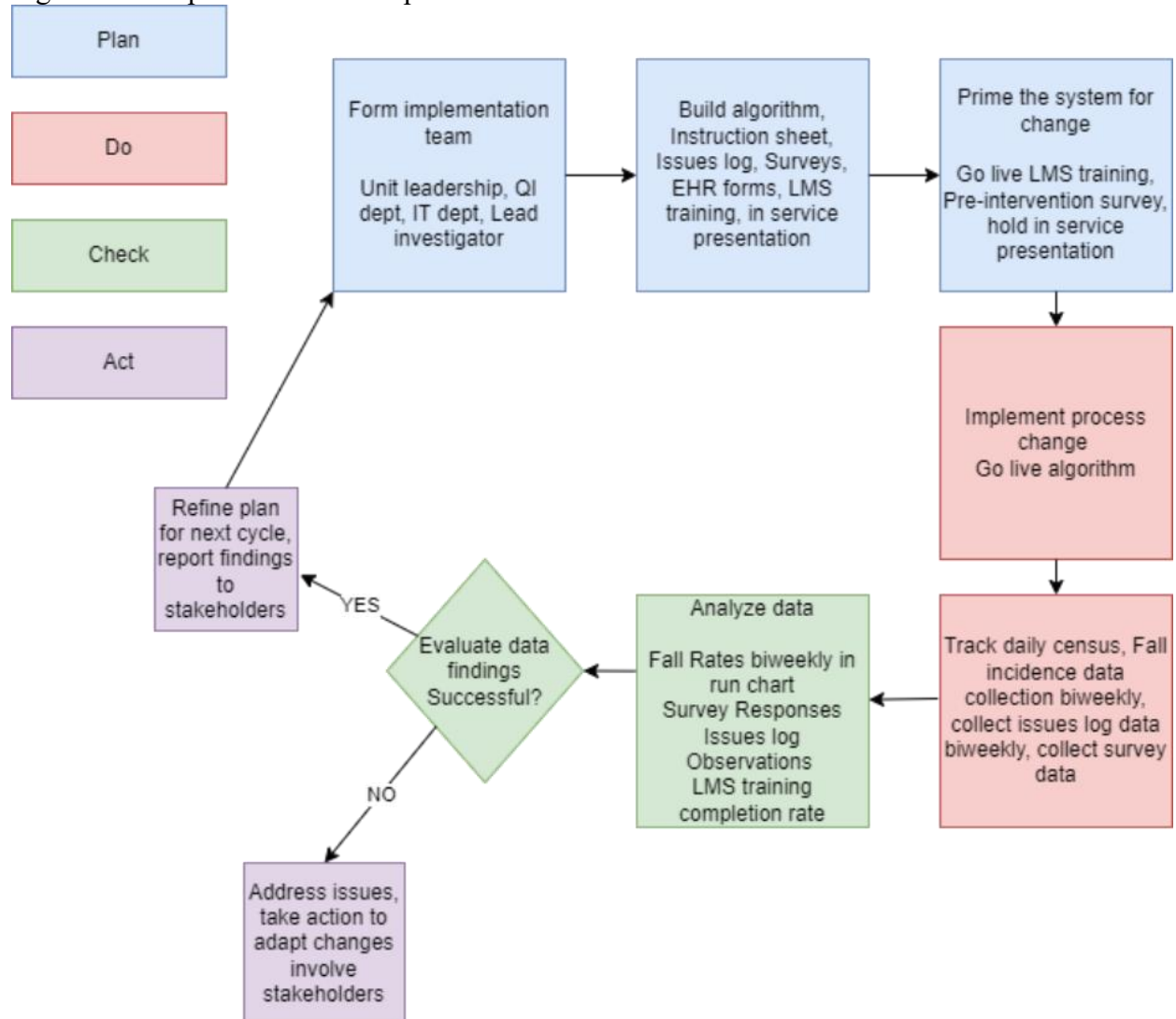
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APPENDICES

APPENDIX A

PROPOSED PROCESS MAP

Figure A1. Proposed Process Map



APPENDIX B

PROPOSED EHR COMPONENTS

Figure B1. Proposed I-View Nursing Assessment JHFRA Band EHR Algorithm Hyperlink

The screenshot displays the EHR interface for the 'Interactive View and I&O' section. The left sidebar lists various menu items, with 'Interactive View and I&O' circled in red. The main panel shows a list of assessment items, including 'Adult Quick View - ECD', 'Adult Systems Assessment - E...', 'RDOS', 'Specialty Gas Management', 'Incentive Spirometry', 'Non-Invasive Ventilation (CPAP/Bi)', 'Invasive Ventilation', 'Chest Tubes', 'Gastrointestinal', 'Gastrointestinal Tubes', 'Genitourinary', 'Urinary Catheter', 'Bladder Scan', 'Urostomy/Nephrostomy', 'Musculoskeletal', 'Johns Hopkins Fall Assessment', and 'Post Fall Evaluation'. The 'Johns Hopkins Fall Assessment' item is highlighted. A red arrow points to the 'Fall Risk Factor Category' field, which contains a hyperlink. Another red arrow points to the 'Fall Prevention Algorithm' field, which also contains a hyperlink. A red text box on the right explains that these hyperlinks will populate the area when a high fall category is charted.

Menu

Interactive View and I&O

Adult Quick View - ECD

Adult Systems Assessment - E...

RDOS

Specialty Gas Management

Incentive Spirometry

Non-Invasive Ventilation (CPAP/Bi)

Invasive Ventilation

Chest Tubes

Gastrointestinal

Gastrointestinal Tubes

Genitourinary

Urinary Catheter

Bladder Scan

Urostomy/Nephrostomy

Musculoskeletal

Johns Hopkins Fall Assessment

Post Fall Evaluation

Adult Lines - Devices - ECD

Infusion Reaction

Patient Education

Intake And Output

Blood Product Transfusions

Early Warning and Rapid Respo...

Moderate - Procedural Sedation

PACU II Assessment MOR_Obs...

Adult ICU Quick View - ECD

Adult ICU Systems Assessment ...

ICU Liberation Bundle - ECD

Infusion - Oncology

Pain Management

Restraint_Seclosure

Pediatric Quick View - ECD

Pediatric Systems Assessment ...

Pediatric Lines - Devices - ECD

Pediatric Education

Charting High Fall Risk category will trigger task list reminder

Find Item

Critical High Low Abnormal U

Result Comments Flag Date

11/16/2023 16:25 MST

Sitting Balance

Strength

Sensation

Tone

Movement Extremities

Antiembolism Device

Special Orthopedic Devi...

Musculoskeletal...

Johns Hopkins Fall Ass...

Fall Risk Quick Asses...

Fall Risk Factor Cate... More than o...

Last Fall Date

Fall Risk Interventions

High Fall Risk (Score... Assess orien...

Fall Prevention Algorithm

Skin Description

Skin Color

Skin Temperature

Skin Turgor

Skin Integrity

Skin Abnormality

Mucous Membrane Color

Mucous Membrane Des...

Two-Person Skin Check

Incision, Wound

Braden Assessment

Sensory Perception Bra...

Moisture Braden

Activity Braden

Mobility Braden

Nutrition Braden

Friction and Shear Brad...

Braden Score

Hyperlink will populate in this area as well when high fall category is charted

Figure B2. Proposed I-View Nursing Assessment Post Fall Band EHR Algorithm Hyperlink

Menu Interactive View and I&O

Orders

Nurse View

Interactive View a

MAR

OmniCell

Activities and Int

Results Review

Notes

Allergies

Diagnoses and Pr

Documentation

Form Browser

Growth Chart

Histories

Whom Have I See

MAR Summary

Medication List

Med Profile (View

MultiMedia Mana

Patient Informati

ROSTER IPASS

Appointments

Multi-Disciplinary

Core Diabetes Flo

Outside Records

Core Diabetes Flo

Adult Quick View - ECD

Adult Systems Assessment - E...

Gastrointestinal Tubes

Genitourinary

Urinary Catheter

Bladder Scan

Urostomy/Nephrostomy

Musculoskeletal

Johns Hopkins Fall Assessment

Post Fall Evaluation

Integumentary

Incision, Wound

Surgical Drains/Tubes

Braden Assessment

Bum Documentation

Student/LPN Validation

Adult Lines - Devices - ECD

Infusion Reaction

Patient Education

Intake And Output

Blood Product Transfusions

Early Warning and Rapid Respo...

Moderate - Procedural Sedation

PACU II Assessment MOR_Obs...

Adult ICU Quick View - ECD

Adult ICU Systems Assessment ...

ICU Liberation Bundle - ECD

Infusion - Oncology

Pain Management

Restraint_Seculsion

Pediatric Quick View - ECD

Pediatric Systems Assessment ...

Pediatric Lines - Devices - ECD

Pediatric Education

Find Item ☐ Critical ☐ High ☐ Low ☐ Abnormal ☐ Unauth

Result Comments Flag Date

11/14/2023 15:12 MST

Post Fall Evaluation

Fall Type

Special Conditions at Ti...

Fall Risk Alert System in ...

Fall Level of Injury

Post Fall Status

Post Fall Comment

Provider Informed of Fall

Patient Observation

Fall Prevention Algorithm

Integumentary

Skin Description

Skin Color

Skin Temperature

Skin Turgor

Skin Integrity

Skin Abnormality

Mucous Membrane Color

Mucous Membrane Des...

Two-Person Skin Check

Incision, Wound

Braden Assessment

Sensory Perception Bra...

Moisture Braden

Activity Braden

Mobility Braden

Nutrition Braden

Friction and Shear Brad...

Braden Score

Hyperlink will open to FPA for easy reference

Figure B3. Proposed I-View Nursing Assessment CAM Band EHR Algorithm Hyperlink

Menu Interactive View and I&O

Orders

Nurse View

Interactive View a

MAR

OmniCell

Activities and Int

Results Review

Notes

Allergies

Diagnoses and Pr

Documentation

Form Browser

Growth Chart

Historic

Adult Quick View - ECD

Adult Systems Assessment - E...

Measurements

Pain Assessment

Delirium Screening

Neurological

Glasgow Coma

NIH Stroke Assessment

Psychosocial Assessment

CIWA Scoring

COWS Scoring

Oral Assessment

Cardiovascular

Edema Assessment

Cardiac Rhythm Analysis

Pulses

Angiogram Assessment

Adult Lines - Devices - ECD

Infusion Reaction

Find Item ☐ Critical ☐ High

Result Commer

11/14/2023
15:15 MST

Delirium Screening

▾ Able to Participate in Sc... Unable t...

▾ *Delirium Scale Positive

➔ Fall Prevention Algorithm

Neurological

Neurological Symptoms

Level of Consciousness

Orientation

▾ Characteristics of Comm...

▾ Characteristics of Speech

Aspiration Risk

Figure B4. Proposed EHR Algorithm Task List Trigger

The screenshot displays the EHR interface with a sidebar menu on the left and a main task list area. The sidebar menu includes items like 'Menu', 'Quick Notes', 'Ambulatory Summary', 'PowerNote', 'Results Review', 'Advanced Growth Chart', 'Immunization Schedule', 'PowerOrders', 'Ambulatory Quick Orders', 'Medication List', 'Problems and Diagnoses', 'Summary Documents', 'All Documents', 'MAR Summary', 'Allergies', 'Histories', 'Form Browser', 'Task List' (circled in red), 'Patient Information', and 'Visit Information'. The main area is titled 'Task List' and shows a date range from Saturday, June 15, 2013 16:11 EDT to Monday, June 24, 2013. Below this, a section titled 'Scheduled Patient Care' contains a table of tasks. The table has columns for Task Description, Priority, Order Details, Provider Name, and Scheduled Date/Time. The tasks listed are: 'abutene' (checked), 'diphtheria/tetanus/pertussis (DTaP) pot' (checked), 'Immunization/Medication Charges Amb' (checked), 'Immunization/Medication Charges Amb' (checked), and 'Review Fall Prevention Escalation Algorithm' (checked). A red arrow points to the 'Review Fall Prevention Escalation Algorithm' task.

Task Description	Priority	Order Details	Provider Name	Scheduled Date/Time
abutene		2.5 mg, IM, Once, Stop: 06/24/13 11:4...		06/24/2013 11:48
diphtheria/tetanus/pertussis (DTaP) pot		0.5 ml, IM, Once, Stop: 06/24/13 15:06:00	Ambulatory, Attending	06/24/2013 15:06
Immunization/Medication Charges Amb		06/24/13 11:50:24		06/24/2013 11:50
Immunization/Medication Charges Amb		06/24/13 15:06:24	Ambulatory, Attending	06/24/2013 15:06
Review Fall Prevention Escalation Algorithm		06/24/13 12:09:00		06/24/2013 12:09

APPENDIX C

PROPOSED ISSUES LOG AND INSTRUCTIONS

Figure C1. Proposed Issues Log

[illegible]

Figure C2. Proposed Issues Log Instructions Sheet

Issues Log Instructions

If you encounter an issue finding or utilizing the Fall Prevention Escalation Algorithm (FPEA) please make note on the Issue Log sheet located in the FPEA folder located at the North Charge Nurse Desk drawer.

- Please denote the date the issue was encountered in the date reported column
- Briefly describe the issue encountered in the description of issue column
- If you were able to find a solution or alternative resolution to the issue please denote in the resolution column, otherwise leave blank
- If you were able to resolve the issue denoted the date in the date resolved column, otherwise leave blank.

Please ensure the Issues Log is returned to the FPEA folder when completed.

*Please do not include any identifying information on the issues log.

APPENDIX D

PROPOSED PRE & POST IMPLEMENTATION SURVEY

Figure D1. Proposed Pre & Post Implementation Survey

Pre & Post Implementation Fall Prevention Algorithm Survey		
1. Do you feel confident in your decision making when considering obtaining an AvaSure for patients at high risk for falls?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
2. Do you feel confident in your decision making when considering contacting the provider to obtain an order for a 1:1 for a patient at high risk for falls?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
3. Do you feel there is currently adequate guidance readily available to escalate fall prevention interventions for patients at increased risk for falls due to an abrupt change in condition?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
4. Do you feel there is currently an adequate process in place to escalate fall prevention interventions for patients at increased risk for falls?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
5. Do you feel patient falls are currently a major concern for this unit?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐

APPENDIX E

PROPOSED KNOWLEDGE CHECK QUIZ

Figure E1. Proposed Knowledge Check Quiz

Fall Prevention Algorithm Knowledge Quiz

1. Where in the EHR can you locate the Fall Prevention Algorithm hyperlink? (Check all that apply)
 - a) Post Fall Band
 - b) CAM Band
 - c) MAR
 - d) Form Browser
2. Where is the Issues Log located on the unit?
 - a) South Nursing station
 - b) North medication room
 - c) Break room
 - d) South Huddles room
3. If you encounter a problem with EHR components what should you do next?
 - a) Call IT
 - b) Call manager
 - c) Write it in the issues log
 - d) Do nothing
4. The Task List Trigger requires associated documentation
 - a) True
 - b) False

APPENDIX F

PROJECT SMART GOALS

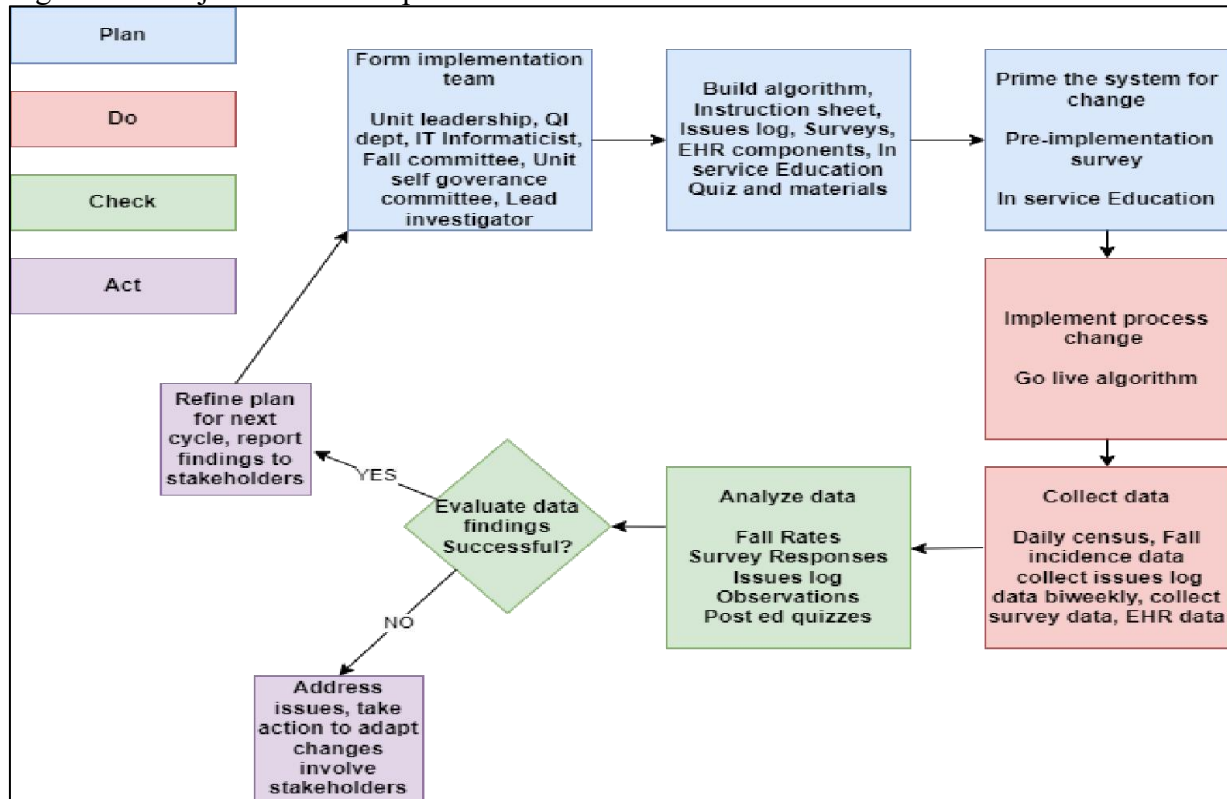
Table F1. Project SMART Goals

<i>Short-term Goals</i>		
SMART GOAL #1: 10 site unit nurses will attend in-service information session on January 26, 2024.		
Data to be collected	Method of collection and who is responsible	Planned data analysis
-Head count -In-service quiz scores	Lead investigator will collect data of head count and score knowledge assessment quizzes	Descriptive statistics
SMART GOAL #2: Implement small trial fall prevention intervention escalation algorithm into workflow at site unit by January 29, 2024.		
Data to be collected	Method of collection and who is responsible	Planned data analysis
-Issues log -User feedback	Lead investigator will collect issues log data from written log and user feedback from unit staff	Qualitative data analysis Thematic coding of trends and themes, thematic map
<i>Medium-term Goals</i>		
SMART GOAL #1: 75% of nursing staff that respond to survey will respond that the algorithm tool effectively aiding in decision making to escalate fall prevention interventions		
Data to be collected	Method of collection and who is responsible	Planned data analysis
Survey responses	Data will be collected through survey with semantic differential scale responses, will be sent to unit staff via employee email, lead investigator will collect and analyze data	-Descriptive statistics standard deviation -Trends and themes, thematic map
<i>Long-term Goals</i>		
SMART GOAL #1: Reduce the number of inpatient falls on the site unit by a clinically significant amount by March 11 th , 2024.		
Strategies to be utilized to accomplish goal		
-A team of stakeholders, site representative, nursing staff and lead investigator will develop a process for escalation of fall prevention interventions into workflow		
-Project lead will work with IT and QI departments to incorporate LMS training for nursing staff		
-Funding for paper and printing services for printed material will be incorporated into the unit operational budget		
Data to be collected	Method of collection and who is responsible	Planned data analysis
-Number of reported inpatients (Census) -Number of falls	Site representative will gather census data from bedboard system and fall occurrence data from the safety net reporting system	Descriptive statistics analysis
SMART GOAL #2: The lead investigator will recommend adaptation and adoption of algorithm into policy by March 30, 2024.		
Strategies to be utilized to accomplish goal		
-Lead investigator will advise key stakeholders, unit and organization leadership and policy makers on key findings		
-A team of stakeholders, unit, and organization leadership will plan and develop a policy for utilization of algorithm		
Data to be collected	Method of collection and who is responsible	Planned data analysis
Unit organization leadership perceptions on policy development	Lead investigator will collect data through communication with the key stakeholder and unit leadership	Qualitative analysis

APPENDIX G

PROJECT PROCESS MAP

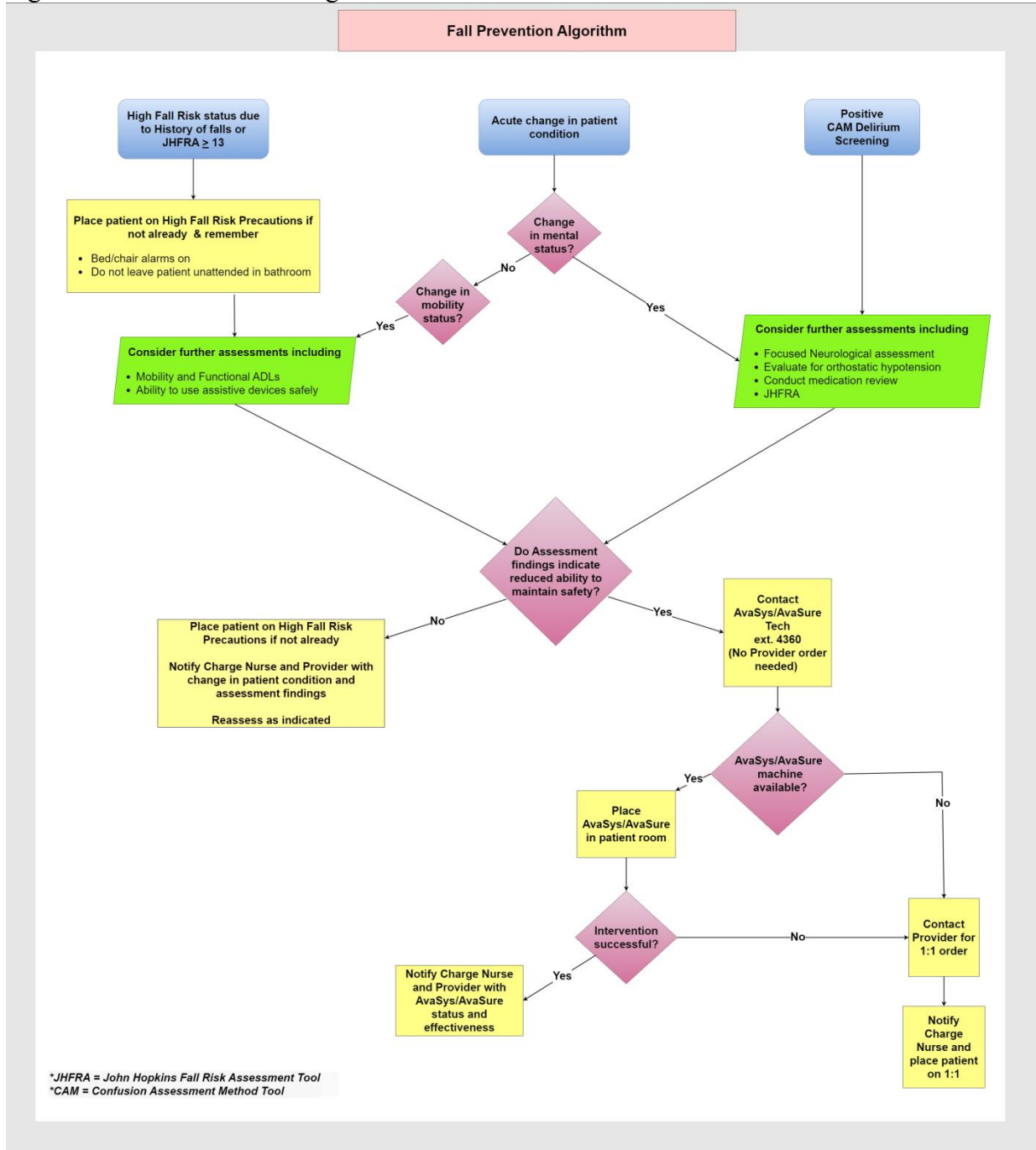
Figure G1. Project Process Map



APPENDIX H

FALL PREVENTION ALGORITHM

Figure H1. Fall Prevention Algorithm



APPENDIX I

IMPLEMENTED EHR COMPONENTS

Figure I1. Implemented EHR Components

EHR Components

Task List Trigger

Scheduled Patient Care

Task retrieval completed

	Task Status	Scheduled Date and Time	Task Description
	Complete	1/24/2024 12:08 MST	Review Fall Prevention Escalation Algorithm

DocSet (containing charted risk assessments, interventions, and hyperlink to digital copy of algorithm)

	02/03/2024	13:00 MST	12:58 MST	12:57 MST
Fall Prevention Algorithm				
▾ Fall Prevention Algorithm				
Fall Prevention Algorithm				
◆ Fall Risk Factor Category JH			Fall durin...	None of t...
◆ Fall Risk Score JH Fall Risk	#		13 ↑	5
BCAM Delirium Scale				
◆ High Fall Risk Interventions JH			Appropri...	

Task List Completion Sign Off

Interactive View and I&O

Activity View

Complete Tasks with Sign Off

Find Item

Fall Prevention Algorithm

Fall Prevention Algorithm

Algorithm Hyperlink

Activity View

Fall Prevention Algorithm

Fall Prevention Algorithm

Find Item

☐ Critical ☐ High ☐ Low ☐ Abnor

Result	Comments	Flag	Date
			01/24
			12:48 MST
Fall Prevention Algorithm			
▾ Fall Prevention Algorithm			
Fall Prevention Algorithm			

APPENDIX J

PRE & POST IMPLEMENTATION FALL PREVENTION

ALGORITHM SURVEY

Figure J1. Pre & Post Implementation Fall Prevention Algorithm Survey

Pre & Post Implementation Fall Prevention Algorithm Survey		
1. I feel confident in my decision making when considering obtaining an AvaSys for a patient at high risk for falls.		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
2. I feel confident in my decision making when considering contacting a provider to obtain 1:1 sitter order for a patient at high risk for falls.		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
3. I feel there is currently adequate guidance readily available to escalate fall prevention interventions for patients at increased risk for falls due to acute changes in condition?		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
4. I feel there is currently an adequate process in place to escalate fall prevention interventions for patients at increased risk for falls.		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐
5. I feel inpatient falls are currently a major concern for this unit.		
Strongly Disagree	Neutral	Strongly Agree
☐	☐	☐

APPENDIX K

IN-SERVICE POST EDUCATION QUIZ

Figure K1. In-Service Post Education Quiz

Fall Prevention Algorithm Knowledge Quiz

1. Where can you locate the Fall Prevention Algorithm Issues Log?
 - A. North Charge desk drawer
 - B. South Unit Clerk station
 - C. South charting room
 - D. Staff break room filing cabinet
2. Does an RN need to obtain an order from a provider to place an AvaSys in a patient's room?
 - A. Yes
 - B. No
3. Where in Cerner can the Fall Prevention Algorithm be located?
 - A. I-View band
 - B. Form Browser
 - C. Safety net link
 - D. Care compass
4. If you encounter a problem with EHR components what should you do next?
 - A. Call IT
 - B. Call manager
 - C. Write it in the issues log
 - D. Do nothing
5. The Task List Trigger requires associated documentation
 - a) True
 - b) False

APPENDIX L

FALL PREVENTION ALGORITHM ISSUES LOG AND
INSTRUCTION SHEET

[illegible]

Figure L2. Fall Prevention Algorithm Issues Log Instruction Sheet

Fall Prevention Algorithm Issues Log Instruction Sheet

If you encounter an issue finding or utilizing the Fall Prevention Algorithm please make note on the Issues Log sheet. This sheet is located in the Fall Prevention Algorithm folder located at the North Charge Nurse Desk in the bottom file drawer. The folder is red and clearly marked.

- Please indicate the date the issue was encountered in the date reported column
- Briefly describe the issue encountered in the description of issue column
- If you are able to find a solution or alternative resolution to the issue please write a brief statement in the resolution column, if no resolution or solution was achieved at that time please leave this column blank.
- If a solution or resolution to the issue was achieved please write the date in the date resolved column, otherwise leave blank.

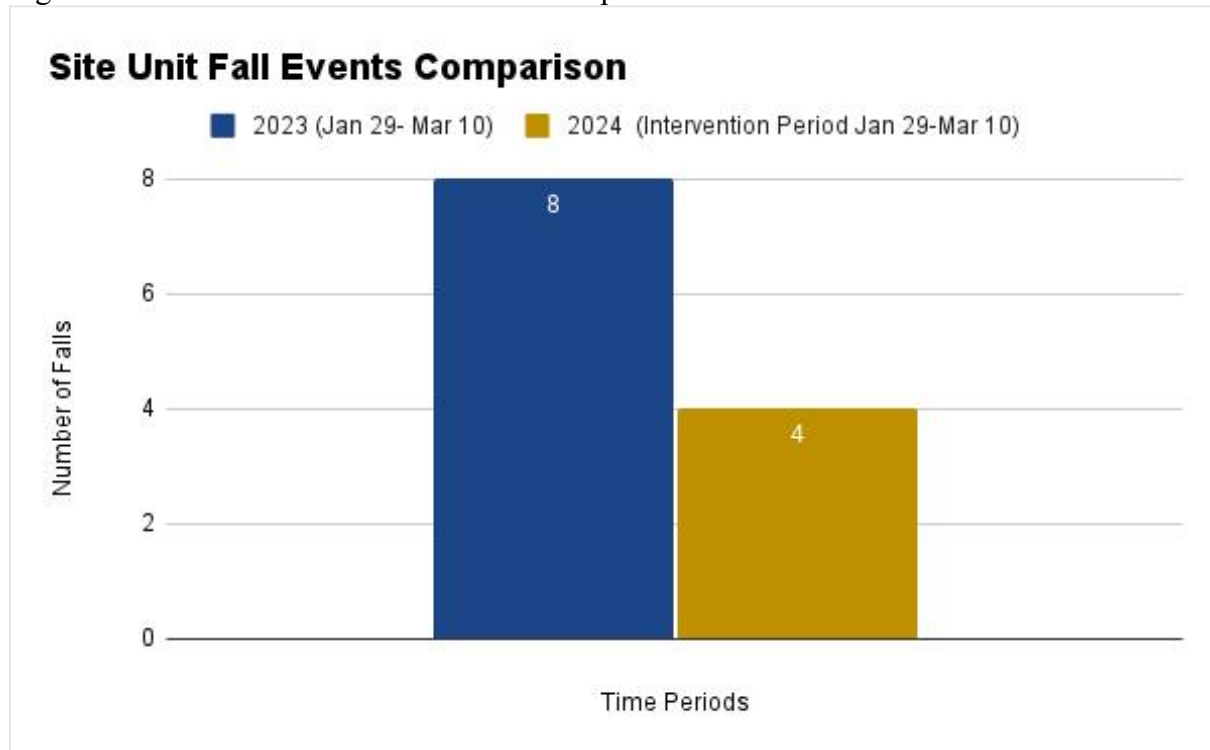
Please ensure the Issues Log is returned to the Fall Prevention Algorithm folder when completed and return the folder to the designated area.

*Please DO NOT include any identifying (Patient or Staff) information anywhere on the Issues Log

APPENDIX M

FALL EVENTS RESULTS COMPARISON

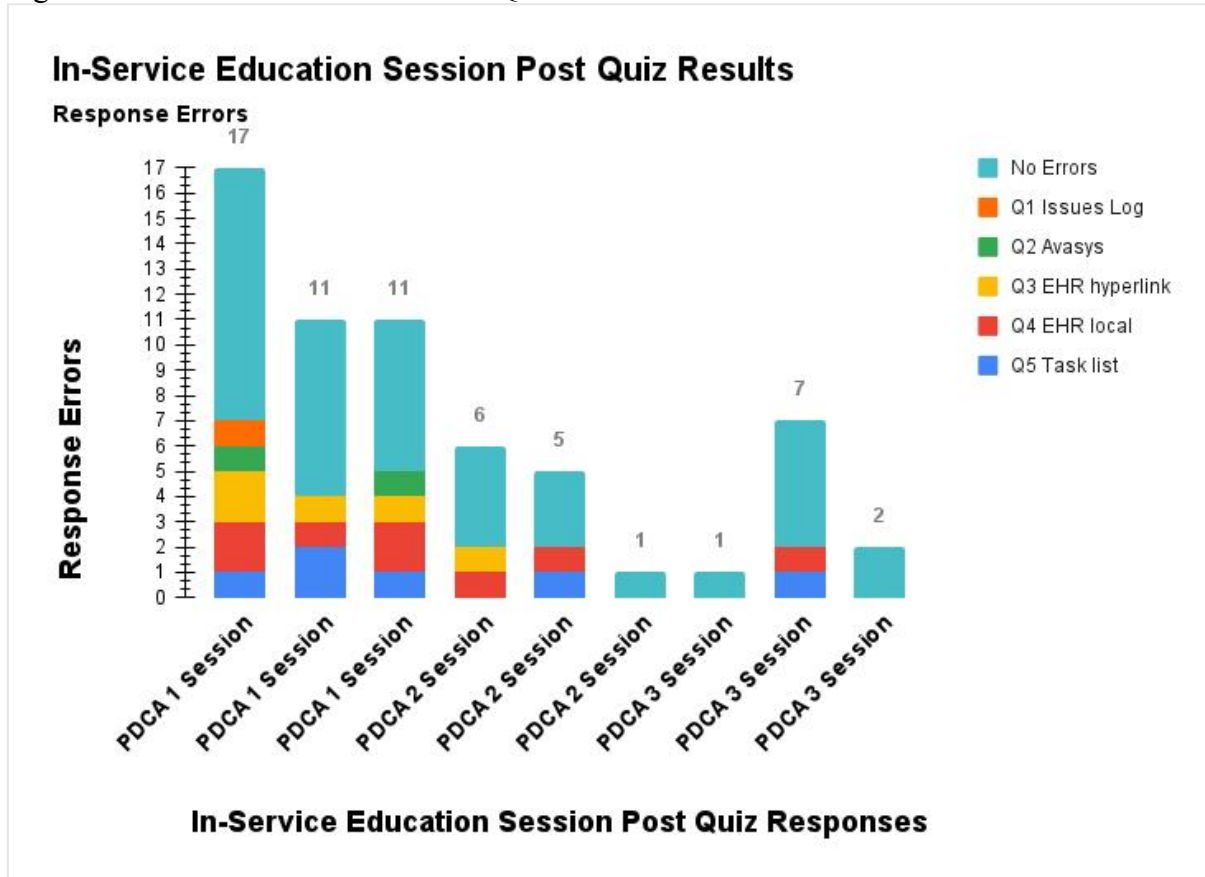
Figure M1. Site Unit Fall Events Results Comparison



APPENDIX N

IN-SERVICE POST EDUCATION QUIZ RESULTS

Figure N1. In-Service Post Education Quiz Results



APPENDIX O

FALL PREVENTION ALGORITHM QUALITATIVE DATA

THEMATIC MAP

Figure O1. Fall Prevention Algorithm Qualitative Data Thematic Map

