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An Innovative Approach Using Virtual Sitter Video Monitoring for Fall Reduction in the Medical-Surgical Microsystem

Roman Kutu
wabij2018@gmail.com

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Roman Kutu

University of San Francisco

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Dr. Cathy Coleman

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Contents

Abstract

Problem: Although many fall prevention protocols have been utilized across hospital settings, the patient fall rate in one acute care medical-surgical microsystem continues to be a significant safety problem. Despite many safety precautions, including external bed and chair alarms, twelve falls were recorded in 2019, and fifteen falls occurred in this unit's 2020 fiscal year.

Context: Despite identifying risk factors for falls and employing several fall prevention protocols, patient falls are the most common adverse and challenging patient safety event for hospitals. One of the most common interventions to reduce falls has been the utilization of in-person sitters; however, this staffing necessity is extremely costly for most healthcare organizations. A new innovative approach is needed to reduce falls and save money.

Intervention: According to several recent authors, new technology has offered a creative solution to this problem. Virtual sitter video monitoring technology has been utilized as an innovative, cost-effective improvement intervention to promote patient safety and reduce falls. A virtual sitter video monitoring system is a real-time centralized video monitoring system that connects the patient to the nursing station or central monitoring. A qualified monitoring technician (MT) observes and communicates with the patients 24/7 for safety. This future improvement project aims to introduce and pilot test the feasibility and cost-effectiveness of a virtual sitter to be implemented in a 24-bed medical-surgical unit by early 2021. This organization has a labor-management partnership, and all staff will have the opportunity to provide feedback.

Measures: The sponsoring organization reprioritized the new technology implementation plan, which has been delayed for this unit until 2021. The project outcome measures address reducing patient fall rates and the associated sitter utilization costs. The primary outcome measures will reduce patient falls and associated costs by 50% annually in the medical-surgical microsystem.

The process measure will identify three shift-specific champions who will serve as master trainers in collaboration with the project leader to conduct staff training regarding approved protocols. One balancing measure will include a pre-and post-survey to monitor staff satisfaction levels during the virtual sitter implementation.

Results: A new comprehensive set of workflows and a policy and procedure for introducing virtual sitter video monitoring technology was developed in another medical center within the same integrated care delivery system by a staff team including DNP - CNL and MSN – CNL graduate students. This document will be replicated by the clinical nurse leader (CNL) for future implementation in this 24-bed medical-surgical microsystem. Anticipated results will reflect both the fall rate and estimated costs per fall. Three staff members will be trained as champions or superusers to reach 90% of the unit staff. Staff satisfaction survey results will be analyzed pre and post-implementation to assess potential resistance and acceptance of the new intervention.

Conclusion: The adoption of new technology can save healthcare organizations millions of dollars related to fall injures while maintaining safe staffing. Virtual Sitter Video Monitoring is a practical, cost-effective technology that enhances patient care experience by promoting safety, security, and privacy. Healthcare organizations that pilot test this technology tool can improve staffing ratios, optimize efficient cost savings and workflows, and anticipate employee and patient/family satisfaction. Clinical Nurse Leaders can be instrumental in developing and implementing new interventions in their microsystems. Introducing a fall prevention quality improvement and implementation plan in a complex healthcare organization requires innovative approaches, targeted data analytics, and significant team collaboration across systems.

Keywords: virtual sitter, patient falls, centralized video monitoring, fall prevention, hospital

Introduction

Patient falls are the most common adverse incident challenging patient safety and are a vital quality issue in an acute care setting. However, falls have no age or gender restriction and can occur anywhere (Gray-Miceli et al., 2017). The National Database for Nursing Quality Indicators (NDNQI) collects fall data, and the benchmark identified by NDNQI for hospitals is to strive toward 2.7 falls per 1.000 patient days. Despite these numbers, fall rates reported in hospitals have ranged from 2.2 to 7.0 per 1000 admissions (Hardin et al., 2013). The World Health Organization (WHO) defined a fall as an event that unintentionally causes a person to descend to the floor or any other lower area (Avanecean et al., 2017). Inpatient falls are the most reported events in medical-surgical units and lead to a substantial financial burden and a considerable cost in human suffering. In 2013 the Centers for Disease and Prevention (CDC) estimated the economic costs of one fall with injury in an older adult (age 65 and older) to be $17,500 (Votruba et al., 2016). The figures for patient falls in hospitals continue to rise, and approximately 700,000 to one million falls occur in the United States annually, with an estimated cost of 50 billion USD (Lucero et al., 2019).

Despite identifying specific risk factors for falls and implementing fall prevention policies and protocols, inpatient falls continue to be a challenging patient safety concern in acute care settings worldwide (Bowden et al., 2019). Clinical nurse leaders (CNL), doctors, staff nurses, and interdisciplinary teams have focused on the prevention of patient falls, which is a national patient safety goal, according to the Joint Commission ([JC] 2019). However, inpatient falls incidence continues to rise for all ages in acute care settings (Quigley et al., 2016). Starting in 2008, the Centers for Medicare & Medicaid Services (CMS) discontinued reimbursement for injuries and extended hospital stay related to falls and prompted healthcare organizations to look into their fall prevention strategies to reduce falls (Hardin et al., 2013)

Vortuba and colleagues (2016) suggested that to translate research into practice and promote evidence-based fall prevention strategies, and intervention using a telesitter with a virtual video monitoring device would be a safe hospital tool. Telesitter or virtual sitter continuous video monitoring system is a real-time direct patient observation via non-recording centralized video monitoring systems that connect the patient with the nursing station, or the centralized monitor station trained and qualified monitoring technician 24/7. However, there has been limited peer-reviewed research on the efficiency of virtual monitoring for patient safety. Still, numerous organizations have seen a change in quality improvement data on telesitter virtual monitoring's success to reduce falls (Roth, 2019). The use of video monitoring for fall prevention and patient safety in acute care is a comparatively recent addition to specific interventions and has been shown to have encouraging results (Sand-Jecklin et al., 2018).

Problem Description

Patient falls are a national safety goal for hospitals and health care institutions. Like most hospitals or organizations, hospital staff and management teams make patient safety a top priority and facilitate every effort to reduce patient harm. Patient fall prevention in the acute care setting is the most challenging issue in healthcare organizations, and nurses are focusing on injury and fall prevention interventions. In one integrated delivery system hospital, the Schmid fall risk assessment model was instituted. Nurses assess fall risk upon patient admission and every shift to identify at-risk patients for falls. If the Schmid fall risk score is greater or equal to three, the patient is given a yellow wrist band, non-skid yellow socks, and "falling star" signage placed on patient room doors.

The nurse then implements appropriate fall prevention strategies based on the patient's risk factors and observed behaviors. The strategies include patient and family education,

individualized care plan, environmental safety measures (i.e., clutter-free room, placing call light and items within reach, nightlight), and frequent staff rounding. Additionally, some technological approaches, like bed and chair alarm and low beds, have been utilized. Other interventions have included identifying the patients' history of falls at home and bedside 1:1 or 1:2 constant observation (using a physical in-person sitter) to keep patients free of falls. According to Sand-Jecklin and colleagues (2016), all of the above fall prevention intervention options were available and appropriately utilized by nursing staff to prevent falls at the hospital during the research. However, many of the fall prevention or precaution interventions had not proven successful in significantly reducing patient falls (Sand-Jecklin et al., 2016).

Patient falls continue to rise, causing stress on nursing staff and management teams, increased bedside sitter utilization for 1:1 constant observation to prevent patient falls, and extended hospital stay, which creates a financial burden on patients, families, and healthcare organizations (Hardin et al., 2013). Patient fall in institutional settings leads to functional decline and increased institutional liability or mitigation. Preventing falls can improve patient outcomes and reduce the financial burden on both the patient and the healthcare organizations **(**Davis et al., 201). According to this integrated delivery system urban hospital's yearly quality report, the medical-surgical microsystem is also facing the challenge of an increase in fall rates. More specifically, in 2019, 12 patient falls were documented in 2020, and 15 patient falls were documented, which increased sitter utilization, causing a financial burden on the unit, patient, and organization (See Appendix A for baseline fall data).

As a result of these concerns, this quality improvement project aimed to reduce patient falls and associated sitter utilization costs by 50% annually in the microsystem. The specific aim was to introduce and pilot the feasibility of a virtual video sitter monitoring system in a 24-bed

medical-surgical unit by the first quarter of 2021. To this end, the current literature reviewed evidence-based best practices for staff and patient education. The project's final goal is to spread project success to other microsystems within the organization to mitigate patient falls as part of a long-term organizational effort to decrease preventable inpatient falls, fall-related injuries, and related costs and reduce the financial burden.

Available Knowledge

PICOT Question

The PICOT model question for this quality improvement research project paper was: in the adult hospitalized medical-surgical patients (P-population), how do virtual sitter video monitoring falls and related cost reduction (I-intervention) compare to the usual falls and corresponding cost reduction (C-comparison); is it safe and does it reduce inpatient falls, injuries, and sitter costs by 50% (O-outcome) by December 2021 (T-time)?

Review of the Literature

A comprehensive literature review search was conducted electronically in June 2019 in the Cochrane Database of Systematic Reviews, PubMed, CINAHL, and Google Scholar. The combinations of the following search terms were used: virtual sitter, patient falls, centralized video monitoring, fall prevention, and hospital. The search limitations were set to include English only, research and systematic and peer reviews, and publication date no later than 2013. The search yielded 16 articles. Seven articles met the search criteria, yet only five articles were selected for review. The literature review focused on finding evidence-based strategies for fall prevention and supporting collaborative care, emphasizing telesitter (virtual sitter) continuous video monitoring intervention at the microsystem level.

Sand-Jecklin et al. (2016) performed a quasi-experimental pre-post design practice change study with the targeted sample of hospital patients at a high risk of falling. The study was conducted in the mid-Atlantic region at one of the large academic medical centers. This article outlines the viability and effect of implementing centralized video monitoring (CVM) and its implication on patients' safety identified as high risk falling in acute care settings. According to Sand-Jecklin and colleagues (2016), in this academic medical center in 2007, comprehensive fall prevention and evidence-based fall risk assessment strategies included implementing Hendrick II fall risk assessment initiated. The prevention strategies were applying purple armband, using non-skid purple socks, and creating purple "falling star" signage outside of the patient room. Besides hourly rounding, they also introduced environmental modifications, family and patient education, individualized care plan, low bed, floor mat, alarms, and in-person sitter were introduced. Sand-Jecklin and colleagues (2016) argued that all the above options were available to the nurses and used appropriately in the academic medical center where the study was conducted. However, these choices did not demonstrate success in a substantial reduction of falls, and patient falls continued to be higher than the target goal for the medical center where the study took place (Sand-Jecklin et al. 2016). The research identified 79% of patient falls were mostly associated with patients getting out of bed for elimination-related needs, and many of the falls were unobserved and unassisted. In this urban acute care hospital, the medical-surgical microsystem faces similar challenges and all the fall policy and protocol in place, with appropriate resources provided and used. Still, patient falls are rising, and this microsystem has not met the target goal for two consecutive years (see baseline data appendix A).

The study of Sand-Jecklin et al. (2016) emphasized the implementation of many fall prevention strategies used by nurses to support fall prevention. Still, the approaches had not been

proven successful in a significant reduction of patient falls. Therefore, to optimize fall reduction, centralized video monitoring (CVM) was implemented. According to Sand-Jecklin et al. (2016), the implementation of CVM took place on four different units in the academic medical center. The study was conducted with a total number of 1,508 cases of CVM on all units during the study period. This included 697 cases for the first two units and 811 cases for the second two units. The average number of days a patient underwent monitoring was 3.3, with a positive skew of a minimal amount of patient monitoring for more days. According to Sand-Jecklin et al. (2016), in the first 2-units, 40 patient falls for baseline (pre) pilot implementation of CVM were documented, but (post) CVM implementation 12 falls were from patients that were monitored by CVM, and 18 falls were non-monitored. In the second two units, during baseline (pre) implementation of CVM, 34 patient falls were documented, and (post) 3 falls were from patients under video monitoring;16 falls were not under video monitoring.

A total of 15 falls only for CVM, and 34 falls for non-CVM monitored patients were analyzed. Standardized calculation of fall rates per 1,000 patient-days was completed for both pre-and post-implementation. For baseline (pre), 74 falls over 19,021 patient-days for all units were documented, showing 3.9 falls per 1,000 patient-days. For post-implementation of CVM, 51 falls per 18,323 patient-days showing 2.8 falls per 1,000 patient-days, denoting a huge reduction of 28.5% ($Z = 1.85$, $P = .032$) (Sand-Jeklin et al., 2016).

Sand-Jecklin et al. and colleagues (2016) also compared the number of sitter utilizations between pre-and post-implementation of CVM. There were 1,082.8 sitter shifts per 19,021 patient-days or 56.9 shifts per 1,000 patients days. Post-implementation of CVM, the number of sitter hours was 800.6 per 18,323 patient-days or 43.7 shifts per 1,000 patient-days, which equated to a 23.2% reduction in sitter hours significant Z score of 5.84 ($P < .001$). Therefore,

patient falls can be prevented or reduced, and the patient can be better protected while also lowering sitter utilization (Sand-Jeklin et al., 2016).

Votruba et al. (2016) performed an intervention phase prospective descriptive study conducted in a 350-bed urban non-for-profit designated hospital over nine months in three adult inpatient units. The research's explicit aim was to evaluate if video monitoring technology is a safe and effective tool for reducing falls and reducing sitter utilization costs in the inpatient adult unit. This study highlighted the demands of increased patient acuity and pressure of productivity optimization, patient falls, and sitter utilization as the challenge and focus of many healthcare organizations. Votruba and colleagues (2016) suggested that video monitoring (VM) is a safe tool for fall prevention. The researchers emphasized that there has been limited peer-reviewed research on the effectiveness of VM for patient safety. However, many organizations have still published quality improvement data that suggest reduced patient fall and sitter utilization costs due to VM use. Their study demonstrated that video monitoring is not only a safe intervention; it is also more effective than patient companions (sitters) in reducing falls and improving outcomes by lower legal expenses and patient and staff satisfaction (Votruba et al., 2016). Results from their study demonstrated falls decreased significantly from 85% to 53% ($P < 0.0001$, 95% CI) (Votruba et al., 2016).

The fascinating outcomes of Votruba et al. (2016) were the 35% reduction in the organization's falls where the research was conducted compared to the baseline data from the nine months pre-intervention. Decreasing falls by 35% would lead to an annual avoidance of 37 falls per year for the organization where the study was conducted (Votruba et al., 2016). According to Votruba and colleagues of this study, falls leading to an injury estimated are estimated to be 9% to 15% of all falls, which means three to five falls with injuries were

prevented by reducing falls by 35% (Votruba et al., 2016). The estimated cost of $17,500 per fall and implementing VM would avoid between $52,000 and $87,000 fall costs yearly. The total cost of avoidance of falls and sitter reduction would be $77,200 to $112,700 annually (Votruba et al., 2016). Therefore, Votruba et al. (2016) demonstrated that video monitoring is a safe and effective intervention and more effective and efficient than in-person sitters in decreasing falls by expanding the number of observed patients continuously 24/7.

Votruba and colleagues (2016) emphasized the importance of the challenges nurses face with selecting criteria to forecast patients who can be candidates for VM. The Process has been challenging for nurses to indicate patients at risk for falls and candidates for VM. Therefore, further study was warranted by Votruba et al. (2020) to establish VM's accurate selecting criteria and to investigating the most appropriate length of shift for telesitter and the most effective telesitter- to- patient ratio (Votruba et al., 2016). The striking part of Votruba et al.'s (2016) study is that since VM is a new technology integrated care delivery system, there is a knowledge curve and trust curve for nurses and telesitters caring for VM patients. Therefore, staff selection and training and maintaining consistent staff are vital success factors for achieving desired outcomes (Votruba et al., 2016).

Davis et al. (2017), in a quasi-experimental series with a non-randomized, uninterrupted sampling study conducted in a large nonprofit teaching facility at West Central Florida for four years. The purpose of Davis et al. (2017) was to determine the effectiveness of physical sitter utilization versus video monitoring to assess the occurrence of falls, self-harm, and the costs associated with usage of bedside sitters (physical sitter) and virtual video monitoring. Davis and colleagues (2017) highlighted that sitters' use is costly for hospitals, and the practice positions a challenge to the healthcare providers. The US hospitals have reported the estimated costs related

to sitter utilization are between $500,000 to $2,000,000 annually (Davis et al., 2017). Davis and colleagues' (2017) study also emphasized the rising of sitter utilization in hospitals; lately, there is a call to examine video monitoring's (VM) practice as an alternative process to practice direct patient observation.

Additionally, Davis et al. (2017) also reported a minimal increase in patient falls associated with in-person sitters. The increase was due to the numerous staff sharing patient care responsibility, which destroyed workflow, and when the use of sitters decreased, the fall rate also decreased (Davis et al., 2017). On the other hand, patient falls reduced by 6% when the sitter was replaced by virtual video sitter monitoring (Davis et al., 2017). Besides, Davis and colleagues (2017) emphasized that in-person sitter use is expensive and does not show success resulting in reducing patient falls. There is not enough evidence about its effectiveness as the best intervention to improve patient safety (Davis et al., 2017). Therefore, Davis et al. (2017) suggested that the nurses must consider less expensive, safe tools interventions that have proven achievement in preventing patient injuries such as education, symptom activating practice, and virtual sitter video monitoring.

Davis and colleagues (2017) aimed to answer three questions: (1)To determine the incidence of falls using in-person sitters and video monitoring, (2) the occurrence of self-harm using in-person sitters and video monitoring, and (3) and the cost related to in-person sitters and video monitoring. According to Davis and colleagues (2017), study results showed no statistically significant differences in falls or self-harm incidents when video monitoring was utilized to provide constant patients observation. Therefore, Davis et al. (2017) suggested that nurses can provide quality and safe patient care at a lower cost without risking patient safety by using video monitoring instead of in-person (in-room) sitters. However, assessing staff and

patients' perceptions of VM's use was recommended for further qualitative study (Davis et al., 2017).

For this quality improvement project, considerations were made about the safety and cost-effectiveness of virtual sitter video monitoring, patients' perception of their privacy, confidentiality, and security. Abbe & O'Keeffe's (2020) peer-reviewed nursing leadership study was conducted as a market research and system determination assessment on available continuous video monitoring vendors driven by nursing leadership. Abbe & O'Keeffe's (2020) research screening criteria were available technology solutions, literature reviews on program effectiveness, and overall vendor outcomes. Abbe & O'Keeffe (2020) is a study done at a large academic Magnet-designated medical center in the United States Pacific Northwest. The nurse leadership recognized that the sitter's need is rising and lack of other resources impacted patient safety, staff satisfaction, productivity, and centralized video monitoring CVM was identified as a solution (Abbe & O'Keeffe, 2020). CVM appears to be an evidence-based solution and could add the possibility to improve patient care satisfaction, productivity, and safety in all patient populations throughout the inpatient setting (Abbe & O'Keeffe, 2020). The organization fosters a safe environment that upholds the hospital values for patients' and staff's respect and dignity while maintaining safety and financial stability through improved resource allocation (Abbe & O'Keeffe, 2020). During the study of Abbe & O'Keeffe (2020), a strong steering committee was organized with multiple representations from across the care continuum during the implementation process, including clinical and technology senior leaders, managers, marketing leaders, quality leaders, the nursing staff administrative team and nursing staff ancillary float pool management team. The team conservatively worked on the implementation of CVM, and

the outcomes showed a one-year post-implementation of CVM, the medical centered saved $ 109511 in the first 3 quarters of use of CVM (Abbe & O'Keeffe, 2020).

The most promising part of Abbe & O'Keeffe's (2020) results is that integrating innovative technology care of CVM care gave more confidence and a sense of security to the patients and their families. During the study of Abbe & O'Keeffe (2020), an online patient and family feedback survey was completed daily by a video monitoring technician (VMT) to evaluate the overall comfort and security, and relief opportunities related to CVM. According to Abbe & O'Keeffe (2020), patient and family survey results demonstrated that patients and families felt more secure when observed with CVM. Patient and family said it provides them more privacy than an in-person sitter 80% of the time; also, they felt 93% of the time video monitoring gives them a sense of added security. However, when asked about patient and family education during the initiation of CVM, only 55% of the time, they felt they received the required patient/family education (Abbe & O'Keeffe, 2020). The deficiency of inadequate patient and family education is the gray area that nursing staff needs to improve. Abbe and O'Keeffe (2020) suggested to set up a clinical alert system to remind nurses to provide CVM education before or upon initiating CMV to the patient if they are alert and oriented or to the family members to close the gap of patient/family satisfaction.

Johnson (2017) highlighted clinical questions related to safety anxieties, stresses of the work atmosphere for nursing staff, and cost reflections that led to clinical questions about utilizing Video Monitoring (VM) for patient safety. VM for patient safety appeared in the nursing literature post-Hurricane Katrina, and New Orleans medical center in 2009 used it as a quick solution to reduce patient falls due to high patient capacities and a shortage of nursing staff (Johnson, 2017). Johnson's (2017) review expressed that even though the situation of Katrina

cannot be compared, many healthcare organizations across the country face similar challenges. Therefore, the significance of Johnson's (2017) executive summary highlighted that VM determines to improve patient safety by providing an alternative to costly nursing staff sitter utilization. The call of sitter utilization is rising due to increased patient capacities at hospitals, declining lengths of stay, a higher patient acuity level, and a staff (Johnson, 2017). Medical reimbursements are affected by avoidable hospital-acquired falls and injuries; these conditions challenge healthcare systems to improve patient safety and reduce adverse outcomes in an economically responsible way (Johnson, 2017).

According to the Joint Commission(JC), hundreds to thousands of patient falls every year in the United States, and between 30% to 50% of falls are associated with injuries and lead to increasing lengths of stay and healthcare costs (Johson, 2017). In Johnson's (2017) executive summary, the author raised the three clinical questions: (1) What impact does VM have on patient outcomes? (2) Does the implementation of a VM program provide cost-benefits? (3) Are there best practice strategies for VM's use to enhance patient safety? Johnson's (2017) complete summary demonstrated that VM implementation had shown a reduction in falls per 1,000 patient days and a significant reduction in sitter shifts (28.5%). Several studies have concluded that VM is less expensive than a sitter and doesn't restrict a patient's safety for falls or increase self-harm (Johnson, 2017). The developing guidelines for evidence-based practice suggest an overall return investment of 29.2 times for two years period with a projection of $2,000,000 in savings for the next 1.5 years (Johnson, 2017). Additionally, Johnson (2017) suggested quantitative and qualitative studies are needed to establish a more significant body of evidence to guide clinical practice for using VM to promote patient safety.

Kowalski et al. (2018) wrote a literature review that analyzed VM's costs and benefits to demonstrate the feasibility of adopting virtual sitter monitoring technology as a quality improvement project in one Midwest medical center. The Kowalski et al. (2018) purpose was to use the available evidence to create a budget proposal for VM sitter implementation to reduce patient falls and in-person sitter utilization. According to Kowalski and colleagues (2018), only limited evidence-based, peer-reviewed articles were available; however, numerous data were available. The data reports showed that video monitoring indicated a reduction in inpatient fall rates, reduced injuries related to falls, and an increased return on investment with a substantial sitter cost avoidance (Kowalski et al., 2018). The three years comparative study of Kowalski and colleagues (2018) baseline data in sitter utilization cost ($1,266,258) and fall and fall-related injury cost ($1,211,184) with the total cost for both sitter use and fall and related-injury cost of $2,477,442 for three years. According to Kowalski et al. (2018), the cost of video monitoring during three years of study was $ 316,564.50; falls and related injury costs were $605,592. The video monitor system cost $171,375.20, with a total cost of $1,093 531.70; from this estimation, the three years' complete cost avoidance was $1,383,910.30 (Kowalski et al., 2018).

Kowalski et al. (2018) concluded that VM sitter utilization could improve nursing practice through enhanced safety, and if safety improved, patient and family satisfaction would improve. Also, returning the patient care technician to the staffing matrix and enhanced patient safety may increase staff satisfaction (Kowalski et al., 2018). Kowalski and colleagues (2018) also suggested other research may also lead to improved quality improvement initiatives. VM technology is a useful blueprint for others to promote innovative clinical evidence to reduce patient falls and fall-related injuries and minimize sitter utilization costs (Kowalski et al., 2018).

Rationale

Role of the Clinical Nurse Leader

A Clinical Nurse Leader (CNL) is an advanced role out of a partnership between nursing education and practice leaders to implement nurse educators to address patient care needs in a complex, shifting healthcare delivery system (King et al., 2019). CNLs facilitate a culture of safety to enhance safety across diverse settings. CNLs are prepared for direct clinical leadership at the point of care (microsystem) to ensure that care delivery is safe, evidence-based, and targeted towards optimal quality outcomes and cost-effective for the unit of customers served by the CNL (Reid & Dennison, 2011). One of the prime challenges in contemporary, complex healthcare settings is useful and timely communication among healthcare providers. Without this communication, care can become rough for the patient and family and increases the risk of a patient's harm and a financial burden (Alder et al., 2018). A central part of the CNL role is to fill the communication gap by ensuring that patient and family desires are assessed. They are steadily connected with all healthcare team members so that care can be more efficiently and effectively coordinated.

A significant component of the CNL role centers on fostering and sustaining a safe culture for the patients and families. A review of current evidence demonstrated seven important subcultures within a safety culture: leadership, teamwork, evidence-based, innovative care, communication, learning, justice, and patient-centeredness (Reid & Dennison, 2011). Therefore, CNLs receive advanced education about risk anticipation and reduction, and clinical practice centers on monitoring and managing information related to risk, safety, quality, and cost-effectiveness. There are also nine Master essentials and corresponding CNL competencies that provide a comprehensive view of expected outcomes of CNL education and simplifying curriculum expansion (King et al., 2019). The nine roles of CNL competencies categories are a

clinician, outcome manager, client advocate, educator, information manager, system analyst/risk anticipator, team manager, member of a profession, and lifelong learner (King et al., 2019). CNLs use performance events to measure and advance care distribution of evidence-based practice and promote outcomes. CNLs perform a comprehensive microsystem assessment to identify the microsystem problem and implement quality improvement approaches based on current evidence-based practice (King et al., 2019). In this project, the CNL served as a team leader to assess patient safety issues to prevent and reduce patient falls and injuries. The CNL focused on developing a teaching plan and implementing an innovative approach by integrating a telesitter virtual video monitoring system to reduce patient harm related to falls.

Theoretical Frameworks

Change Theory

Changes are unavoidable events. It is essential the process occurs; nevertheless, nursing literature finds difficulties associated with transforming plans into action; efforts at reform fail because the change agents take an unstructured approach to implementation (Mitchell, 2013). It is essential for change agents to find an appropriate change theory or model to provide a framework for implementing, managing, and evaluating change (Mitchell, 2013). Therefore, since previous fall prevention interventions were unsuccessful and innovative approaches needed, Lewin's three-stage theory is appropriate as a framework for this quality improvement project study. Lewin's Theory of Change gives the conceptual framework for the virtual sitter pilot testing project. Kurt Lewin is the father of a social psychologist of his era in the early 20th century. Lewin was recognized as a pioneer in the study of group dynamics and organizational growth, established Lewin's Theory of Change, which is often emphasized in the nursing study (Shirey, 2013). The theory's structure and steps help avoid common drawbacks related to change and assist significant change creativities (Shirey, 2013). Lewin's change theory's three stages are

unfreezing, moving, refreezing (Mitchell, 2013; Shirey, 2013). Lewin was known as a founding father of change management with his three unfreeze-change-refreeze steps (Cummings, 2016) (see Appendix B).

First Step: Unfreezing

Mitchell (2013) and Shirey (2013) emphasized that the unfreezing step is the essential step in identifying the issue or problem. The unfreezing state is perhaps one of the most crucial phases of understanding in the world of change we live in today. The unfreezing step is all about getting ready to change. It includes getting to the point of thinking that change is essential and be prepared to move away from the existing comfort zone. It includes getting equipped for a change using a change agent that acknowledges a problem and improvement requirement. During this phase, the need to reduce patient falls and sitter utilization was identified as a microsystem problem. A CNL student completed a microsystem assessment and determined that an innovative approach is essential to minimize falls and sitter utilization. The virtual sitter is an innovative technology to reduce and prevent falls and reduce sitter utilization, ultimately improving the staffing shortage that many organizations are experiencing due to increased use of 1:1 in-person-sitter utilization to avoid falls.

The Second Step: "Moving" or "Changing"

The "Moving" or changing" step is the second most vital step, validating the change's profits and reducing the forces that disturb change. This step is the essential stage because it can ease union leaders' and staff resistance secondary to anxiety, fear, or uncertainty related to new technology or change (Shirey, 2013). The moving step is a transitional stage and needs support in training and coaching, and clear communication is vital at this stage. A detailed and well-organized plan of action requires encouraging and engaging staff to try out with lots of support.

This step is well organized, easy to understand, and simple, but the sustainable staff and family education will be handy (Shirey, 2013). Lewin emphasized that this phase involves seeing the change as a method rather than an event (Shirey, 2013). It includes preparation from all aspects to initiate the virtual sitter video monitoring pilot testing implementation project. The implementation plan looks into the technology, data analytic standpoint, clinical workflow, policy, and procedure.

The Third Step "Refreezing"

The final refreezing stage is an establishment, which creates stability after the change has been made and accepted (Mitchell, 2013). At this stage, change assimilates and creates new balance into the system, so it becomes practice and resists further changes. The refreezing step is when the virtual sitter pilot is adapted and ready to spread to the mesosystem. Virtual sitter video monitoring policy and procedures are approved, workflow, and the process will be established and maintained. The fascinating part of Lewin's Theory of Change identifies driving forces and resistance forces as a positive force for change (Shirey, 2013). During this stage where the change stresses stabilization, embedded into the culture, policies, and practice. During virtual sitter monitoring, the leading project agent and the three champions will be the driving forces. The resistance from some staff and union representatives will be an example of resistance forces.

The unfreezing stage is perhaps one of the more essential steps to understand in the world of change we live in today. The unfreezing stage is all about getting ready to change. It includes getting to the point of thinking that change is essential and be prepared to move away from our existing comfort zone. The second stage, the moving (or change) stage, needs support in training and coaching; clear communication is also vital (Mitchell, 2013). The final refreeze stage is an establishment, stability after the change has been made, and accepted changes.

Model for Improvement (MFI)

The Model for Improvement (MFI) is considered a simple tool to use but is nevertheless instrumental and influential for change management; it was developed by the Associates in Process Improvement (Institute for Healthcare Improvement (IHI), 2017). It is a powerful tool for fast-tracking improvement and is widely used in health care organizations to improve many different healthcare developments and outcomes. The model planned to speed up the improvement process consisted of two parts. First, three fundamental questions to focus improvement work: the test's aim, how improvement will be accomplished, and how each specific change can result in development. Secondly, it analyzes transformation using the plan-do-study-act (PDSA) process. The PDSA provides an organized, experimental learning approach to pilot change for quality improvement (Reed & Alan, 2016). It allows for continuous adjustment, thus increasing the chance of accepting and supporting the anticipated outcomes.

The PDSA method users follow four-stage cyclic learning approaches to adapt change aimed at improvement (Taylor et al., 2014). The PDSA cycle is a tool within the medical-surgical microsystem to conduct small virtual sitter monitoring pilot tests. The model by developing a plan to test a change (Plan), carrying out the analysis (Do), detecting and learning from the effect of the tested change (Study), and determining what modifications should be made to the test (Act) (IHI, 2020). For this quality improvement project, the PDSA will conduct small change tests for the virtual sitter video monitoring evidence-based fall reduction interventions. The first PDSA is the pre-implementation staff and patient/family survey to assess their reaction toward integrating technology and providing appropriate staff and patient/family education. See (Appendix B Part I)

The Global Project Aim

The global aim of this quality enhancement development was to reduce the incidence of patient falls, injuries, and sitter utilization costs by 50% on an annual basis in the microsystem.

Specific Aim

This quality improvement project aim was to introduce, and pilot test the feasibility of a virtual sitter video monitoring system in a 24-bed medical-surgical microsystem by the early year 2021 to reduce patient falls.

Aim Statement

The aim is to promote safety and improve patient outcomes in the medical-surgical microsystem within the urban acute integrated care delivery system and introduce and pilot test the feasibility of a virtual sitter video monitoring system (VSVMS) in one 24-bed medical-surgical unit by the first quarter of the year 2021.

Methods

Context

Preventing patients' falls has been a challenge for the project site medical-surgical unit. Numerous efforts have been made, including initiating and maintaining a universal fall assessment and prevention intervention policy and protocol that have been utilized to reduce falls. Besides the universal fall precaution, many assessment strategies have been used, including Schmid fall assessment tools, focusing on patient mobility, mental status, elimination, prior history of falls, and medication review by geriatric nurse specialists. Also, the Schmid Plus ABCS fall assessment tool has been implemented, which focuses on age >75 years old (A), bones specifically any history of bone disease (B), coagulation impaired bleeding issues (C), and surgery within 48 hours (S) assessments strategies. These above fall risk assessment tools have been used upon patient admission or transfer to the unit, post-fall or near misses, change of patient's condition, and every shift to initiate fall prevention interventions (Per hospital fall prevention policy, 2019).

Common fall assessments and fall precautions are usually adopted within hospitals almost routinely, although the evidence is inconsistent concerning standardized interventions in reducing inpatient falls (Avanecean et al., 2017). Some of the fall preventions interventions protocols that have been utilized at the project site are: purposefully round every hour, teach-back about falls and interventions, keep bed or gurney in the lowest position, use the low-bed, ensure call light and items within reach, assist with ambulation, promote mobility, and provide non-skid yellow footwear. Other measures have been to eliminate potential trip hazards in the room, keep the room clutter-free with adequate lighting, address sensory deficits for glasses and hearing aids, etc. (Urban Hospital Fall Prevention Policy, 2019). The main focus has been applying yellow armbands, communicating fall risk, and risk-specific interventions during

handoff and huddle, a 7-10-minute shift change meeting's informational transition. Also, provide and reinforce patient and family education on fall risk and intervention measures, identify individuals' risk factors for falls, and create individualized care (Urban Fall Prevention Policy, 2019).

The microsystem also implemented a unit-based best practice. In this mindset, patient safety overrides patient privacy, and no one is allowed to leave the patient alone while adhering to a 'no call light passing zone' practice. The unit also uses two types of alarm systems: a bed alarm and an external small green box alarm system that goes off when a patient attempts to get out of bed without calling for help. There were some improvements during the initiation of the unit-based best practice. However, a few months later, the unit's fall rates continued to rise again, and the in-person sitter began increasing. Votruba and colleagues (2016) demonstrated that applying research into practice and promoting technology and evidence-based innovation for fall prevention interventions in acute care adult patients could reduce hospital-based falls. Also, Titler and colleagues (2016) suggested that hospital clinicians need to know their patients' risk factors for falls and must utilize evidence-based, patient-centered care interventions to mitigate those risks.

Despite identifying specific risk factors for falls and implementing fall prevention policies and procedures, inpatient falls continue to be a challenging patient safety concern in acute care settings worldwide (Bowden et al., 2019). Nurses and other interdisciplinary teams make every effort to prevent patient falls by using their professional expertise, standardized fall risk assessment tools, and fall prevention interventions. However, inpatient falls continue to rise within all ages of the inpatient population (Quigley et al., 2016). According to this urban acute care yearly quality report, the project site medical-surgical microsystem is also facing the

challenge of patient falls, with 12 patients having fallen in 2019 and 13 patients in 2020. (see Appendix A fall baseline data report)

Microsystem Assessment

Different approaches can be used for microsystem assessments. CNLs can better understand who they provide care for and what areas need improvement using the 5 Ps assessment framework model. Therefore, the 5 Ps Dartmouth Institute Microsystem Assessment Tools were used to analyze the medical-surgical unit microsystem at this urban acute care hospital. These 5 Ps are including Purpose, Patients, Professionals, Pattern, and Process with relevant metrics that matter, according to Dartmouth Institute Microsystem (2019). The microsystem assessment efforts are to identify individuals at high risk for falling by performing a new fall risk assessment and innovation prevention approach. Innovation is a fundamental component of the care revolution and an essential part of how organizations will enhance care across the care continuum (D'Alfonso et al., 2016). For patient safety and fall prevention and reduction, innovative approaches are needed to develop successful and sustainable quality improvement projects. Therefore, a microsystem assessment was conducted by CNL to assess the areas where innovative improvement to reduce patient falls would be most beneficial. (See Appendix D)

Purpose

The urban acute care hospital was established 67 years ago in northern California and had a unique history. The hospital provides 24-hour emergency service, inpatient and outpatient surgery, level-2 pediatrics care service, maternal child services, adult intensive care, medical-surgical, oncology, certified stroke center, orthopedic, general surgery, and some cardiac procedure services. The clinical microsystem assessment of the medical-surgical unit and the orthopedic unit was completed using the Dartmouth Clinical Microsystems Assessment tool.

The urban acute care medical center exists to provide affordable, high quality, and safe medical care to its members and the surrounding communities in the area. It exists to provide "Safety for everyone, every time, everywhere to create an environment free of harm" (the Safety Statement vision, 2020). This urban acute care facility is designated as a mesosystem for this quality improvement project, and the medical-surgical unit is the microsystem. The virtual sitter monitoring pilot testing was planned to promote better outcomes to reduce patient falls and reduce sitter utilization hours and financial costs related to falls.

Patients

This integrated acute care hospital is a licensed 233-bed facility (mesosystem). In contrast, a medical-surgical microsystem is a 24-bed unit whose primary patient population varies in age groups from 19 to 76 years or older. The patients served are orthopedic surgery, general surgery, telemetry (heart monitoring), and medical overflow services. Approximately more than half of the patients are 60 years old and older, and 55% of patient admission are women, and 45% are male. The top ten admission diagnoses include joint replacement, colorectal surgery, transurethral resection of the prostate (TURP), small bowel obstruction (SBO); upper respiratory infection (PNA, asthma, and COPD), clostridium difficile (c-diff) gastroenteritis, altered mental status secondary to advanced dementia, urinary tract infection, Severe sepsis, and pancreatitis and miscellaneous general surgery.

This microsystem has various patient populations at a higher risk for falls with injury due to the many diagnoses that affect their health condition. Many of these fundamental health issues increase the patients' dependency and reduce their independence, placing them at advanced risk for falls with injury. Extrinsic health factors, such as strong medications administered for the post-operative patient and pain medications, put the patient at a higher risk for falls with injury. The port of entry also varies: 50% of admission come from Post-Anesthesia Care Unit (PACU),

30% from the Emergency Department (ED), 10% transfer from within the facility from another unit, 3% direct admission from home or clinic, 4% transfer residential care, and 3% transfer in from another facility. The average daily census from January to December 2019 was 18 patients. The typical length of stay is three days for medical patients and two days for surgical patients. Around 60% of patients are discharged to their homes, while about 20% of surgical patients go home with a home health visiting nurse, and 10% are released to a skilled nursing facility (SNF). Then, 3% go to another acute care facility and 4% to rehabilitation. The remaining percent (3%) is transferred to a higher level of care, such as the ICU. Zero percent leave against medical advice (AMA).

Professionals

The medical-surgical unit has a diverse group of patient care teams consisting of department managers (DMs), assistant nurse managers (ANMs), and registered nurses (RNs). The majority of the RNs have telemetry experiences, and one RN has staff nurse IV level expertise. Still, a small number of RNs do not have telemetry certification and can only take care of medical-surgical patients. The unit also has a patient care technician (PCT), unit assistants (UA), physicians, hospitalists, surgeons, and specialty physicians. The patient-to-nurse staffing ratio for this microsystem is based on the California ratio for a medical-surgical unit, a 1:5 ration throughout the shift for 24 hours of operation. There is mixed staffing from regular, per diem, on-call, and traveler nurses.

The unit has 24 beds, and each shift staffed with 4 to 6 RNs and 1 to 2 PCTs for day and evening shift based on the daily unit census to assist RNs with patient mobility and activity daily living. However, only 0.5 to 1 PCT is on the night shift. The number of patients in the unit determined how many RNs and PCTs are required. There is usually one UA for day and evening each shift but only 0.5 UA for the night shift because during the night shift, one UA is shared

between two units. Sharing UA at night has been a challenge because if nurses or PCT are with their patients, no one answers patient call lights or phone calls. Most of the falls occur during the night shift. The department also has supportive services, including physical/occupational therapy, respiratory therapy, pulmonology, neurology, nephrology, cardiology, OBGYN, laboratory, radiology, pharmacy, pain management pharmacy team, case manager social services, environmental service, nutritional, ancillary, material management, and engineering.

Process

The medical-surgical unit has standardized routine processes for change of shift, admissions, discharges and transfers, medication administration, and daily patient care plans. The shift changes occur most of the time every eight hours (at 7 am, 3 pm, and 11 pm), but sometimes staff work twelve hours shifts, and shift change can occur at 7 pm. The change of shift process starts with. The unit census and staffing report for the shift are also addressed during the huddle, and the huddle messages are expected to end within seven minutes. Every shift change report or "Nurse Knowledge Exchange (NKE)" occurs at the bedside to involve the patient and family in the patient's care and keep them informed. A multidisciplinary round (MDR) is also one of the processes in which the doctor, nurse, and patient care coordinator (PCC) go to the patient's room to discuss the progress, plan of care, and discharge plan. An authentic hourly round is completed by RNs and PCTs to ensure patient safety and ensure their needs are met.

Patient admission to the unit is determined by the nursing supervisor with an assistant to the house supervisor. The nurse and bed assignment for the patients are managed by an on-duty Assistant Nurse Manager (ANM). The nurses are expected to receive the report within 10 minutes of notification of the patient assignment. The UA notifies the PCT to set up a room by placing a new patient admission kit and ensuring fall prevention safety measures like bed and

chair alarms to be activated when the patient arrives. When the patient arrives in the unit, the nurse is notified and expected to come to the room to receive, settle, and orient the patient and family members. The nurse also goes over the unit's routine process about safety, mobility, medication, bedside report, and updates the care board with the plan of care for the shift or day, staff name and contact information, and other necessary details. After settling the patient and family, the primary RN completes a head to toe system assessment and two-person skin check admission assessment with PCT or another nurse and document the findings into the Health Connect (HC).

There are two means of communication for patients and families to get in touch with staff: intercom-call light calling and phone call systems. During patient welcoming and before leaving the room, the nurse activates the bed alarm and external green alarm system and instructs the patient and family on using the call systems for any need or before attempting to get out of bed to avoid injury. The nurse is expected to go over with the patient and family using the call light, TV control button, and the phone system. The nurse is also expected to complete admission questionnaires within eight hours of the patient's arrival at the unit.

After the RN finishes the admission process, the ANM will go into the patient's room and complete the nurse leader (NL) welcome round for new patients. During the NL round, the ANM sets the stage by informing the patient and family that the unit's goal is to deliver excellent care to all patients admitted to the unit. The ANM also notifies patients that daily NL rounds will be done to establish recognition and any service recovery to ensure the quality of care has been delivered. Finally, the ANM gives her/his business card and encourages the patient and family to contact the NL for any concerns or questions. The NL round is also completed before the patient leaves the unit on the day of discharge.

Patterns

The focus of the unit is safety, care experience, and quality measures (fall prevention, patient mobility, enhanced recovery after surgery [ERAS], hospital-acquired pressure injury [HAPI], hospital-acquired pneumonia [HAP], etc.). During the huddle, the staff is reminded daily about safety, including patient falls, staff injury, and quality measures. The safety topics are posted on the huddle board and discussed every shift daily. ERAS, constant observation (CO), which is in-person sitter, expected discharge date, and fall risk patients are identified by the ANM on duty for the shift and marked on each shift's assignment. Patients with Peripheral inserted central catheter (PICC) and central venous Catheter (CVA) lines, epidurals, and patient-controlled analgesia (PCA) are marked on the assignment sheet at all times to alert staff for safety. Early mobility and initiation of appropriate diet order are the unit's focus, and fall prevention and workplace safety are among the unit's priorities. All staff takes responsibility for doing safety checks during NKE. Since it is a surgical unit, all patients on the unit are considered to fall risk patients and placed on two kinds of alarm systems: bed and external green alarm system, both of which must stay activated while a patient occupies a room. High-risk fall patients, identified by a fall Schmidt score of 3 or higher, have a yellow armband, yellow non-skid footwear, and a fall risk sign placed on their door. Both RNs are expected to check on these during NKE. The ANM completes two NKE observations, each shift and gives real-time feedback for incoming and off-going RNs.

The daily morning huddle, monthly staff meetings, and monthly Care Experience Excellent Team (CEET) committee meet to address safety, care experience, quality, and staff and management concerns.

Metrics that Matter

The medical-surgical microsystem has many quality improvement opportunities based on the yearly performance report "Metrics that Matter," based on many quality measures including fall prevention, clostridium difficile (C-diff) infection prevention, early mobility, and nutrition for ERAS patients. Incentive spirometry to prevent hospital-acquired Pneumonia (HAP and leaf systems from monitoring patient repositioning to prevent hospital-acquired pressure injury (HAPI) is carefully monitored. Due to JC's new guideline requirements, smoking and substance abuse assessment documentation during patient admission is closely monitored. According to the Joint Commission. (2020), there is strong evidence that substance and tobacco dependence interventions if provided in a timely and efficient manner, reduce the risk of suffering from tobacco and substance abuse-related diseases and improve patient outcomes. According to the WHO (2020), there is significant evidence for the benefits of screening and short-term intervention in primary health care for alcohol and tobacco problems.

Quality Gap

As a surgical and ERAS unit, the staff in this urban medical center is very knowledgeable on early mobility being a high-quality indication in enhancing a patient's recovery, improving patient care experience outcomes, and preventing harm related to HAP and HAPI. The patient mobility report showed consistency and met an ambulation target of 4.8 and higher in 2019 and 2020. The region quality department recognized the medical-surgical microsystem as one of the improved 2019 and 2020 consecutive units. However, the fall prevention measures gap remained high, and the number of unplanned and assisted patient falls was also high. The number of patient falls had increased (including those falling while working with nurses, PCTs, and physical therapy), leading to patient harm and poor patient recovery outcomes. Despite nurses being encouraged to follow the fall prevention policy and unit best practices, the number of

patients falls in 2019 and 2020 and continued to increase, and 13 falls occurred during the fiscal year of 2020.

The review analysis of microsystem processes revealed a total of 15 pages of inpatient fall assessments and prevention implementation policy and protocols. The medical-surgical unit also had a unit based best practice fall prevention, but no sustainable program was implemented, and falls continued to rise. The patterns revealed that even though the management team and staff were trying to follow and utilize the fall policy and protocol, falls continued to grow due to no close oversight body to monitor the high at-risk patients.

Thus, the microsystem assessment revealed that despite the comprehensive falls assessment and prevention intervention policy and protocol, increasing staff engagement to follow the policy and unit best practice didn't resolve patient falls. Multiple alarm systems initiatives were utilized, which can cause alarm fatigue. Therefore, a delayed response to the alarm may have been one of the contributor factors for patient falls. Moreover, not continuously monitoring the patients at high risk for falls, lack of integration of evidence-based practice, and lack of innovation may have also been factors. Therefore, the innovative approach of virtual sitter monitoring was selected for a pilot to see if it reduced fall rates and sitter utilizations, improving staff shortages.

After the microsystem assessment, CNL developed a comprehensive project charter that includes project statements, background objectives, project aims, measures, project stakeholder teams, etc., plan for the virtual sitter video monitoring pilot testing process. (see Appendix H)

SWOT Analysis

SWOT stands for strengths, weaknesses, opportunities, and threats. A complete SWOT analysis of this quality improvement project was completed to positively and negatively evaluate the aspects that could affect the project improvement. This analysis was essential to the success

and sustainability of planning and implementing the virtual sitter for fall prevention. SWOT analysis can maximize strengths and highlight the threats that might inhibit achievement. SWOT gives a visual representation of the most dynamic dimension of the new initiative for any project. Therefore, the strengths identified for this quality improvement project were increased fall prevention capacity, reduced patient falls, more monitored patients, improved safety and outcomes, minimal sitter utilization, and reduced fall associated costs. It would also enhance staff shortage, direct visual engagement of patients and staff, enable staff to cluster their work, and monitor the patient's vital signs or IV pump (medication). The weaknesses were staff accountability, inaccurate assumption between staff and virtual sitter monitor technician (VSMT), poor communication between staff and VSMT, lack of teamwork, inadequate training of staff and VSMT, and staff VSMT inability to manage more patients on one screen, inconsistent fall risk assessments, and not following the virtual sitter workflow.

The project opportunities identified were evaluating the effectiveness of virtual sitter; staff, patient, and family perception evaluation; patient and staff education; workflow and policy development; team building and increased staff buy-in and responsibility; and increased staff engagement and accountability. There may have also been an increase in staff understanding of the virtual sitter safety and workflow, shift huddle messages, and selecting a champion to act as the staff trainer. A threat was anything that can cause damage or impact the project negatively. Therefore, the risks identified for this quality improvement project were financial costs, resistance from staff and a labor union, VSMT inaccurate prediction of patient activities, monitored technology, incompetency, and extended response time to alert notification from VSMT. Additionally, there may have been an increase in fragmented workflow, an increase in patients fall-related to lack of accountability, injury/death, and lawsuits (see Appendix H)

Cause and Effect (Fishbone) Diagram

Cause and effect (Fishbone) diagram analysis was another quality improvement tool used to analyze the current rates statistic and fall-related injuries in the microsystem. Making a cause and effect (Fishbone) diagram was an essential part of explaining the process because it demonstrated all the possible causes of the problem in a realistic way. Cause and effect captured the relationship between the potential causes and stimulated an in-depth analysis by giving the big picture of the problem. The main categories included staff, equipment, process, environment, patient factors, and communication.

Cost-Benefit Analysis

Hospital-based falls are a substantial clinical, legal, and regulatory problem, and the Center for Medicare and Medicaid Services (CMS) no longer reimburses hospitals for any inpatient fall-related care and treatments (Hempel et al., 2013). Patients can have a significant physical injury from falls and decreased quality of life. Annually in the US, the estimated number of injuries and death related falls are 250,000 injuries and 11,000 deaths (LeLaurin & Shorr, 2019). Falls also increase financial burdens to patients, families, and healthcare organizations by increasing length of stay, medical treatment costs, and litigation. According to Votruba et al. (2016), falls are the most expensive treatment; one falls with financial injury cost is $17,500. Hospital falls are a preventable condition, yet still, rank as the most costly and challenging condition. Therefore, this quality improvement project was designed to reduce hospital falls and associated costs, such as sitter utilization, extended length of stay, injuries, and litigation.

The total number of falls for the performance year of 2019 at the urban acute care hospital was 71 falls, and 12 of them occurred in the medical-surgical microsystem. The cost of one fall without injury is $3,500. The expenses of falls for this urban acute care facility in 2019

were $248,500, and $42 000 was for the medical-surgical microsystem alone. The sitter hours utilized in 2019 were 52,424 hours for this urban acute care medical center, and 7,465 hours of the sitter hours were for the medical-surgical microsystem. According to this urban medical center finance department report, the average cost of RN sitter pay is $84.00/hr, and PCT sitter pay is $31.00/hr. The percentage of RNs being used as a sitter was 14%.

The total sitter costs urban acute care facility in 2019 was $2,014,130.08, and the sum of the total costs of falls and sitter utilization was $2,262,630.08. The cost of materials for virtual sitter monitoring is approximately $232,680. Cost avoidance measure is the total costs of the event (falls and sitter utilization costs in 2019) multiplied by 0.50 (the project's aim, reduce falls and sitter utilization by 50%), which was $1,131,315.05. Return of investment (ROI) is a cost-saving benefit from cost avoidance, which is $1,131,315.05 minus $232,680, which gives an ROI of $898,635.04 on an annual basis (see Appendix E)

CNL Fall Prevention Teaching Plan

A CNL facilitates a culture of safety to enhance safety across diverse settings. CNLs are prepared for direct clinical leadership at the point of care (microsystem) to ensure that care delivery is safe, evidence-based, and targeted towards optimal quality outcomes for the cohort of clients served by the CNL (Reid & Dennison, 2011). The primary patient safety concern in healthcare is the risk of patient falls and possible harm related to falls. Various targeted fall risk assessments and interventions have been utilized to reduce falls and fall-related costs but not sufficiently enough to meet the targeted organizational benchmarks. A significant component of the CNL role centers on fostering and sustaining a safe culture for the patients and families. Implementing a successful and sustainable fall prevention strategy needs collaborative efforts and organizational and clinical factors.

CNLs need to maximize staff engagement by providing appropriate education and training about virtual sitter monitoring. CNLs need to provide staff education and patient and family education as an essential part of the fall prevention program. Therefore, the CNL teaching plan is to create a simulation teaching program that could explain the purpose and inspire staff engagement with the appropriate utilization of virtual sitter. For this project, two- to three-minute virtual sitter Youtube video clips were incorporated into the education plan to give the visual stimulation staff would need to learn about the project. CNL and geriatric CNS prepared educational material (see Appendix Part I & Part II). The CNL also developed patient and family education flyers (see Appendix K). Based on the literature, SWOT analysis, fishbone diagram, and evaluation of the microsystem comprehensive fall risk assessment and prevention implementation program, the CNL determined that it was necessary to look into innovative technology to reduce patient falls, leading to the integration of the virtual sitter monitoring program.

Intervention

Virtual Sitter Monitoring Innovative Technology

Vortuba and colleagues (2016) suggested that using a virtual sitter video monitoring device is a safe hospital tool to reduce patient falls. Research has indicated that a virtual sitter can be useful in reducing patient falls and related associated costs (Sand-Jecklin et al., 2018). The virtual sitter monitoring solution has three components: technology, clinical workflow, and data analytics (Playford, 2017).

From the technology perspective, a virtual sitter video monitoring system aggregates virtual sitter views of at-risk patients. Virtual sitters have two options: a wireless mobile cart or a fixed device mounted in the ceiling in the patient's room that sends images over the regular

network to a centralized video screen. It is an in-room video monitor solution that provides a real-time continuous remote patient observation system. The mobile device represents an innovative patient engagement platform that includes a two-way camera and speaker on a rolling unit similar to an IV pole in which several patients can be observed from a remote centralized location by a trained technician. The mobile virtual sitter device can be moved from room to room like an IV pole?. Trained technicians can monitor up to 16 patients simultaneously; therefore, most human bedside sitters could be replaced (Roth, 2019).

The virtual sitter camera has different features, and the quality of the camera depends on the vendor. Therefore, the selection of the right vendor is paramount to achieve desired outcomes. For example, the AvaSure camera on each mobile cart can pan, tilt, and zoom, allowing the observer to see anywhere in the room, including usage details, such as skin color, changes, low breathing, and whether a patient's pulse oximetry is still attached. Staff can cluster their work due to virtual sitters (Playford, 2017). The observer can vocally engage with the patient via the two-way audio system. The patient can respond without touching anything, which is very handy for a physically disabled patient. If the patient tries to get out of bed without assistance, the observer can intervene by calling the patient's name and asking them their needs. The observer redirects and reassures the patient by saying, "Someone will come to help" or "Please stay in your bed or chair. I am going to send your nurse to help you." However, if the patient is unresponsive to verbal direction, an emergency alarm automatically cues the nursing staff to go to the patient's room immediately. The significant part of the virtual sitter monitoring solution for the patient with language barriers is that the team can use pre-recorded statements in more than 200 languages. The common phrases are "stay in bed," "what can help," "I am going to send help now," etc. An appropriate protocol and policy were developed in clinical workflow,

including sitter escalation, virtual sitter initiation, virtual sitter monitoring, and discontinuation. The development of redesigning workflows was a collaborative effort. CNL, clinical nurse educators, management team, geriatric CNS, technology review board, and clinical informatics teams finalized the workflow based on evidence-based practices.

The virtual sitter video monitoring provides robust data analytics (Playford, 2017). The system includes a real-time dashboard that shows a variety of metrics, including, but not limited to, the current number of carts in use, verbal redirections, emergency alarms, and so on. Leaders can see comparable data by viewer, unit, shift, patient condition, and so on. The illuminated night light can also assist the monitor tech and patient during night time. The virtual sitter monitoring system features allow leaders to analyze how their staff and processes compare with similar organizations. Therefore, virtual sitter monitoring is a safe intervention to reduce falls and more cost-effective than an in-person sitter in decreasing falls by expanding the number of patients directly observed 24/7 (Votruba et al., 2016).

Study of the Intervention

This fall prevention improvement project's population criteria included all patients admitted to the medical-surgical unit who had a Schmid fall risk assessment score of three or higher and Schmidt plus. Some examples of inclusion criteria are patients with a background of alcohol abuse and clinical institute withdrawal assessment (CIWA), fall risk, history of fall, noncompliant with fall, confusion, dementia delirium sundowners, impulsive. Also, patients with a risk of elopement and have a physical disability with a chance of falls can be included. However, the excluding criteria were patients with an order of 5150 hold or higher risk of suicide, patients on behavioral restraint, eating disorder patients, patients admitted due to a drug overdose or those unable to redirect verbally, and the patient deaf.

Measures

Process Measures

Measures included the percentage of patients who met virtual sitter's eligibility criteria and received a virtual sitter and the percent of additional patients that the virtual sitter system could monitor 24/7.

Outcome Measures

The project outcome measures are to reduce patient fall rates and fall-related harms and reduce sitter utilization costs. The project outcome measures focused on three measurable objectives: the measurement method, data collection method, and data collection frequency. The reduced fall rates were measured by falls per 1,000 patient days and injury events related to falls with significant injury or death. The data collected from staff reported fall events via electronic Responsible Reporting Forms (eRRF) with the frequency of baseline and during the intervention period. Reduced sitter utilization or cost measurement data methods were measured as sitter hours per patient day (HPPD). Sitter data were collected from the staffing office and sent to the finance department. The sitter data frequency compared baseline to weekly post-intervention data.

Balancing Measures

In addition to fall data and sitter frequency, a SWOT analysis survey will measure staff satisfaction with technology adoption during the pilot test to assess strengths, weaknesses, opportunities, and threats (before, during, and after the pilot) (see Appendix L& M).

Ethical Considerations

This quality improvement project was reviewed by faulty and met the guidelines for evidence-based change in practice project, rather than a research project. An institutional review board (IRB) review is not required, and the project met the exemption criteria (Appendix M).

Furthermore, 82% of the American people voted nurses as the highest ethical and honest professionals in the U.S. for the past 12 years in a 2013 Gallup poll survey (Mallari &Tariman, 2017). In healthcare, nursing professionals need to keep this public confidence high by following ethical standards. Nurses must participate both in clinical and non-clinical decision making using ethical principles.

Malari and Dariman (2017) also stated ethics is one of the foundations of nursing practice. As part of society and the front line of healthcare, nurses face ethical issues involving patient care daily. Ethical decision-making consists of making knowledgeable selections about moral concerns based on a set of standards for separating right from wrong (McGonigle & Mastrian, 2018). Healthcare providers need to understand the elements of ethical decision-making as they apply to the arena. The American Nurses Association (ANA) stated the basic principles for ethical nursing practice are autonomy, beneficence, nonmaleficence, accountability, fidelity, and justice (Appenzeller et al., 2019). Ethics is one of the critical and essential elements in the healthcare practice's frontline work and always needs to be considered when providing care. These principles and standards create the heart of nursing, and at its core, the practice of professional nursing is fundamentally driven by a code of ethics and ethical decision-making (Mallari & Tariman, 2017).

This practice improvement project's core focus was on the ANA code of ethics for nurses provision #3, which emphasizes that healthcare providers, primarily nursing professionals, are held to a high standard of moral, ethical, and professional duties (ANA, 2015). Healthcare providers, especially nurses, are expected to promote, advocate for, and protect patients' health and safety (ANA, 2015). However, this project's ethical consideration for improvement included the patient's autonomy, privacy, and confidentiality, which can conflict with the good intentions

of patient safety. Patient safety is a growing issue in healthcare, and a virtual sitter is a safe tool for fall prevention. It can be more useful to reduce falls by allowing nurses to expand monitoring to more patients (Votruba et al., 2016). However, shifting from in-person sitters to virtual sitters could introduce new ethical considerations into the patient care environment and raises concerns over patient privacy (Krasniansk, 2020). Privacy is a crucial ethical consideration in any project, and it is established to safeguard that participants' information and data are kept confidential. The virtual sitter monitoring project included educational information about participants when giving a formal report between the caregivers.

Krasniansky (2020) demonstrated that despite the virtual monitoring manufacturers' promises that their camera does not record or store any images and the device has built-in privacy activation mode to protect patient privacy, a patient and family may still raise the concern of privacy. One research study conducted by Ohio State University showed that "fear and personal space" were the main elements identified as patient concerns (Krasniansky, 2020). Therefore, virtual sitters require careful consideration of the patient relationship (Krasniansky, 2020). Communication with patients and family about privacy, comfort, and control is a critical part of patient care delivery during virtual sitter monitoring. Providing patient and family education is an essential element of the healthcare delivery system and nursing practice. Therefore, nurses have ethical and professional duties to understand patient safety while respecting autonomy, privacy, confidentiality. Before initiating the virtual sitter monitoring, the nurse must appropriately educate the patient and family on privacy, comfort, and control in the monitoring environment.

Furthermore, while acknowledging the patient and family's concerns related to privacy and their effort taking over the power of their care, the nurse has to protect the patient from

harm, which represents beneficence. The strategies to reduce falls and injury, including virtual sitter monitoring, are not only safe interventions, but it is also more effective than patient companions in decreasing falls by expanding the number of patients observed 24/7 (Votruba et al., 2016). It also helps the patient's needs to be addressed adequately and promptly. Therefore, when nurses practice ethical principles such as autonomy, beneficence, nonmaleficence, accountability, fidelity, and justice, one can make the best and most ethical decision on healthcare issues. Ultimately, the decision must benefit the patients while having each patient's best interests at heart.

Results

Outcome Measure Results

With the global aim of implementing virtual sitter monitoring for a 50% reduction of patient falls and sitter utilization in the microsystem, the quality improvement project was started in April 2020. During the information search, it was discovered that one of the same integrated healthcare delivery system regional clinical practice consultants was also working on a similar project, using the virtual sitter video monitoring in her DNP quality improvement project program that would be implemented at the macrosystem level for one of the extensive integrated healthcare delivery systems in urban northern California region. The DNP student plans to implement pilot testing in the two selected pilot sites and spread it throughout its 21 medical facilities in Northern California. Therefore, the MSM-CNL student introduced the project program of piloting virtual sitter video monitoring at one of the microsystems at one of these integrated healthcare delivery medical centers. MSN-CNL and DNP-CNL students agreed to pair the program. Data and literature were reviewed and presented to the microsystem Chief Nurse Executive and Director of adult services for approval.

The pilot testing for the microsystem was approved toward the end of May 2020. The author's home microsystem and other medical centers within the same integrated delivery system were selected as the first two pilot testing sites for Northern California. However, the regional technology review board (TRB) of this integrated healthcare system had a meeting on June 5, 2020. It discovered that the author's home microsystem would not meet the project kickoff timeline for 2020 (see Appendix N). The author's pilot testing timeline has been pushed to early 2021, and another medical center within the same integrated delivery system approved for 2020 pilot testing implementation. Therefore, the author's project has no actual implemented pilot testing data result for 2020. The actual pilot test data result will not be available for this project

until 2021. However, the future readiness preparation and another location pilot testing interim result report will be reflected in this paper.

Readiness Plan and Interim First Pilot Site Results

Policy and procedure with workflow (see appendix O), new patient/family (see appendix K), and staff education (see appendix J) for introducing virtual sitter video monitoring technology was developed in another medical center within the same integrated care delivery system by DNP- CNL and MSN- CNL students. These documents will be replicated in the author's home microsystem by the clinical nurse leader (CNL) for future implementation in the 24-bed medical-surgical microsystem. Anticipated results will reflect both the fall rates and estimated costs per fall. Three shift specific master champions will be trained as superusers to reach 90% of the unit staff for the process measure. Staff satisfaction survey results will be analyzed pre-and post-implementation surveys (see appendix L) to assess potential resistance and acceptance of the new intervention. The future results will be monitored weekly basis to evaluate the final implementation metric.

The initial organizational pilot's interim results in another same delivery system location include the two-weeks post-pilot-implementation staff education and the training satisfaction survey conducted (see appendix L). The survey result showed a Likert scale of 4.7 out of 5-stars rating. The survey data was analyzed and reported to the project committee members by the project lead agent during the weekly status verbal report virtual meeting. This initial staff satisfaction brought an aha moment. Because it did not reflect the anticipated balancing measure of staff backlashing from technology adaption. It could be imperative and promising to continue monitoring and analyzing pre-and post-implementation surveys to assess potential resistance and acceptance of technology adoption from other nursing staff.

Discussion

Summary

This practice improvement project aimed to reduce patient falls by 50% annually in the microsystem. The project's specific aim was to introduce and pilot test the feasibility of a virtual sitter video monitoring system in a 24-bed medical-surgical unit at an urban acute care hospital by early 2022. The microsystem was facing an increase in fall rates. Additionally, the sitter utilization had been increasing, causing a financial burden on the microsystem. This unit had not met the urban acute care regional target threshold of fewer than two falls per quarter for patient fall prevention in 2019. The summary and findings will be discussed on the available knowledge and plan readiness preparation for the author's home microsystem pilot testing. With increasing patient acuity reducing patient falls and the costly nature of utilizing in-person sitters, it is expensive to keep patients safe. Many healthcare organizations have been using virtual sitter monitoring and published data that shows improvement in reducing falls and fall-related costs (Votruba et al., 2016).

Findings

At another medical center with the same integrated care delivery system as the author's microsystem, the 1st pilot testing of virtual sitter video monitoring was planned to be initiated. The microsystem selection was made by carefully reviewing the mesosystem's patient falls history, environmental and geographical location of the microsystem. The project lead agent, committee members, and hospital leaders designated one of the microsystems as the best fit for the pilot testing unit. The microsystem that the pilot testing of virtual sitter video monitoring initiated is a stepdown unit where one of the project champions agents works as an assistant nurse manager (ANM). According to this champion agent, the ANM telephone report to the author, the step-down unit is a 16-bed capacity unit and a brand-new room extending from the

stepdown unit. It was approved and got the permit in mid-March 2020 to admit the COVID-19 patients who do not require the intensive Care Unit (ICU) level (L. Shiferaw, Personal communication, October 18, 2020).

The assistant nurse manager described this step-down unit; patients' rooms doors were built with solid wood doors with no glass to visualize patients for safety. The staff couldn't put eyes on the patients in closed-door rooms for positive results or suspected COVID-19 diagnoses patients per one of the COVID-19 isolation protocols required to keep the door closed for safety and prevent spreading the infection. As a result, the patient cannot be visualized under closed doors. Despite using baby monitoring to observe patients maintain other fall prevention interventions like initiating bed and chair alarms, the department had seven falls within three months (L. Shiferaw, Personal communication, October 18, 2020). This step-down microsystem, before designated as COVID-19 unit, had zero falls for almost two years. Therefore, due to the dramatically increased number of falls in this unit, the pilot testing project was selected for Virtual Healthcare Companion (VHCC), which this mesosystem named the virtual sitter monitoring as "Virtual Healthcare Companion (VHCC)." (L. Shiferaw, Personal communication, October 18, 2020). Thus, twelve VHCC cameras were installed on the wall in twelve of the sixteen patients' rooms (see appendix F)

This stepdown microsystem has approximately about 26 staff members, and 90% of them got the education and training voluntarily per union agreement because it was not mandatory per union and organization contract (L. Shiferaw, Personal communication, October 18, 2020). The patient care technicians (PCTs) received education and training, both online modules and hands-on training. However, the nurses received only an online module because they were only required to do the online module education, which takes them about 15-30 minutes. The

knowledge needed for the nurses was how to put the order and document the initiation of video monitoring in selected patients (L. Shiferaw, Personal communication, October 18, 2020).

At this urban acute care hospital in northern California, the VHCC pilot testing go-live date was October 1, 2020, at 09 am. The project started by initiating a VHCC on two identified patients that met the monitoring criteria. The author was at this pilot testing site on the pilot go-live date and time with the project lead-agent, clinical nurse educator, department manager, Assistant Nurse Manager, (ANM)- champion agent, the information technology (IT), and HealthConnect (HC) to support nursing staff during the pilot go-live. The initiation was smooth and successful with a minor clinical and technical glitch, and the glitch was fixed right away by the IT and HC support team.

The two patients selected were monitored until 3 pm only on the first day and till 11 pm for the next day. The monitoring paused for the weekend to place appropriate staffing and support systems during the weekday when all the administrative and supportive resources are available and resumed on Monday, October 5, 2020, with more patients selected to be monitored. Since then, it has been utilized successfully; the maximum patient - to- monitor technician ratio is 1:9 since the pilot started. The technicians manage it smoothly without difficulty; no patient fall reported since the pilot began in the microsystem per the biweekly project committee meeting report.

The main stakeholders for virtual sitter monitoring are patients, their families, frontline staff, nurses, patient care technicians, department manager, assistant nurse manager, senior leaders. The literature demonstrated that although there has been a small number of peer-reviewed articles on the effectiveness of virtual sitter monitoring, many organizations have informally reported improvements in falls reduction using virtual sitter monitoring. Votruba et al.

(2016) suggested that virtual sitter monitoring is a safe tool to use and more effective than in-person sitters in reducing falls by expanding the number of patients directly monitored 24/7 and lowering costs related to falls. During Votruba et al., (2016) study, the number of falls decreased meaningfully from 85 to 53 (P <0.0001, 95% CI), which was a 35% decrease in falls.

The existing evidence review demonstrated that few evidence-based, peer-reviewed articles were published to confirm the effectiveness of virtual sitter video monitoring to reduce patient falls and associated costs; however, there are numerous quality improvement data found (Vortuba, 2018 et al., 2018). In another study, despite the deficiency of evidence supporting the foundation for the utilization of virtual sitter video monitoring, it doesn't impose patient safety risk for falls or self-harm with virtual sitter video monitoring (Davis et al., 2017). A review of evidence recommends evaluating patient and family and staff perception related to the virtual sitter and could potentially be a qualitative study to confirm (Davis et al., 2017). Numerous organizations are gearing toward adapting virtual sitter video monitoring implementation to promote patient safety and cost-saving (Votruba et al., 2016). However, one study emphasized that the performance of virtual sitter video monitoring and the adaption of technology can be frightening. Therefore, the distribution of cultured best practice and standard for virtual sitter video monitoring is vital as technology will linger to develop in our global health care setting (Abbe & O'Keeffe, 2020).

Implications for Practice

Clinical Practice

Healthcare organizations must provide safe, effective, and efficient care while improving the patient care experience. Virtual sitter monitoring is an evidence-based tool to keep patients safe, assist staff in fall prevention, and save organizations costs by reducing falls and injuries and minimizing one-on-one sitter utilization costs (Votruba et al., 2016). Virtual sitter monitoring

also improves staffing shortages by allowing PCTs to be utilized at the bedside for patient care to keep more patients safe. Staff satisfaction may improve by not pulling PCTs from the unit to use them as one-on-one sitters. Virtual sitter monitoring allows for staff optimization by offering a 1:12 ratio instead of a 1:1 ratio for patient observation 24/7.

Future Implications

Virtual sitter monitoring is effective in reducing falls and falls with injury. Several organizations have utilized virtual sitter monitoring to monitor high-risk falls and low and moderate risk suicide patients (Johnson, 2017). The JC (2019) standard indicated that high-risk suicide patients need to be monitored through constant one-on-one observation from a qualified staff member per one high-risk patient. In a retrospective review study, 39 participants who were deemed low risk for suicide received video monitoring instead of a one-to-one sitter. There were no adverse events (95% CI = 0.000-0.090) (Kroll et al., 2019). At this time, the project site decided not to include mobile video monitoring for suicidal patients. However, utilizing this technology may have future implications for monitoring low and moderate risk for suicide patients.

Conclusions

This project was a complex quality improvement initiative because it was undertaken within a multi-system organization. Despite many technologic, people, and operational challenges, adopting new technology can save healthcare organizations millions of dollars related to fall injuries while maintaining safe staffing. Virtual Sitter Video Monitoring is a practical, cost-effective technology that enhances patient care experience by promoting safety, security, and privacy. Healthcare organizations that pilot test this technology tool can improve staffing ratios, optimize efficient cost savings, workflows, and anticipate employee and

patient/family satisfaction. Clinical nurse leaders can be instrumental in researching the evidence and developing and implementing new interventions in their microsystems. Introducing a fall prevention quality improvement and implementation plan in a complex healthcare organization requires innovative approaches, targeted data analytics, and significant team collaboration across systems.

Truly scant peer-reviewed literature exists that describes the utility and validity of this new technology. Variation and flexibility in workflows will be required; besides, patient and monitor technician ratios need to be monitored and adequate in this technology's future implementation. Further study is necessary for objective criteria to select the most appropriate patients for virtual sitter monitoring. Length of time or shifts for virtual sitter monitoring technicians and the most effective and proper patient-to-virtual sitter monitoring technicians' ratio should also be evaluated for outcomes. In one study, 40 patients were not selected based on the history of fall, mentation, and orientation, and 13 patients who were video monitored experienced a fall (Votruba, 2016). Therefore, the recommendation for practice is to decrease the monitor technician-to-the-patient ratios to permit the technician to observe patients effectively. Robust staff engagement and enthusiasm will promote consistency with monitoring technicians and is anticipated to increase the project outcomes beyond saving healthcare dollars and minimizing staff shortages. This innovative technology has the promise of reducing falls and saving lives.

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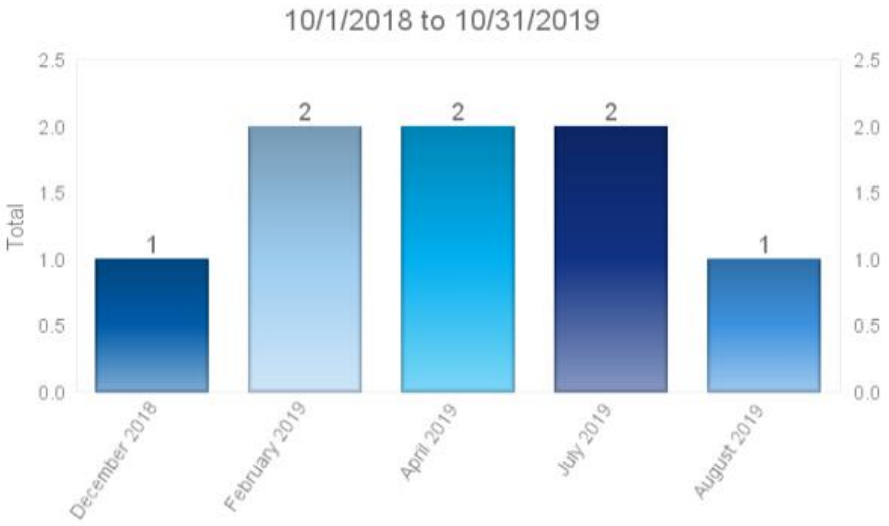
Appendices

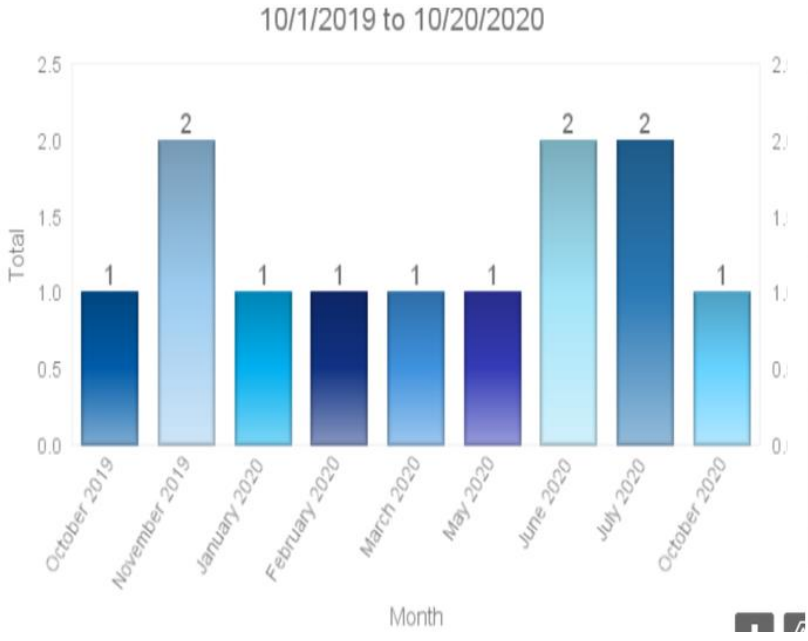
Appendix A

Medical-Surgical Microsystem Falls Baseline Data for 2019 & 2020



HARM: FALL

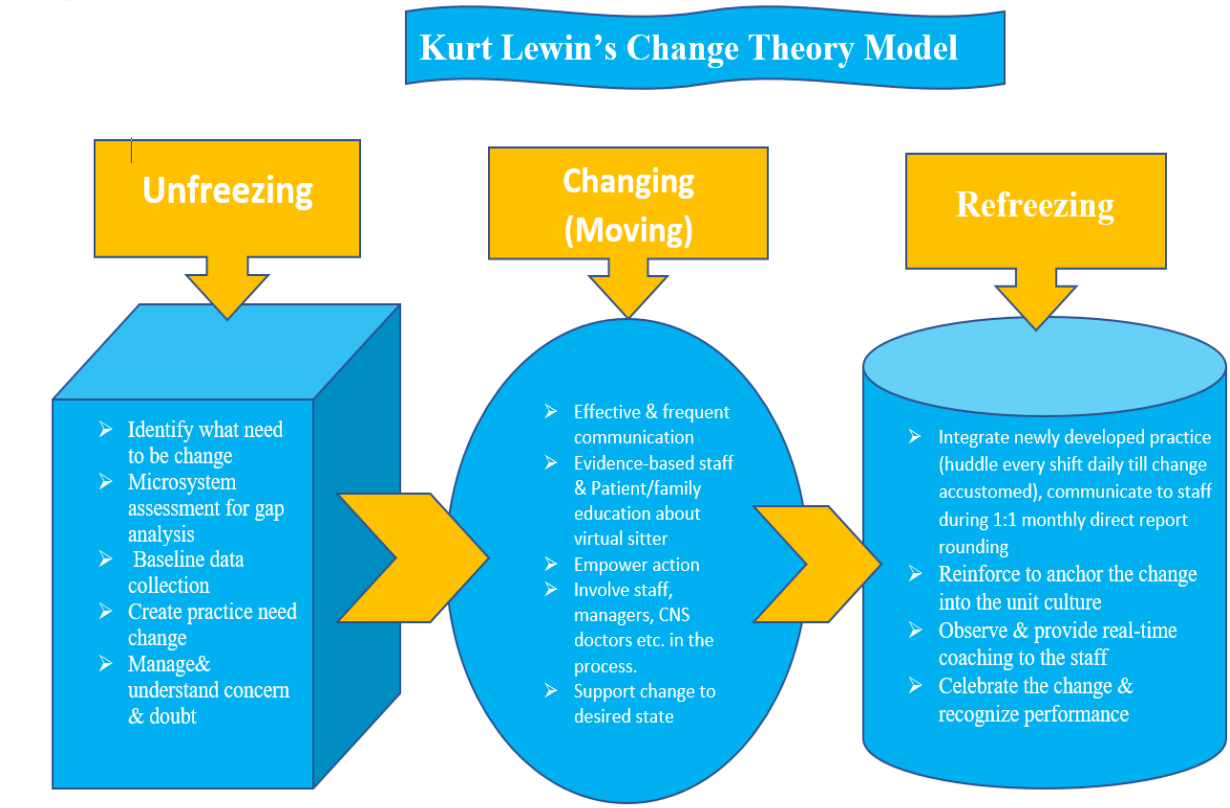
Date	Harm
8/31/2019	FALL
7/17/2019	FALL
7/4/2019	FALL
4/15/2019	FALL
4/3/2019	FALL
2/5/2019	FALL
2/4/2019	FALL
12/19/2018	FALL

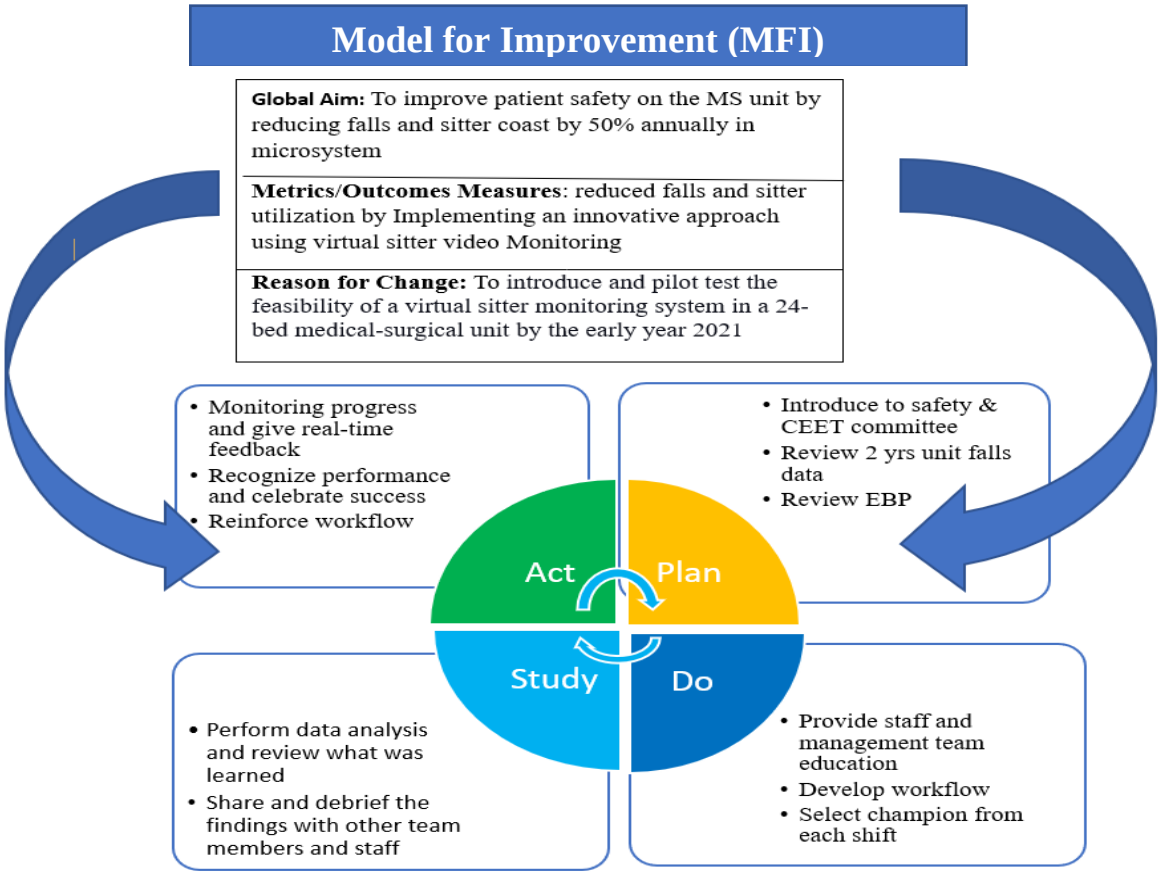


Date	Harm
10/16/2020	FALL ...
7/17/2020	FALL ...
7/17/2020	FALL ...
6/28/2020	FALL ...
6/17/2020	FALL ...
5/15/2020	FALL ...
3/13/2020	FALL ...
2/1/2020	FALL ...
1/28/2020	FALL ...
11/20/2019	FALL ...
11/15/2019	FALL ...

Appendix B

Frameworks

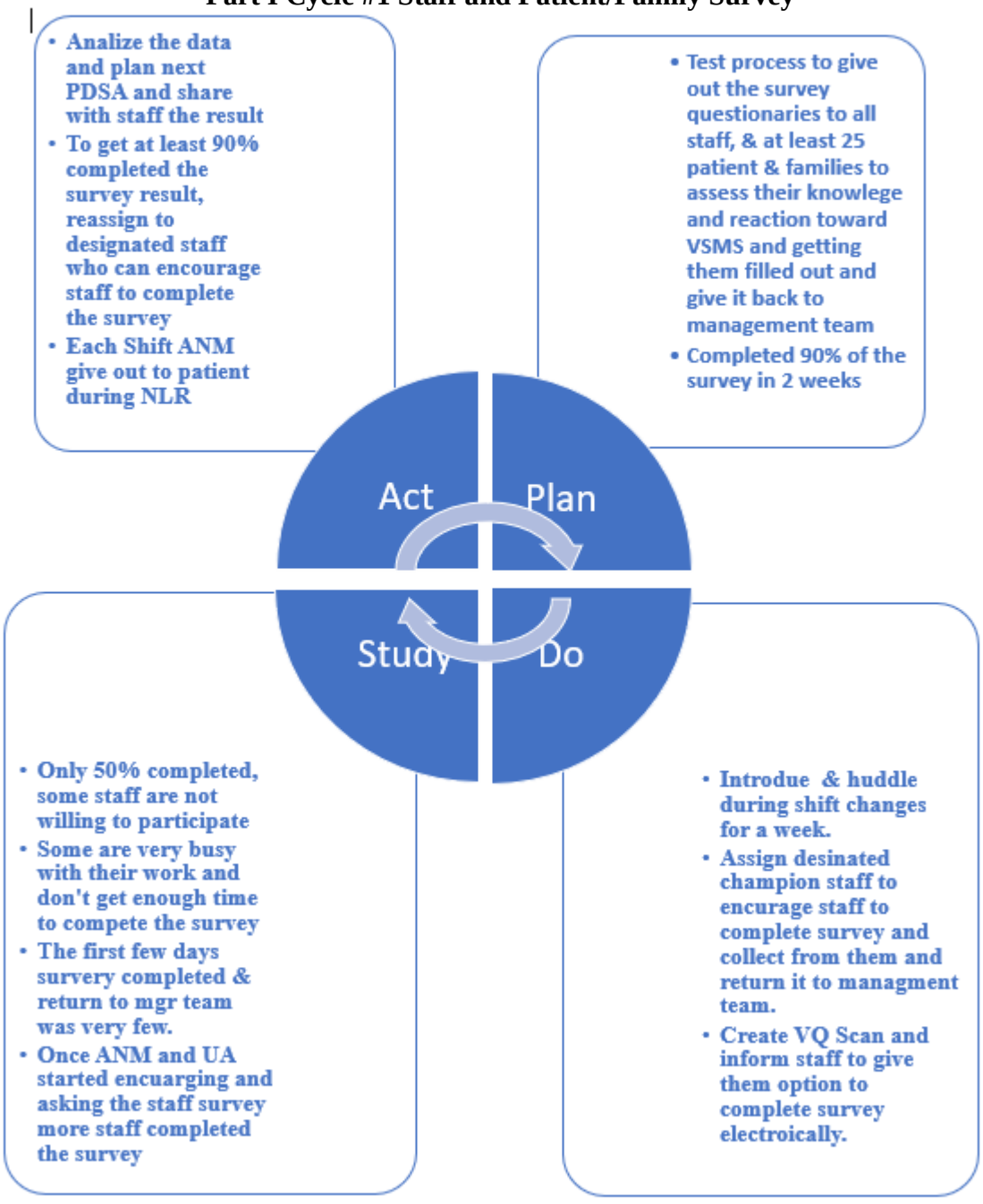




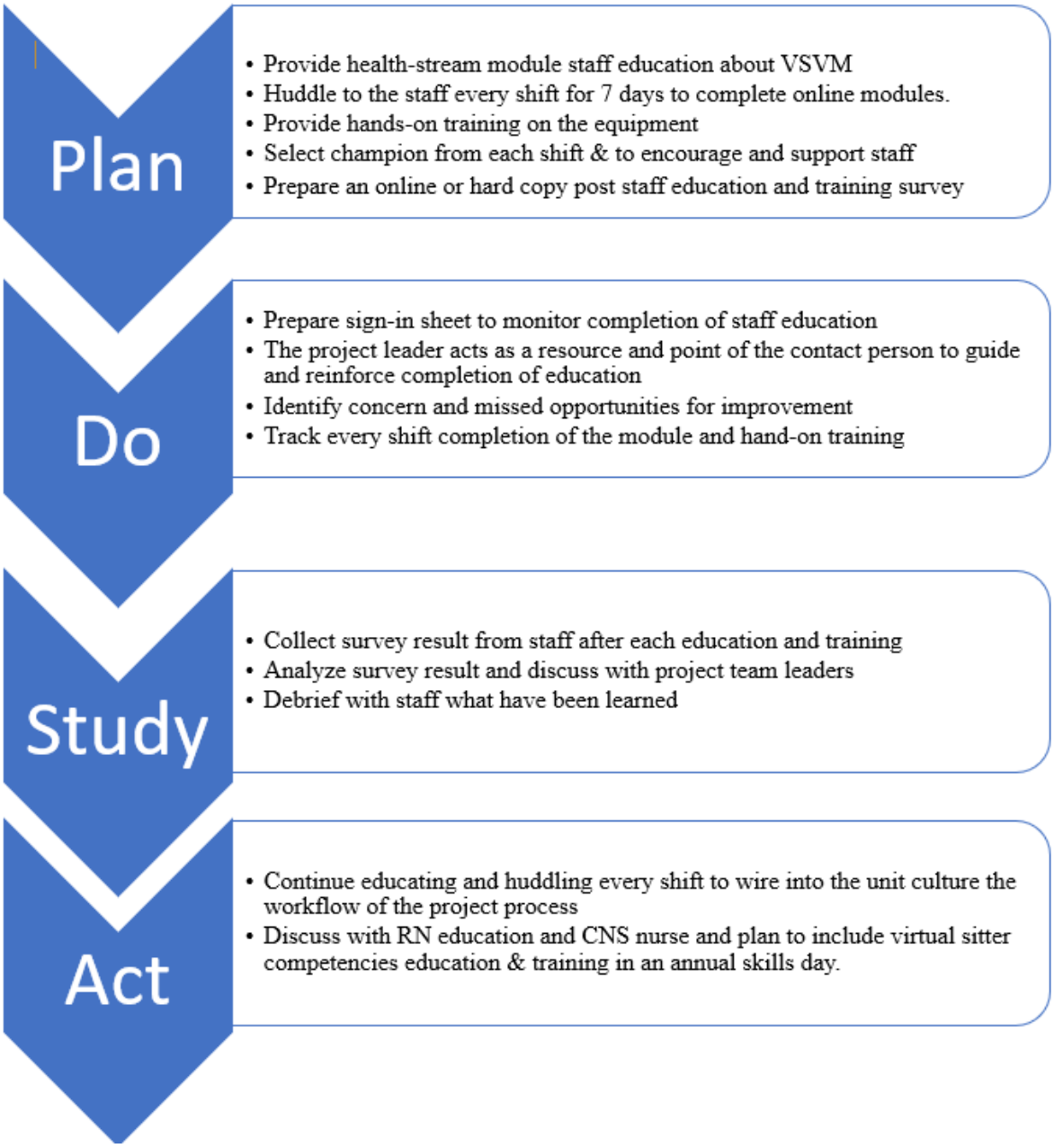
Appendix C

PDSA

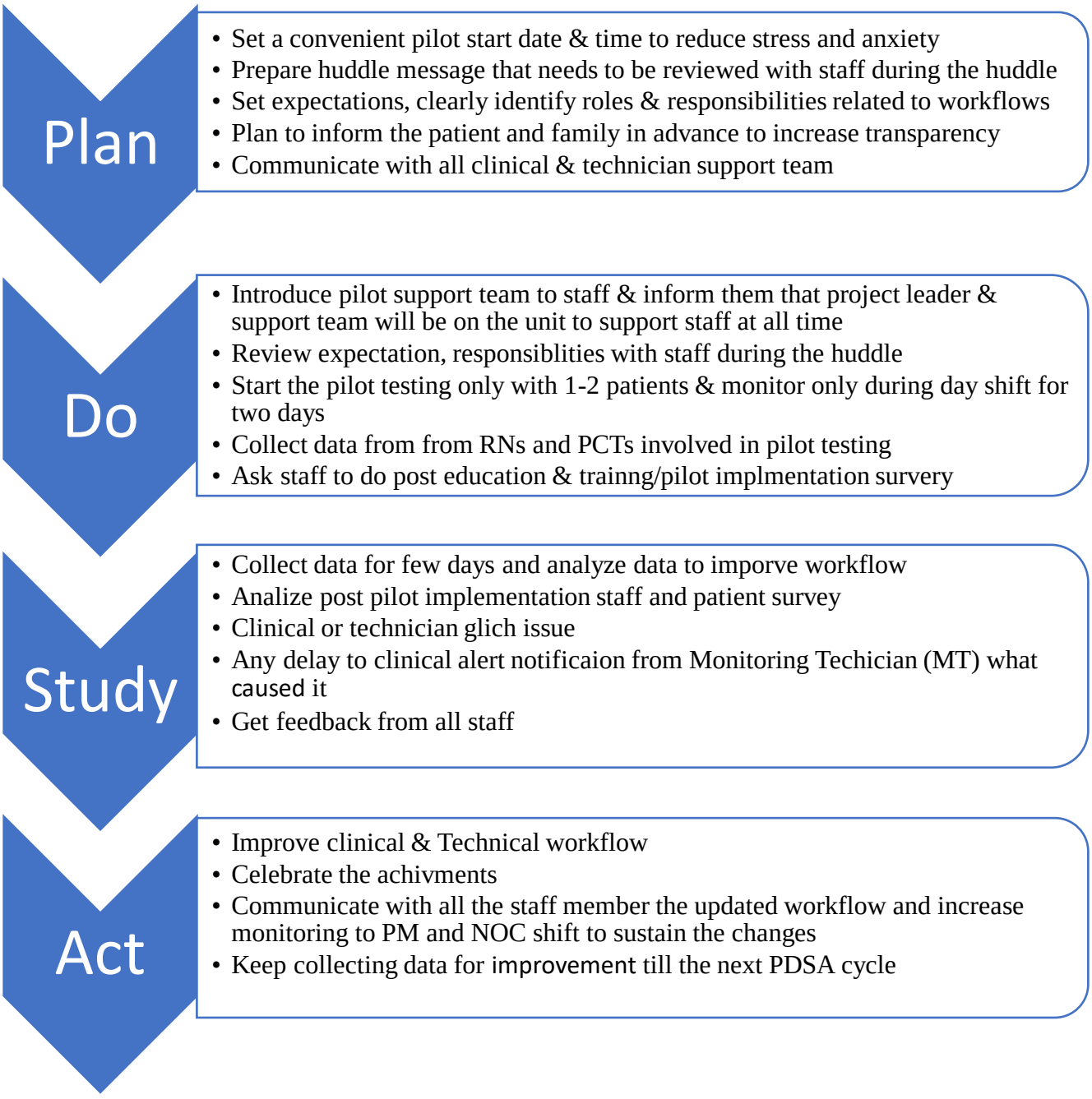
Part I Cycle #1 Staff and Patient/Family Survey



Part II #2 Staff Education and Training

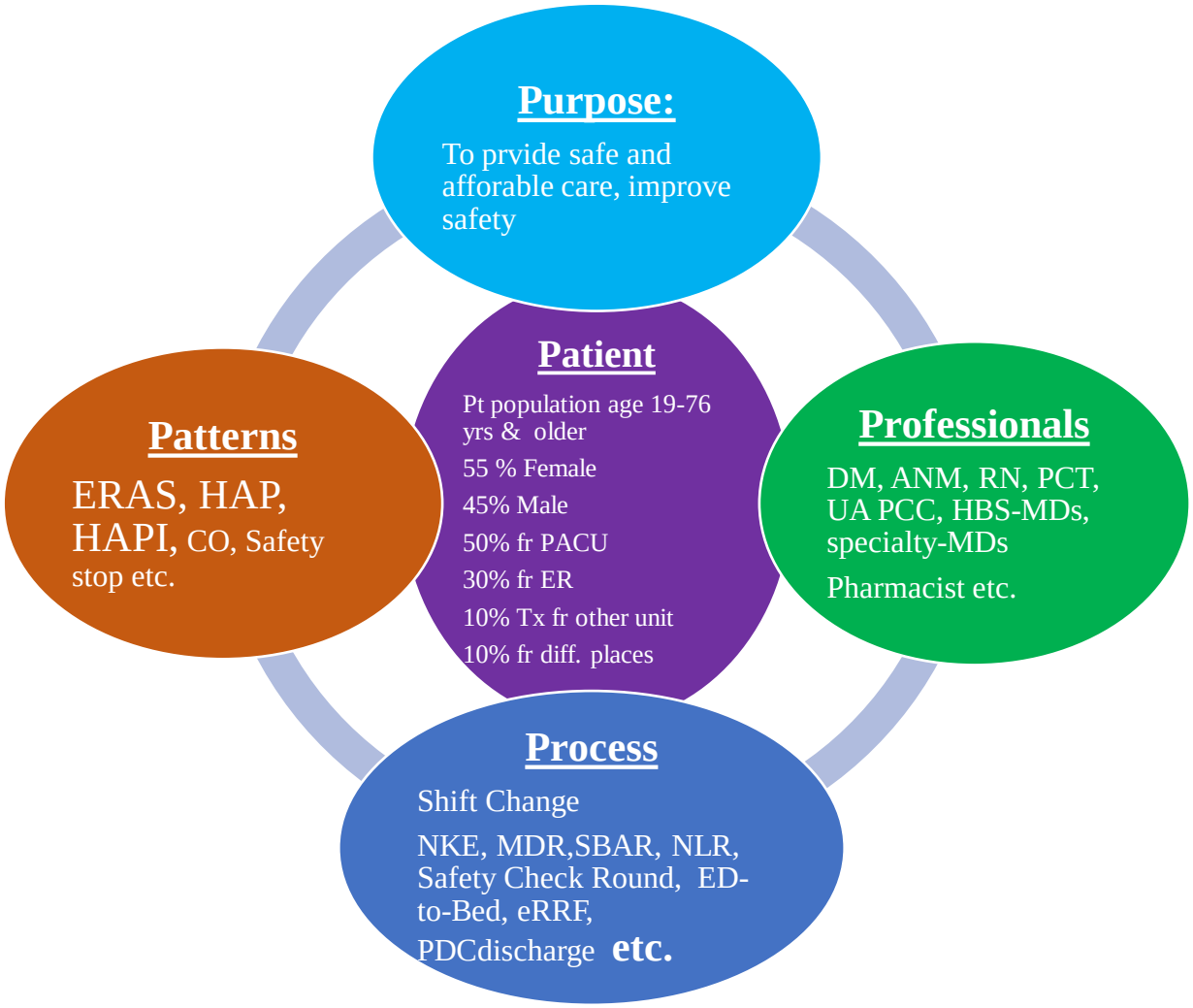


Part III A Virtual Sitter Video Initiation Workflow Testing



Appendix D

The 5 P's Assessment of Medical-Surgical Microsystem



Appendix E

Project Charter

Final Project Charter **Roman Kutu 06/10/20**

Team/stakeholders

(see Appendix P)

Project goal/Title

To collaborate to pilot test video monitoring initiative for fall reduction in the medical-surgical microsystem.

Problem

Despite the implementation of many fall prevention protocols, patients falls in an acute care setting continue to be a significant safety problem. According to Avanecean and colleagues (2017), fails represents a substantial problem in the acute care setting. Over the past two years in the medical-surgical unit, patient falls have increased, resulting in suboptimal HCAHPS scores. Although the addition of external bed and chair alarms in place, patient falls continue to occur. A new innovative approach is needed for fall reduction.

Rationale

According to the patient fall data report for the Walnut Creek KP facility, there were 102 falls in 2019, and 12 patient falls occurred on 3 South A unit. This unit has not met the organization's regional target threshold of fewer than two falls per quarter for patient fall prevention in 2019.

Global Aim: To reduce the incidence of patient falls by 50% annually in the microsystem.

The specific aim: To introduce and pilot test the feasibility of a virtual sitter video monitoring device in a 24-bed Medical-Surgical unit by October 1, 2020.

Background

Falls have no age or gender restriction or geographical limitation and can occur anywhere (Gray-Miceli et al., 2017). According to the World Health Organization (WHO), a fall is defined as an event that unintentionally causes a person to descend to the floor or any other lower area (Avanecean et al., 2017). Inpatient falls are the most reported medical-surgical unit events and lead to a substantial financial burden and a considerable cost in human suffering. According to the Centers for Disease Control and Prevention [CDC], 2013), the financial cost of one fall with injury in an older adult (age 65 and older) is estimated to be $17 500 (Votruba et al., 2016). Approximately 700 000 to 1 million falls occur in the U.S annually, with an estimated 50 billion USD (Lucero et al., 2019).

Despite identifying specific risk factors for falls and implementing fall prevention policies and protocols, inpatient falls continue to be a challenging patient safety concern in acute care settings worldwide (Bowden et al., 2019). Clinical Nurse Leaders (CNL), staff nurses, and interdisciplinary teams remain focused on the prevention of patient falls, which is a national patient safety goal, according to the Joint Commission ([JC], 2019). However, inpatient falls incidence continues to rise among all ages in acute care settings (Quigley et al., 2016). According to the urban acute care medical center yearly quality report, the microsystem is also facing the challenge of an increase in fall rates; explicitly, in 2019, 12 patient falls were documented

Vortuba and colleagues (2016) suggest that to translate research into practice, promote evidence-based fall prevention strategies, and use a virtual sitter video monitoring with a virtual

video monitoring device is a safe tool for consideration in hospitals. Although there has been little research on the efficiency of virtual monitoring for patient safety, numerous organizations have issued quality improvement data on telesitter virtual monitoring's success to reduce falls (Roth, 2019). Video monitoring would improve outcomes, reduce costs, and increase patient satisfaction (Votruba et al., 2016). The Telesitter mobile device is a wireless cart that can move from room to room or installed into the wall or ceiling. (See appendix G). This device represents an innovative patient engagement platform that includes a two-way camera and speaker on a rolling unit similar to an IV Pole in which several patients can be observed. Trained Telesitters can simultaneously monitor up to 16 patients; most human bedside sitters could replace (Roth, 2019).

According to Roth (2019) report, the virtual sitter monitoring program improves patient safety and reduced fall by 51% across all medical-surgical units for 11 hospitals. The cost-saving varies by institution, but UC San Diego Health reports saving 2.5 million over two years (Roth, 2019). The study also demonstrated that the virtual monitoring program is the leading innovative patient safety technology that provides evidence of patient aggression and violence against the nursing workforce and improves workplace safety (Quigley et al., 2019).

Expectations

1. The leadership project sponsor has approved a pilot test and funding in partnership with the Telesitter device vendor.
2. All patients will be appropriately assessed with the existing fall risk assessment tool Schmid fall score).
3. 100% of staff (including float and travelers) will be oriented and educated regarding the new device and will express the buy-in post-education survey.

4. Foster a culture of safety and continuous improvement in the work environment.

5. Patient fall reduction on the microsystem will decrease during and after the pilot test by October 1, 2020.

Outcome measures:

1. Reduce patient falls and extended hospital stay related to falls, reduce sentinel events related to falls with injuries or death,
2. Reduce the high cost of sitter utilization

How to Measure the Project/Pilot Outcomes

Measurable Project Objectives	Measurement method	Data Collection Method	Data Collection Frequency
Reduce patient fall rates	Falls per 1,000 patient days Sentinel Events related to falls with significant injury or death	Staff reported fall events via electronic Responsible Reporting Forms (eRRF)	Baseline and during the intervention period
Reduce sitter utilization/coast	Total sitter hours Sitter hours per patient day (HPPD)	Sitter data collected from the Staffing office & sends to the finance department to track data per pay period	Baseline and during the intervention period/weekly

Process Measures

1. Identify two team members per shift during the week and weekend to act as champions and educate the general staff.

2. % of Patients that met virtual sitter's eligibility criteria and received a virtual sitter % of additional patients that virtual sitter system can monitor 24/7

Balancing measure:

Monitor staff satisfaction of technology adoption during the pilot test to assess strengths, weaknesses, opportunities, and threats x3 (before, during, and after the pilot) to measure staff

acceptance or resistance by a SWOT analysis survey. (staff and patient satisfaction with virtual sitter program).

Driver Diagram (see Appendix Q)

Fishbone Diagram (See appendix I)

Measurement Strategy (Overall): by process and outcomes measurement

1. Effectiveness measures (participant and sponsor satisfaction and reduction of fall
2. keep track of fall and causes of fall and near misses
3. identify and measure the specific risk factors that cause falls
4. keep track of the observer effectiveness
5. keep track of falls Electronic Responsible Report Form (eRRF) and Post fall assessment events from MIDAS report per week

Changes to Test:

1. Pilot virtual sitter solution in one unit
2. Test and redefine workflows for improvement
3. Demonstrate evidence that the solution works and estimate the organizational impact of
4. Revise education and training materials
5. Revise patient-facing communications
6. Update and finalize the change management plan

7. Monitor and assess daily the appropriateness of patient selecting criteria
8. Audit daily virtual sitter monitoring log sheet for intervention provided via audio redirecting of dispatching staff members to the room
9. Track the number of falls daily and analyze weakly the measured improvement

Gantt Chart (see Appendix N)

Lessons learned:

- There is an ongoing effort to reduce patient falls. Many healthcare organizations already incorporate innovative technology, the virtual remote Telesitter patient monitoring, excellent improvement outcomes, and others going toward incorporating technology.
- Patient engaged video observation monitoring prevents falls, reduces cost, and it is an effective method to track and trend patient aggression toward nursing staff, increasing patient and nursing workforce safety (Quigley et al., 2019).
- One study revealed that during the first phase of the Telesitter intervention implementation, there was a learning curve that several potentially avoidable falls occurred on the camera. The inaccurate assumptions between the nurse and the Telesitter regarding when the nurse should be notified or what the patient could be permitted to do independently were not clear. Therefore, three months into the
- implementation, retraining was completed both with nurses and Telesitter to increase the communication between the nurses and Telesitter for patients' individualized expectations (Votruba, 2019). This information is a beneficial

lesson to learn for my project to be prepared for the potential requirement of retraining staff and Telesitter.

CNL Competencies:

Clinical Nurse Leader (CNL) is a role advanced out of a partnership between nursing education and practice leaders to discourse the need for nurse educators to address patient care needs in a complex, shifting healthcare delivery system (King et al., 2019). CNL facilitate a culture of safety to enhance safety across diverse settings. CNL is prepared for direct clinical leadership at the point of care (microsystem) to ensure that care delivery is safe, evidence-based, and targeted towards optimal quality outcomes for the cohort of clients served by the CNL (Reid & Dennison, 2011). One of the prime challenges in our complex healthcare settings is useful and timely communication among healthcare providers. Without this communication, care can become rough for the patient and family and increase patient harm. A central part of the CNL role is to fill the communication gap by ensuring that patient and family needs are assessed and steadily communicated with all healthcare team members to be more effectively coordinated.

A significant component of the CNL role centers on fostering and sustaining a safe culture for the patients and families. A review of current evidence shows seven important subcultures within a culture of safety. These subcultures are leadership, teamwork, evidence-based care, communication, learning, justice, and patient-centeredness (Reid & Dennison, 2011). Therefore, CNLs receive advanced education about risk anticipation and reduction, and clinical practice centers on monitoring and managing information related to risk, safety, and quality.

There are nine master's essential and corresponding CNL competencies providing a comprehensive view of expected outcomes of CNL education and simplifying curriculum

expansion (King et al., 2019). The focus of CNL would be on essential # 3, Quality Improvement and Safety, and necessary # 5, Informatics and Healthcare Technologies. The nine roles of CNL competencies categories are a clinician, outcome manager, client advocate, educator, information manager, system analyst/risk anticipator, team manager, member of a profession, and lifelong learner (King et al., 2019). CNL will serve as a team leader of the project to assess patient safety issues to prevent and reduce patient falls and injuries in the urban acute care medical center's microsystem. CNL will focus on implementing an innovative approach, a virtue sitter monitoring system to reduce patient harm related to falls. The four leading roles of CNL competencies are risk anticipator/system analyst, educator, information manager, and outcome manager.

Appendix F

Images of Wall Mounted & Mobile Cart Virtual Sitter Cameras

Note: Sample picture of wall mounted camera taken from patient room @1st pilot site within the same organization of author's microsystem

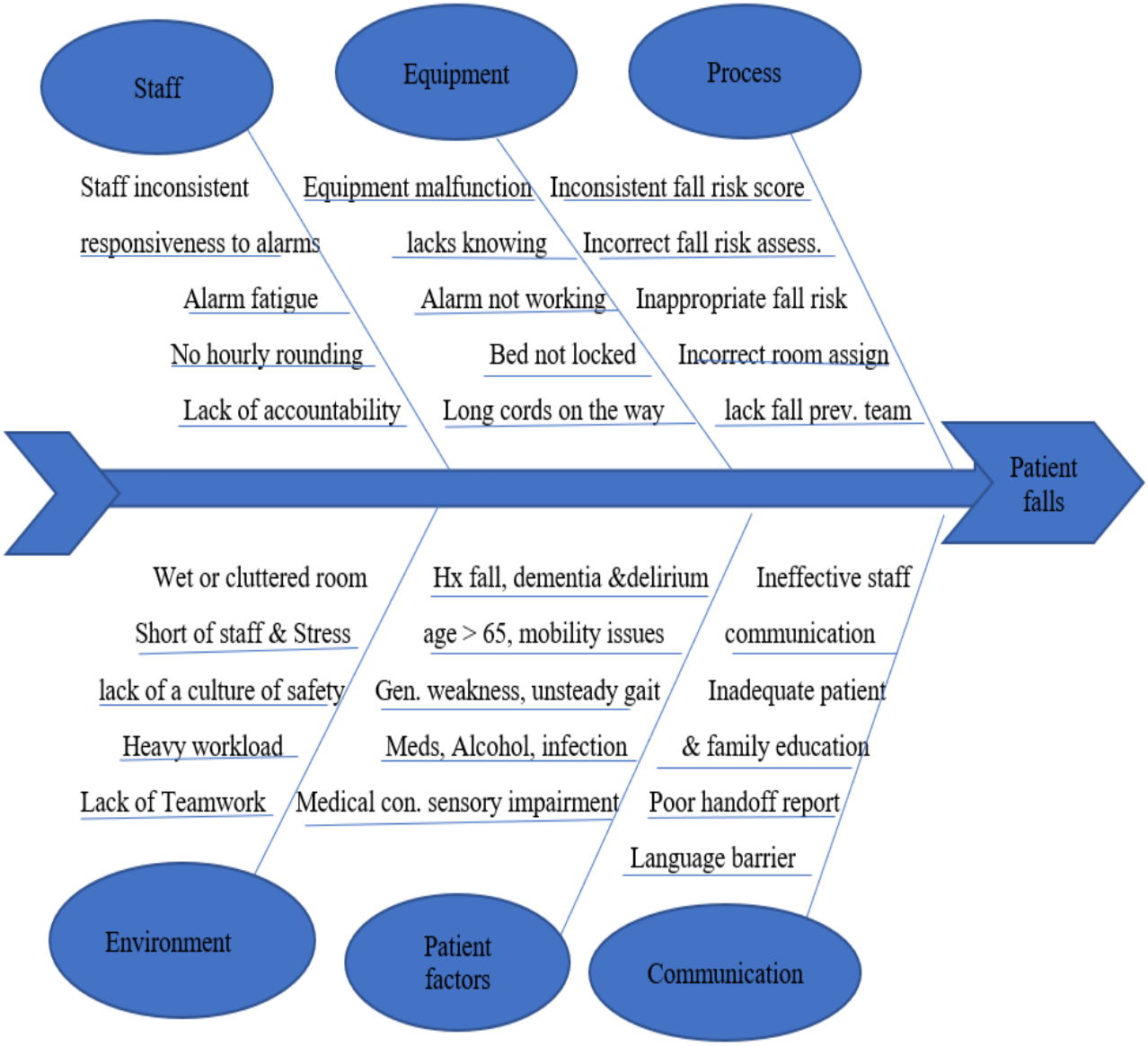
Note: This picture was from vendor's website https://avasure.com/ permission pending

Appendix G

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis

Appendix H

Fishbone (Cause and Effect)



Appendix I

Part I Mesosystem Falls and Sitter Utilization Hours Cost-Analysis

Urban Acute Care Mesosystem in Northern California 2019 Sitter Information		
2019 Total Sitter Hours	52424hrs	
Sitter Pay (PCT)	$31.00	52424hrs – 7339 RN hrs. = 45084.64hrs PCT sitter hrs. 45084.64hrs X $31 =$1, 397, 623.84
RN pay	$84.00	7339.36 RN hrs. X $84 = $616, 506.24
RN % sitter hours	14% (7339.36hrs) of NR served as a sitter	52424hrs x14% (52424 X 0.14= 7339.36 RN hrs. of sitter)
2019 Total Sitter Costs	**$2, 014, 130.08**	**Total costs is $1, 397, 623.84 + $616, 506.24 = $2, 014, 130.08**

Urban Acute Care Hospital Falls and Fall Related Injuries Information for 2019			
Measures	# of Falls	Cost per fall	Total Costs
2019 Falls with injury	0	$35, 144	$0
2019 Falls without injury	71	$3500	$248, 500 (71X3500)
Total Falls	**71**	**0**	**$248, 500**

Mesosystem Total Costs of Sitter and Falls 2019	
Total Sitter Costs = $2, 014, 130.08	Total Falls Costs = $ 248. 500
Sitter Costs + Falls Costs = $2, 014, 130.08 + $248, 500 = $ 2, 262, 630.08	

Part II 1st Yr. Total Capital Acquis. Install. & Maintenance Cost

1St Year Total Capital Acquisition, Installation & Maintenance Costs				
	Epic Monitor, 3rd Party Camera, Speaker/ Microphone		Epic Monitor Software & Caregility Hardware	
Equipment Hardware	Cost/Unit	Total Cost	Cost/Unit	Facility/yr
Camera with double Audio	$1500/unit x10	$15000	$7000/Cartx10	$70, 000
Video Cards for Workstation	250/unitx2	$500		0
Standard 24“ View Monitor	$200	$200		0
Maintenance Support Cart	$1200	$1200		
Total Equipment Cost		**$16, 900**		**$70, 000**
Installation Labor	**Cost/hr**	**Total Cost**	**Cost/hr**	**Total Cost**
Camera Installation Approx.. cost@ $160/hr	$160hrx12hrs	$1920	$160/hrx12hrs	$1920
Network Connection Configuration	$90/hrx3hrs	$270	$90/hrx3	$270
Epic Monitor Software Installation	$125/hrsx100hrs	$12, 500	$125/hrx100hrs	$12 500
Total Installation Labor Cost		**$14, 690**		**$14, 690**
Maintenance	**Per Item/month**	**Facility/yr.**	**Per Item/Month**	**Facility/ yr.**
Hospital Server	$174	$2088	$174	$2088
Epic Maintenance	$0 (epic is part of hospital healthconnect no fee)	$0	$3396/Month	$40, 752
Total Maintenance Costs		**$2088**		**$42, 840**
The Total Cost of Equip. Install—& Maintenance.		**$33, 678**		**$127, 530**

Part III 2019 Mesosystem Benefit Summary & ROI for one Year

Mesosystem benefits summary

Measures	Cost in 2019	% reduction	Estimated Savings	Net estimated Annual Cost
Fall Cost	$248, 500	50%	$124, 250	$124,250
Sitter Cost	$2, 014, 130.08	50%	$1, 007, 065.04	$1, 007, 065.04
Total Cost of Falls and Sitter	**$2, 262, 630.08**		**$1, 131, 315.04**	**$1,131,315.04**

Mesosystem ROI Assessment for 1 Year (2019)

	Epic Software & Hardware 3rd party Vendor Camera	Epic Monitor Software &Care-gility Hardware
1st Year Total Capital acquisition Installation and Maintenance	$33, 678	$127, 530
Estimated Savings	$1, 131, 315.04	$1,131,315.04
ROI	**$1, 097, 637.04**	**$$1, 003, 785.04**

Part IV 2019 Projection MS Microsystem Benefit Summary & ROI

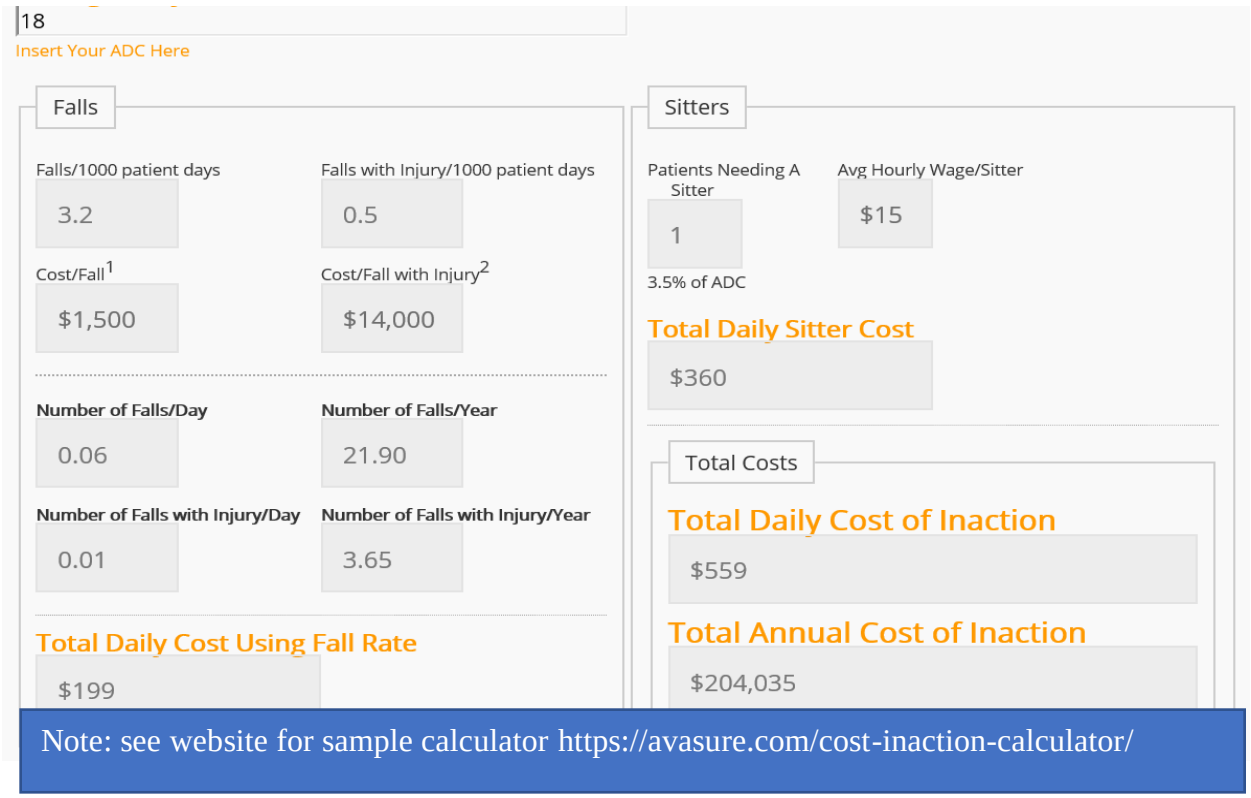
Microsystem Benefit Summary for 2019

Measures	Cost in 2019	% reduction	Estimated Savings	Net estimated Annual Cost
Fall Cost	$42, 000	50%	$21, 000	$21, 000
Sitter Cost	$286, 808.4	50%	$143, 404.2	$143, 404.2
Total Cost of Falls and Sitter	**$164, 404.2**		**$164, 404.2**	**$164, 404.2**

Microsystem ROI Assessment for 1 year, 2019

	Epic Software & Hardware 3rd party Vendor Camera	Epic Monitor Software &Caregility Hardware
1st Year Total Capital Acquisition Installation and Maintenance	$33, 678	$127, 530
Estimated Savings	$164, 404.2	$164, 404.2
ROI	**$130, 726.2**	**$36, 874.2**

The table below shows the estimated projection result based on the Average Daily Census (ADC) of the microsystem per AvaSure telesitter vendor online cost-benefit calculator display.



Note: see website for sample calculator https://avasure.com/cost-inaction-calculator/

Appendix J

Part I Staff Education Teaching Plan Simulations Scenario #1

Mr. Smith is an 89 Y old male who came from a board and care facility (BCF) for fever. The patient was alert and oriented x 2, poor historian, and has no complaints. He has no appetite, fever 101 with body aches, and headache.

PMH includes BPH with urinary obstruction, prostate nodule, dementia, history of Tabaco & quit in 2016. In the ER, the COVID test was done and was detected. The patient was admitted to the telemetry unit. The patient assessed for fall risk with Schmid's assessment. Schmid's score is 4, A&O x2, history of fall at BCF. Occasionally, she gets out of bed without calling for help, is redirectable, his room is not visible from the nurses' station. Fall precaution measures include yellow armband, yellow socks, and fall signage placed outside his door. The patient met the criteria for Visual Sitter Monitoring (VSM), and the nurse plans to initiate VSM.

Equipment/set up:

- ✓ VSM (camera in the room)
- ✓ Phone
- ✓ Bed

Primary RN

- ✓ Review the Virtual Healthcare Companion (VHCC) assessment criteria.
- ✓ Enters order, indicate the reason, and acknowledges the order
- ✓ Sets up & turns on EPIC VSM from the patient RM.
- ✓ Call & gives report to rounding PCT & monitor tech PCT, Confirms functioning correctly.

- ✓ Document a note indicating a report given to rounding PCT and VHCC and document confirmed connectivity.
- ✓ Educates family over the phone/at bedside regarding VSM
- ✓ Introduces the monitor tech to patients and explains that they will be watching patients through the camera for any needs.

Family/patient: expresses concerns about privacy and recording

After an explanation, the patient/family agreeable to VSM

Rounding PCT:

- ✓ Goes into the patient room and introduces self
- ✓ Receives call from monitor tech
- ✓ PCT responds to the room, picks up the phone from the floor, and asks the patient to help the patient make a phone call to his wife.

Patient:

- ✓ **Mr. Smith** drops his phone next to his bed and is seen leaning forward toward his bedside table and trying to reach the phone.
- ✓ Says, I need to get to my phone; I dropped the phone; I want to call my wife.

Virtual Healthcare Companion (VHCC):

- ✓ He/she responds to the patient via voice-over when he notices the patient reaching for his phone.
- ✓ Redirect patient over voice
- ✓ Calls rounding PCT to go and assist the patient in finding a phone.

Rounding PCT not available VHCC calls **primary RN/ANM and RN/ANM respond**

Part II Staff Education Teaching Plan Simulations Scenario #2

Mrs. J is a 45-year old female alert and oriented x3 who came to the ER last evening with nausea and vomiting complaints x 3 days. She appears very anxious, has poor personal hygiene, and she stated she is experiencing a visual and auditory hallucination. She was given IV fluids in the ER and admitted to the Med-Tele unit at 3 AM for dehydration and ETOH withdrawal. Per the nurse assessment on the unit, the patient is experiencing tremors, is diaphoretic, and stated she had a seizure and fell at home. She was also complaining of head heaviness and headache pain 8/10. Her CIWA score was 20, BP and HR are elevated, and she is unsteady on her feet and high risk for falls. PMH History of hypertension, gastritis, hyperlipidemia, and ETOH abuse

Social history: has significant other, two grown children. She works at a local factory. She actively smokes 1/2 pack per day for 15 yrs.

Equipment/set up: VSM (camera in room)

- ✓ VSM (camera in the room)
- ✓ Phone
- ✓ Bed

Primary RN

- ✓ Review the VSM assessment criteria.
- ✓ Enters order, indicate the reason, and acknowledge it.
- ✓ Sets up & turns on EPIC virtual Healthcare companion (VHCC) from patient RM.
- ✓ Call & gives report to rounding PCT & VHCC, Confirms functioning correctly.
- ✓ document report was given to rounding PCT and VSMT
- ✓ RN scans camera to associated patient.
- ✓ Educates family over the phone/at bedside regarding VSM

Family/patient: expresses concerns about privacy and recording

RN educates patient and family:

- ✓ This Virtual sitter companion (VHCC) is a HIPAA (privacy) approved system
- ✓ It is a live monitoring system; It does not record
- ✓ Privacy is provided for personal care. It has a privacy blocking mode. The curtains will be drawn for privacy

Patient/Family-: After an explanation, patient/family agreeable to VHCC

- ✓ Document patient/family education completed.
- ✓ Introduces the monitor tech to the patient and explains that they will be watching the patient through the camera for any needs.

Virtual Healthcare companion (VHCC): comes on via voice-over and says, hi Mrs., my name is John, I am the monitor technician. I will be monitoring your camera view, and will remind you about safety when needed, and will call your nurse/PCT when you need help as well.

RN & VHCC: both RN&VHCC confirm appropriate connectivity to ensure the VHCC could see entirely patient from all angles in the room.

RN: -document confirmation of connectivity, place call light, phone, and items within reach, encourage patient to call for help, and leave the room.

Patient: Mrs. J is on the VSM monitor and working well.

Rounding PCT(RPCT): goes into patient RM and introduces themself by saying I am Kim PCT, I, and my colleague John, VHCC, will take a turn to come and check you every 4hrs and as needed. Do you have any questions or need anything while I am here, Mrs. J?

Patient: - says no/ I am good/ I need water/or no response and remain silent

and rounding PCT, say thank you, and leave the room.

Patient: Mrs. J is trying to get out of bed without calling for help

VHCC):- Responds to the patient via voice-over when notices patient trying to get out of bed and says, Mrs. J., you need help?

Patient: - says no, I am okay; I am trying to go to the bathroom, I can do it, patient moves her blanket and bedsheet off her body.

C VHCC- says I am sending your nurse to help you, please wait and do not get out of bed.

A Pt -says I got to go, I cannot wait, and I will be okay, (patient trying to swing her leg off the bed).

C VHCC: - sent (pressed) emergency alert notification to all the assigned persons while continue talking to the patient pressed

RNs/rounding PCTs/ANM, DM, UA (it depends on how the alert system set up done)

Someone responded to Mrs. J's RM and found her at the edge of the bed.

RN/**RPCT**: - says to her, Hi Mrs. J, what is going on? How can we help you?

Patient: says nothing is going on; I want to go to the bathroom.

B RN/PCT: says you need to call us when you need help, we are here to help you, and we do not want you to fall. Assist and encourage what patients need.

Appendix K

Tri-Fold Virtual Sitter Patient/family Education Flyer

What is Virtual Health Care Companion Program?

Virtual Health Care Companion Program:

is a remote (distant) video camera monitoring patient observation system that allows audio and visual patients monitoring that will keep you connected to your care team at all time to prevent falls.

It is new and innovative (advanced) solution that provides real-time continuous non-recording direct patient observation.

How does Virtual Health Care Companion work?

Virtual Health Care Companion has a one-way video camera and two- way speaker that send visual and audio (sound) to the nursing station.

A trained Patient Care Technician will watch you from the nursing station. They check on all aspects of your care to protect your safety.

Virtual Health Care Companion camera can be portable, wireless unit or permanently installed in the celling.

How Does Virtual Health Care Companion program benefit me?

Falls are a challenging issue for all health care organizations, and it is one of the patient safety goal. In our facility, keeping our patients safe is our highest priority.

Therefore, Virtual Health Care Companion will keeps you safe by constantly seeing you and reminding you to call for help before you get out of bed or assist you getting the help you need by send one of your care team directly to your room when you need within timely manner.

Please ask your nurse if you have more question about Virtual Health Care Companion.

How often am I monitored?

Our health care team, or Patient Care Technician, (PCT) can always see you except when the monitor is on privacy mode.

What about my privacy?

When you are being cared for by your nurse, nurse assistance, or doctor and need privacy, or when you are dressing, bathing going to the bathroom and your care team are with you, the observer turn on the privacy mode.

Am I Protected?

Yes, your privacy and confidentiality are secure. No recordings or pictures are taken using Virtual Health Care Companion.

How will I be kept safe and connected to my team care?

Keeping you safe and responding to your needs are our highest priority. Your nursing team checks on your hourly and responds to your needs as occur.

It allows staff immediately and directly interact with you and assist you when you need help.

How do I call my nurse if I need something?

You can use your nurse call button when you need something. and our nursing staff are always available to assist you. Also, when you talk your Virtual Health Care Companion can hear you without you pressing anything and can send someone to your room.

KP Safety Vision Statement & Fall Prevention objectives

This flyer's objective is to give you an overview of what the Virtual Health Care Companion is about and how it reduces falls and keeps you safe while you are in hospital.

"Safety for everyone, everywhere, every time"

Where, When, Why, & How does Fall Occurs and Who Can fall?

Falls have no age or gender restriction or geographical limitation Whether you are at home or in the hospital, fall can occur at anywhere, anytime for different ways and reasons to anyone. Therefore, your care team would like you to call them to:

Appendix L

Post Training Staff Survey Questions

PCTs and RNs please complete the VHCC Pilot Staff Feedback Survey!

You can scan this QR code on your phone or go [redacted] link on the Unit 210 intranet page. It is an anonymous survey and only takes 2 mins. Thank you advance for evaluating this pilot!

Virtual Sitters - Staff Feedback

Technical Feedback

Features, functionality, and ease of use.

1. Did the equipment (speaker, microphone, and camera) function in the patient's room? If not, please explain.

- Yes
- No

Next

Page 1 of 3

Clinical Workflows

2. Was the staff responsive to your request and enter the patient's room? If not, please explain.

- Yes
- No

Back | Next

Page 2 of 3

Patient and Staff Experience

3. Did you feel this system was able to prevent the patient from harm (e.g., falls, interrupted intravenous therapy, etc.) If not, please explain.

- Yes
- No

Back | Submit

Page 3 of 3

As of 10/15/20 the survey result 4.7/5.0 rating

Appendix M

Statement of Determination (SOD)/(IRB) Approval

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

CNL Project: Statement of Non-Research Determination Form

Student Name: **Roman Kutu**

Title of Project:

Collaborating to pilot test a telesitter video monitoring initiative for fall reduction in the medical-surgical microsystem.

Brief Description of Project:

Despite the implementation of many fall prevention strategies, patient falls in hospitals continue to be a substantial safety concern for the healthcare organization. According to Avanecean and colleagues (2017), falls represent a significant problem in the acute care setting. Over the past two years in the 3 South A unit, patient falls have continued to increase, resulting in suboptimal HCAHPS scores. As a result, physical sitter usage is rising and causing a financial burden on the unit. The implementation of telesitter video monitoring initiatives can assist in reducing patient falls. Telesitter video can also decrease the costs associated with in-person sitter by allowing more patients to be monitored around-the-clock, as one staff can monitor up to 16 patients on one screen at a centralized station.

A) Aim Statement:

To introduce and pilot test the feasibility of a telesitter video monitoring device in a 24-bed Medical-Surgical unit by October 1, 2020.

B) Description of Intervention:

Telesitter is an innovative solution to reduce fall risk. The system consists of a wireless portable camera that can be moved from one room to another or wired or permanently installed in the ceiling. The camera is mounted on a poll like an IV pole at five feet tall. The camera can pan, tilt, and zoom and has a privacy feature that can be block video during patient care. It has a broad view non-recording video camera and two-way audio that transmits to a central monitoring station.

A one trained observer can monitor up to 16 patients at a centralized station, and staff will be consistently alerted by the observer to assist the patient before falls occur. If the patient doesn't understand English, the system can issue pre-recorded simple commands in as many as 250 languages. If the patient needs something such as water, going to the bathroom, the observer can summon help. The population of patients who are candidates for telesitter includes patients with dementia, a history

Note: The image is from vendor's website https://medcom.uiowa.edu/theloop/wp-content/uploads/2018/01/video-monitoring-unit.jpg

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patients

on the ventilator or who exhibit aggressive behavior.

C) How will this intervention change practice?
Increase the effectiveness of the fall prevention program and allow more patients to be monitored around-the-clock by a trained observer, as one observer can observe up to 16 patients. Video monitoring enables staff to cluster and prioritize care by visualizing vital signs, alarm, IV pumps, ventilation, and also allows staff to interact and dialog with their patients remotely and the decrease in-person sitter utilization and costs.

D) Outcome measurements:

1. Reduce patient falls, and extended hospital stay related to falls, reduce sentinel events related to falls with injuries or death.
2. Reduce the high cost of sitter utilization.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

X This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title: Collaborating to pilot test a telesitter video monitoring initiative for fall reduction in the medical-surgical microsystem.	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	

5-17

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The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive a standard of care.	X	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case-control). The project does **NOT** follow a protocol that overrides clinical decision-making.	X	
The project involves the implementation of established and tested quality standards and/or systematic monitoring, assessment, or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new, untested standards.	X	
The project involves the implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students, and/ or patients.	X	
If there is an intent to or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at [redacted] hospital or agency and as such was not formally supervised by the Institutional Review Board."*	X	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print): ROMAN KUTU

Signature of Student: Roman Kutu **DATE 6/17/20**

SUPERVISING FACULTY MEMBER NAME (Please print):

Signature of Supervising Faculty Member Cathy Coleman **DATE** 6/30/2020

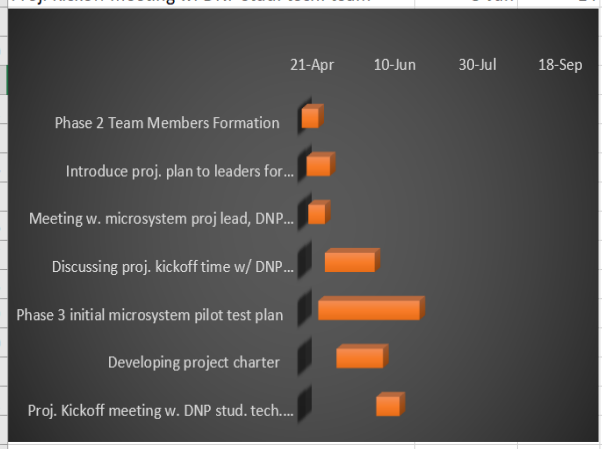
5-17

Appendix N

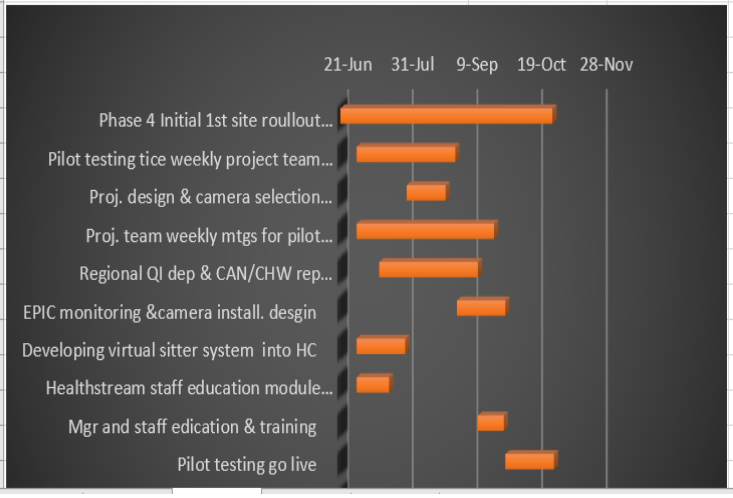
Project Timeline (Gantt Chart) Phase 1-5

Task	Start Date	Days to complete
Microosystem Ass. & Project Aim	1-Mar	30
Literature Search & Review	1-Apr	20
Meeting W/DM/Preceptor	21-Apr	7
Team Memebers selection	21-Apr	14
Introduc prj. to leaders Approval	24-Apr	14
Meeting W/Leaders& DNP Stu.	5-May	7
Developing Project Charter	12-May	28
Project Kick off Meeting w/IRB	5-Jan	20
Design & Camera Instull. Aproval	10-Jan	14
Staff & Chanpion Education	15-Jan	14
Pre-Pilot Assessment Phase	20-Jun	11
Pilot Kickoff	30-Jan	76
During & Post Pilot Assessement	30-Jan	90
Project spread and scale planning	1-Apr	60

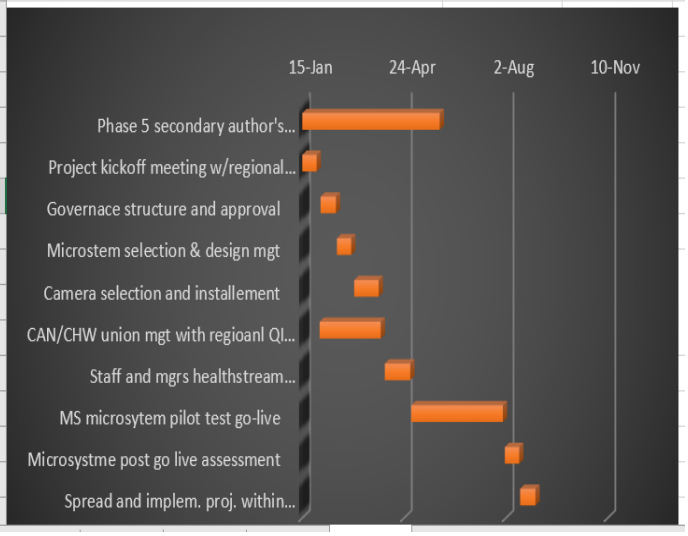
	A	B	C	D
1	Tasks Name	Start Date	Duration	End Date
2	Phase 2 Team Members Formation	21-Apr	10	1-Mar
3	Introduce proj. plan to leaders for approval	24-Apr	14	8-Mar
4	Meeting w. microsystem proj lead, DNP student	25-Apr	10	5-May
5	Discussing proj. kickoff time w/ DNP stud./leaders	5-May	30	4-Jun
6	Phase 3 initial microsystem pilot test plan	1-May	61	30-Jun
7	Developing project charter	12-May	28	9-Jun
8	Proj. Kickoff meeting w. DNP stud. tech. team	5-Jun	14	20-Jun



	A	B	C
1	Tasks Name	Start Date	Duration
2	Phase 4 Initial 1st site roullout planning & implem	21-Jun	131
3	Pilot testing tice weekly project team mtg	1-Jul	61
4	Proj. design & camera selection process	1-Aug	24
5	Proj. team weekly mtgs for pilot kickoff date	1-Jul	85
6	Regional QI dep & CAN/CHW rep union meeting	15-Jul	61
7	EPIC monitoring &camera install. desgin	1-Sep	30
8	Developing virtual sitter system into HC	1-Jul	30
9	Healthstream staff education module prepariation	1-Jul	20
10	Mgr and staff edication & training	14-Sep	16
11	Pilot testing go live	1-Oct	30
12	Post go live assessment	1-Nov	29



	A	B	C
1	Tasks Name	Start Date	Duration
2	Phase 5 secondary author's microsystem pilot test	15-Jan	135
3	Project kickoff meeting w/regional proj. lead	15-Jan	14
4	Governace structure and approval	2-Feb	15
5	Microstem selection & design mgt	18-Feb	14
6	Camera selection and installement	6-Mar	24
7	CAN/CHW union mgt with regioanl QI department	1-Feb	60
8	Staff and mgrs healthstream education & training	5-Apr	25
9	MS microsytem pilot test go-live	1-May	90
10	Microsystme post go live assessment	1-Aug	14
11	Spread and implem. proj. within mesosystem	16-Aug	15



Appendix O

Part I Policy and Procedure for Virtual Sitter Technology

Appendix Policy and procedure for Virtual Sitter Technology Bullet Points appendices 1

Policy Title: Document Title	Policy Number: N/A
Owner Department: Adult Patient Care Services	Effective Date: Recommend effective date = 30 to 90 days after approval date
Document owner/Custodian: Clinical Adult Services Director	Page: 1 of 10
Creation Date:	Last Review Date:
Approval Date: Date Approved	Last Revision Date:
Approving Committee/Title of person responsible:	

Policy Statement

- Large intigrated health care system in Northern California is committed to preventing patient falls and injuries, promoting health, a culture of safety, and well-being for all patients . Virtual sitter technology provides continuous video monitoring and two-way communication with applicable patients. This technology is designed to facilitate the rapid intervention of patient . The patient's right to privacy and confidentiality will always be respected

Purpose

To provide guidelines for the continuous visual monitoring of patients using virtual sitter technology and selection criteria.To provide a safe environment and ensure reliable staff processes for close observation of the patients utilizing the virtual sitter technology. The initiation of continuous visual monitoring is a nursing intervention. It can be utilized to ensure patient safety as an additional tool in the plan of care for patients meeting selection criteria.

Scope/Coverage

This policy applies to all employees who are employed by the following entities (collectively referred to as "Kaiser Permanente"): Kaiser Foundation Hospitals and Health Plan, Inc. (together, KFH/HP);

Definitions

Virtual Sitter / Virtual HealthCare Companion: Shift-based role assignments, delegating tasks to: Watch the video monitor screen and intervene verbally or request personal intervention Respond and intervene in person .Maybe rotated every 2-4 hours, after collaboration with primary RN
Inclusion selection and Exclusion criteria were included

provisions/ procedures

Virtual sitters may simultaneously monitor up to 12 patients remotely at a central monitoring location (e.g., nursing station).Cameras and audio (microphone and speaker) systems are in the patients' rooms and may be installed in the room or on mobile carts.Initiation of a virtual or in-person sitter, Video monitoring the patient, Discontinuing the virtual sitter, Patient Privacy

Training/ Education

Virtual Sitter HealthStream Module, Hands-on In-person training, Downtime

Roles and Responsibilities

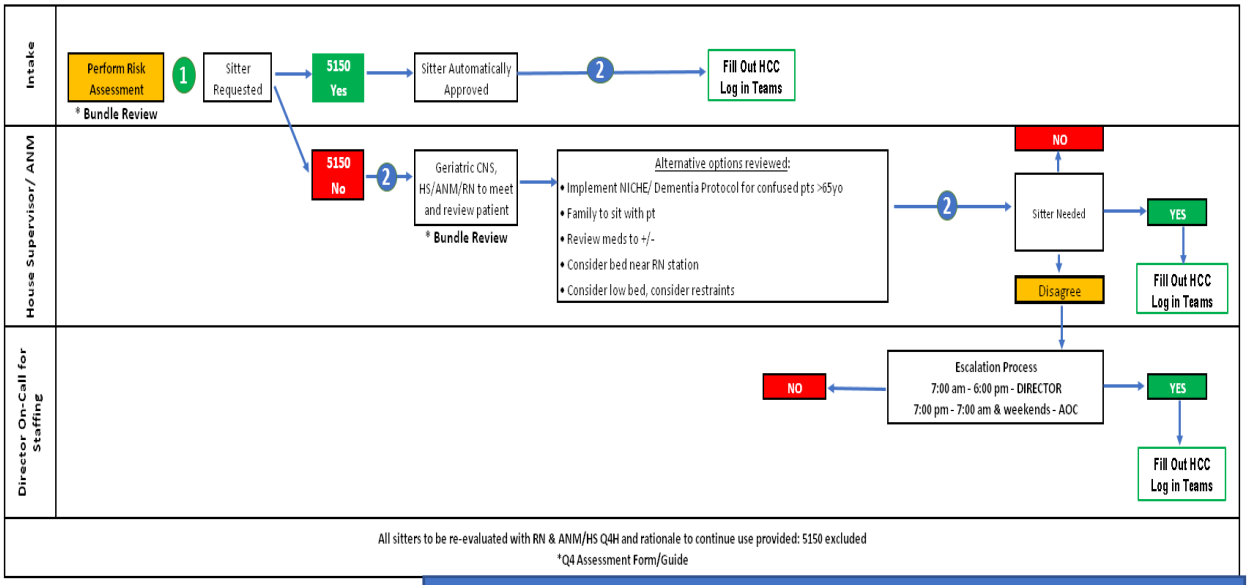
Primary Nurse, Virtual sitter or VHCC Responsibility, assigned to watch monitor, Rounding PCT Responsibility, assigned to respond and intervene in person, Assistant Nurse Manager (ANM) Responsibility, House Supervisor/Unit Leadership Responsibility, Staffers Responsibility, Nursing administration (Managers and Education)

Other elements

References,
Appendices: Appendix A: Sitter Escalation, Initiation, Monitoring, and Discontinuation Processes
Appendix B: Patient Education Flyer, Appendix C: Virtual Sitter Competency Checklist

Part II Sitter Escalation & Virtual Sitter Algorithm-Cameras in Room

Sitter Escalation Algorithm

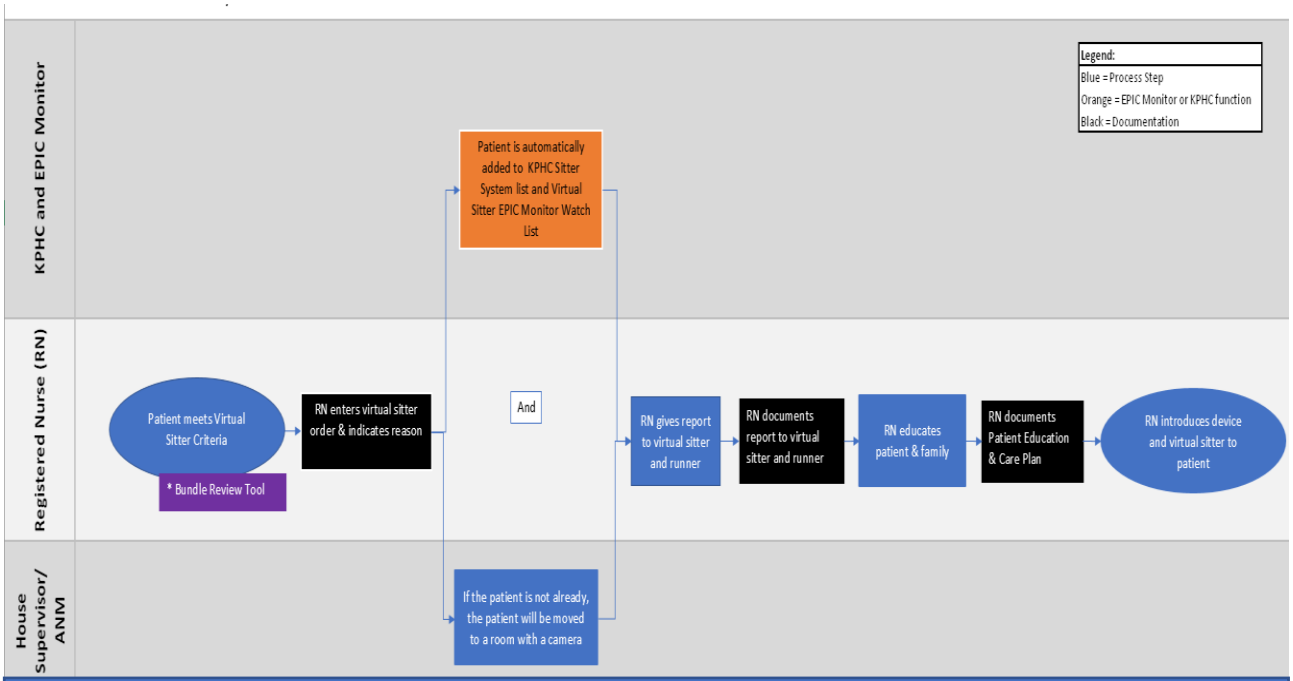


1 Perform Initial Sitter Risk Assessment Using Bundle Reccomendation

2 Review Risk Assessment: Review Bundle

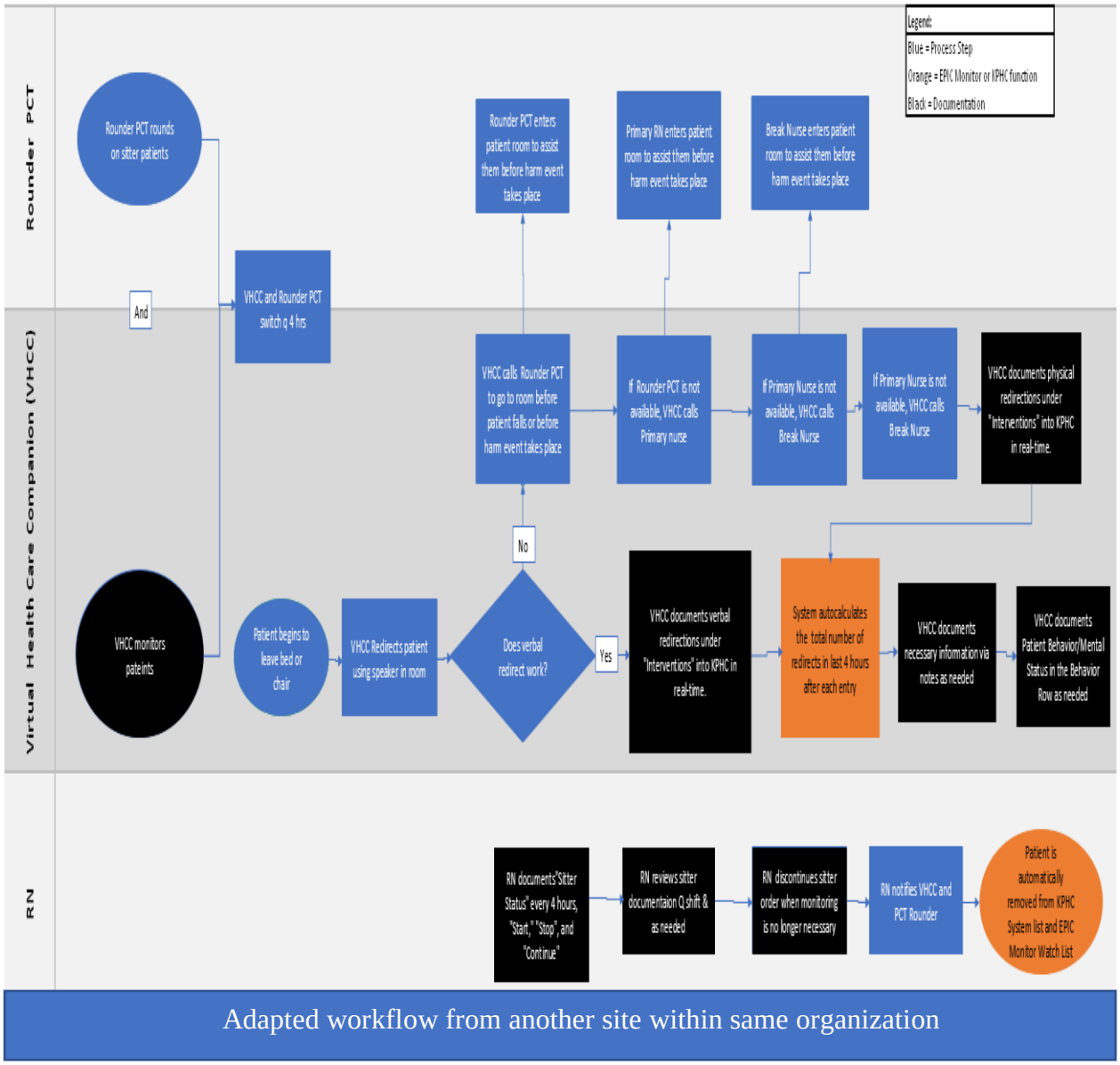
Adapted sitter escalation workflow from another site within same organization

Virtual Sitter Algorithm -Camera in Every room (if the camera is not mounted permanently)



Adapted workflow from another site within same organization

Part III Virtual Sitter Algorithm Monitoring & Discontinuation Process



Adapted workflow from another site within same organization

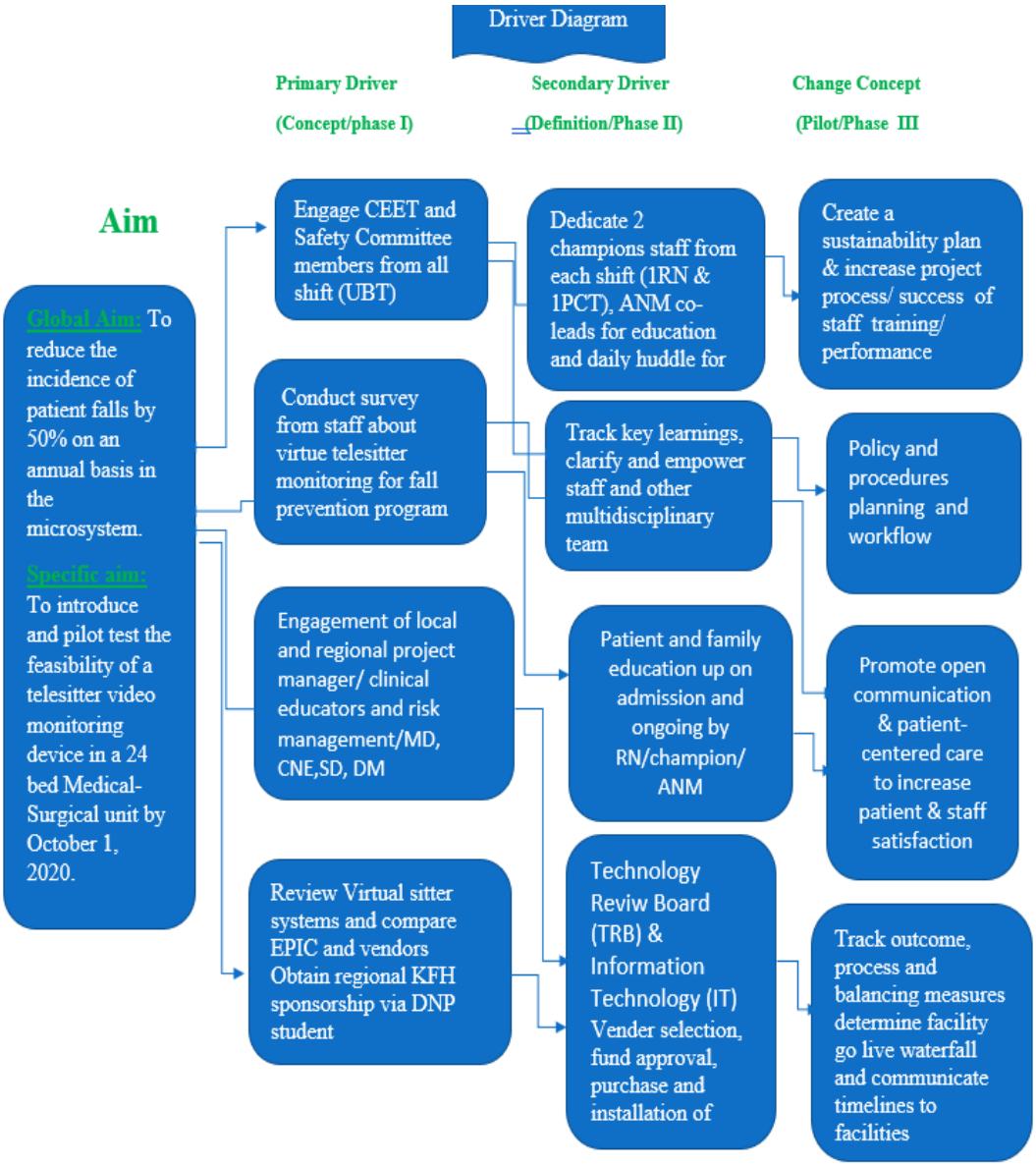
Appendix P

Team Member/Stakeholders

Project Team members	**Project Role**
Clinical Nurse Executive (CNE)	CNE-Project Sponsor
Service Director (SD)	Project Sponsor
Department Manager (DM)	Project Co-sponsor & Preceptor
MSN-CNL Student	Project Owner and Lead Agent
Specialty/Chief of Surgery Doctor	Project Champion
Geriatric Clinical Nurse Specialist (CNS),	Subject Matter Expert (SME)
Risk & Quality Department	Data collection and trend analysis
DNP-CNL, Student Clinical Practice Consultant,	**Co-lead Agent**
Assistant Nurse Manager (ANM)	Evening Shift Change Agent (Superuser)
Assistant Nurse Manager (ANM)	Day Shift, Change Agent
Nursing/House Supervisor	Change Agent
Staff RN, Care Experience Excellent Team (CEET) Committee Co-lead	Co-lead, Safety and CEET/ Unit Base Team (UBT) Agent
Staff RN, CEET Committee Night Shift	Staff RN, Night Shift CEET/ UBT Agent
Patient Care Technician (PCTs)	One PCT, from each shift CEET/UBT member
Patient and family members	TBA During pilot testing

Appendix Q

Driver Diagram



Appendix R

Evidence Evaluation Tables

Evidence 1 Evaluation Table 1

Citation	Design/ Methods	Samples/ Setting	Measurement	Data Analysis	Findings	Appraisal Rating
Sand-Jecklin et al., 2015	The practice change implementation study used a quasi-experimental pre-post design with a targeted Neuroscience and medicine unit. the second pilot expanded to other 2 Medical-surgical units six months later sample	**Sample** Hospitalized patients with high risk for falling, including high Hendrich II falls scores and history of fall. **Setting:** In an acute care The first pilot was initiated in January 2013 on two units with the highest incidence of falls; on those four units, 14 Cameras were installed permanently in 14 private rooms with monitor screen installed at centralized monitoring room, The camera was real-time capture and no recording	Pre-post evidence-based targeted high risk Implementation outcomes and processes measures fall rates, falls/ injuries Use of risk-specific falls	Falls documented, and camera video monitoring, video monitoring technician intervention, sitter hours, & cost-effectiveness to demonstrate reduction of falls, and injuries, and cost associated falls over 19021 patient-days	Total of 1508 cases of video monitoring during the study. 697 for the first two units and 811 for the second unit. The average # of monitored days per patient was 3.3 (median 1.0). During the baseline period for the 1st two units, 40 falls for pre & 30 falls for the post, but only 12 falls were from the monitored group. During the baseline period for 2nd units, there were 34 pre and 19 falls post, but only three falls with monitored. Per 1000 patient-days for both pre and post, there were a total of 74 falls. Data indicated for four units after implementing video monitoring 51 falls per 18323 patient-days reflecting 2.8 falls per 1000 patient-days, significantly reducing 28.5	**Strengths:** It Has a definitive conclusion with adequate sample size and reference sources. Demonstrated that video monitoring is not only significant to reduce fall and cost-saving but also a better approach to protect patients from harm **Limitations:** Lack of data related to patients who fell while not on vide 2. Lack of study for patient and family education 3. The study did not have a further recommendation for future practice **Critical Appraisal Tool & Rating L III B**

Evidence 2 Evaluation Table 2

Citation	Design/ Method	Samples/ Setting	Measurement	Data Analysis	Findings	Appraisal Rating
Votruba et al., 2016	The prospective descriptive study's intervention phase took place over nine months, but for both the baseline and intervention phases, the study took place over 18months.	For nine months, 5041 discharges from the study units. A total of 828 unique adult patients were monitored during 992 video monitoring episodes, and 4213 patients did not meet video monitoring. They were not monitored by camera and 1:1 companionship, and the patient the family used to observe patients. **Setting:** The study took place in a 350 beds capacity non-for-profit Magnet-designated urban hospital. The intervention was done in three inpatient adult units, including critical care, intermediate, and a neuroscience	Outcome measure-reduce the number of falls with or without injuries and reduce sitter costs. Specific was to evaluate virtual video monitoring's effectiveness with a virtual telesitter to reduce falls and in-sitter utilization	Simple descriptive statistics analyzed data, excluding the change in falls, was analyzed with paired t-test using a 95% confidence interval.	The number of falls reduced significantly from 85 to 53($p < 0.0001$, 95% CL) 35% reduction in falls and a 10% reduction in sitter hours compared baseline data from 9 months before the intervention. The 35% fall reduction could lead to an avoidance of 37 falls per year. And save 3-5 falls will be avoided. The estimated cost of one fall with injury is $ 17 500. The calculated cost avoidance from fall will be $52-87, 500, and $25 200 costs saving from sitter reduction hours with the total estimated saving of $77 200 to 112 700 annually.	It has a definitive conclusion with a recommendation for future study and insightful implications for practice. Also has an excellent source **Critical Appraisal Tool & Rating:** LII A

Evidence 3 Evaluation Table 3

Citation	Design/ Method	Samples/ Setting	Measurement	Data Analysis	Findings	Appraisal Rating
Davis et al., 2017	Quasi-experimental approach with 4x8 design series with non-randomized evaluating study design with a study. In-room sitters & video monitoring studied	**Sample** adult medical-surgical patients 18 years of age or older admitted to either the cardiology or the Neuroscience units during designated three biannual four months periods for four years of data collection. **Setting:** in a large non-profit teaching hospital in West Central Florida	Falls per 1, 000 patient days, patient's action for potential or actual to cause self-harm, and cost, patient monitored via video or in-person sitter observation of 1-2 patients	Patient falls and self-harm data collected monthly from hospital risk management, cost data, and patient days were collected from the hospital finance department	There was no substantial difference in falls or self-harm prevalence between in-person sitter and virtual video monitoring. But the data reflected a decreasing trend in falls per 1000 patient days for each unit after video monitoring was implemented	**Strengths:** The study has a comprehensive reference source, and a recommendation for further qualitative research to evaluate staff and patients' perception of video monitoring also has implications for practice, . **Limitations:** Retrospective data obtained from the hospital were not created for the study purpose. The author's bias because the primary researcher for this study was responsible for implementing video monitoring at the organization. **Critical Appraisal Tools L III B**

Evidence 4 Evaluation Table 4

Citation	Design /Method	Sample/ Setting	Measurement	Data Analysis	Findings	Appraisal Rating
Adde & O'Keeffe, 2020	Market research and system determination assessment on available Continuous video Monitoring (CVM) Vendors. Nursing leadership conducted a Review of literature Market research assessment on available continuous video monitoring	**Setting** At large Academic Magnet-designated medical Center in the Pacific Northwest of the United States. **Samples** Three video monitoring vendors and 2 of them are less than six months in the business and did' t have adequate outcomes metrics to provide future evaluation, so the choice of vender was AvaSure	Patient safety, staff satisfaction, and productivity	Data analyzed were available technology solution, literature review on program effectiveness, and overall vendors outcomes	Continuous video monitoring is a bridge for the nursing staff to enhance patient safety Cost-saving of $109511 in the first three-quarters of use of CVM & $86 407 in quarter 1 of 2019. Additional metric showed that VMT reported an average of 2768 potential fall events prevented per month in 2019. Increase patient, for patients pull lines securement product, protective Sleeve used to cover the lines between hand and arms & 70% decrease in pulling lines on the trial unit. Then the Sleeve became the best practice with the patient admitted to the company with CVM. Patient satisfaction survey result demonstrated that the patient and family said 80% of the time CVM gave them more privacy than a person sitter, and 93% of the time, they felt that CVM gave them a sense of added security. The survey results also showed that Patient/family reported that 55% of the time, they received patient and family education at the time of initiation of CVM	**Strengths:** Has adequate reference sources, definitive conclusion It has a clear and specific standard of work. The study also has a recommendation for practice to increase patient satisfaction related to the lack of consistent patient education during the initiation of CVM. It also has a strong project steering committee from across the continuum of care **Weakness** The study design/Method, sample/setting was not clearly stated, **Critical Appraisal** LB III

Evidence 5 Evaluation Table 5

Citation	Design/ Method	Sample/ Setting	Measurement	Data Analysis	Findings	Appraisal Rating
Kowalski et al., 2018	A quality improvement project for the budget proposal. The study designed to create a blueprint for collecting clinical-based data and working with an interprofessional team including senior leadership, nurse manager, fall-prevention committee, biomedical engineering and quality, and safety managers to create a budget proposal for fall reduction	**Sample** The fall and fall-related injuries estimated costs category of none ($1,139), minor ($7136), and major ($30 9331) **Setting** At one government healthcare in Midwest Medical Center	Baseline data collected before video monitoring implemented an annual fall rate per 1000 bed days, fall injury rates, sitter costs, facility aggregate staff satisfaction, and patient/family satisfaction .	Morse scale assessments score bedside and sitter data Nurse assistance FTE collection analysis to provide the blueprint for a nurse leader	Video monitoring will improve the measured outcomes and become a part of the cycle for quality improvement. A video monitoring system has the potential to improve nursing practice by enhanced safety. Enhance staff satisfaction by closing the staff shortage. The budget proposal the available evidence for the use of video monitors to reduce patient falls and bedside sitter utilization costs revealed few evidence-based, peer-reviewed articles are unavailable Three years of cost avoidance for this study was $1, 383,910.3058	**Strength**: The study has comprehensive reference sources Simple and straightforward financial narrative, the project-specific aim was clearly stated It also has a recommendation for practice **Weakness** The abstract is not clear, and no recommendation for future study **Critical Appraisal rating** LB IV