2017

Evaluation of Implementation of a Patient Safety Agreement (PSA) Program on Fall Rates in an Acute Care Hospital

Mariellena Sudak
Medical University of South Carolina

EVALUATION OF IMPLEMENTATION OF A PATIENT SAFETY AGREEMENT (PSA) PROGRAM ON FALL RATES IN AN ACUTE CARE HOSPITAL

BY

Mariellena Sudak

A doctoral project submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirements for the degree Doctor of Health Administration in the College of Health Professionals

EVALUATION OF IMPLEMENTATION OF A PATIENT SAFETY AGREEMENT (PSA) PROGRAM ON FALL RATES IN AN ACUTE CARE HOSPITAL

BY

Mariellena Sudak

Approved by:

Chair, Project Committee	Kit Simpson, DrPH	Date
Member, Project Committee	Jaqueline Close, PhD	Date
Member, Project Committee	Margret Talley, PhD	Date
Dean, College of Health Professions	James S. Zoller, PhD	Date

ACKNOWLEDGEMENTS

First and foremost I would like to thank my husband Keith, and my children Christina, Tony, and Jennifer for their unconditional love and unwavering support. Their words of encouragement, sense of humor, and cheerleading, gave me the strength and determination to see this work to the end. Keith, please know that this would not have been possible or even imagined without your love and support. Words alone cannot express how thankful I am for all you have done towards helping me achieve my goals.

I would like to thank Dr. Kit Simpson, the Chair of my doctoral project committee. Dr. Simpson was there for me when I had questions and needed that push to keep going. Her wisdom, guidance, and love for outcomes were key to the completion of this project. Dr. Simpson helped focus my work and was always encouraging. Likewise, the support and feedback from my other committee members. Margaret Talley PhD and Jaqueline Close PhD was invaluable, as was the partnership from Rick Roth, Isabel Cheong, and Dr. Angela Gorzeman.

Thank you goes out to Joy Gorzeman, Lorie Shoemaker, and Frank Beirne for their mentoring and recognition of my potential, always encouraging me to take that next step and believe in myself. To my colleagues, peers and friends, who forgave my moodiness and missed social gatherings in lieu of literature searches, data analysis, and writing. This was no easy feat to accomplish, but your friendship and comradery made a difference and kept me focused and on track.

Last but not least, thank you to my friend and study partner, Ryan Garrison. His can do attitude and sense of humor helped get me through some of the most challenging times over the past few years. In person and from a distance, I could always count on Ryan to be there.

TABLE OF CONTENTS

LIST OF TABLES

Abstract of Doctoral Project Report Presented to the Doctoral Program in Health Administration & Interprofessional Studies
Medical University of South Carolina
In Partial Fulfillment of the Requirements for the
Degree of Doctor of Health Administration

EVALUATION OF IMPLEMENTATION OF A PATIENT SAFETY AGREEMENT (PSA) PROGRAM ON FALL RATES IN AN ACUTE CARE HOSPITAL

By
Mariellena Sudak

Chairperson: Kit Simpson, DrPH
Committee: Jaqueline Close, PhD, APRN, GCNS-BC, FNGN
Margret Talley, PhD, RN, CNS, CWCN-AP

Abstract

Objective: This study aims to evaluate the impact of implementing a Patient Safety Agreement (PSA) on hospital fall rates. Despite implementation of numerous interventions, patients continue to fall. The PSA program goal is to decrease patient falls in the acute care hospital by engaging patients in their plan of care. Implementing a Patient Safety Agreement program (PSA) can empower patients to become active participants in their own safety and fall prevention measures while in the hospital (Tzeng & Yin, 2014). Many of the current fall prevention intervention program elements employed to reduce patient falls require little active participation from the patient. There is little evidence to show the effectiveness of approaches that engage patients in fall prevention care for reducing fall incidents during hospital stays (Tzeng & Yin, 2014).

Prevention of patient falls in the hospital setting has gained an increasing amount of interest over the last decade and is noted as the most frequent adverse event reported in hospitals. The Agency for Healthcare Research and Quality (AHRQ) reports that nearly 1 million patient falls are recorded in U.S. hospitals every year, equating to 2–10% of hospital inpatients falling sometime during their hospital stay (Hefner, Scheck McAlearney, Mansfield, Knupp, & Moffatt-Bruce, 2015).

Methods: A pre- and post-evaluation study of a quality improvement initiative in the hospital setting comprised of 11 inpatient care units was conducted to assess the effect of a Patient Safety Agreement (PSA) program on fall rates. Four types of patient care units participated (acute medical and surgical, progressive or intermediate, and critical care areas), in the implementation of the PSA.

The National Database of Nursing Quality Indicators (NDNQI) was resourced to ensure a standardized definition and categorization of falls, and uniform method of rate calculation. Patient demographics, LOS, and fall risk scoring were abstracted from the study site's electronic medical record. The time span for this study will be 1 year to include fall rate pre- and post-implementation.

Results: Based on the statistical analysis performed, there was no statistically significant difference in patient falls while in the hospital during the pre- and post-evaluation period. There was no effect realized for patients with a Morse Fall Score (MFS) of 0 on admission. There may be a protective effect, but there is not a statistically significant difference in effect until patient's have an admission Morse Fall Scale score > 55, at the $p < .05$ level. Additionally during this study period, there was an increase in falls in patients who had a MFS score between 5 and 45 on admission.

Discussion: The anticipated outcome of the PSA is a reduction in patient fall rates. Examination of the patients who experienced a fall while in the hospital setting showed different patterns of fall risk based on mental cognition, length of stay, and medications. Variations in fall risk scores as reported by the Morse Fall Scale were evident. Patient falls were analyzed by fall score and type of fall. Anecdotal findings indicated that the Patient Safety Agreement was generally well accepted by patients, family members/significant others, and staff. Medical Staffs supported the implementation of the PSA process and assisted with reinforcing fall prevention measures. "Patient engagement in their health care could translate into measurable improvements in safety and quality (Tzeng & Yin, 2014)". Potential limitations to the study include staff adoption of the PSA, language and comprehension barriers, patient cognition, and inconsistent implementation and execution across nursing units.

Keywords: Falls, Patient Falls, Hospital, Patient Engagement, Contracting, Patient Contracting, Fall Risk, Empowerment, Patient, Fall Prevention, Hospital Falls, Fall Risk Score, Patient-Centered Design, Patient Safety, and Evidenced–based Fall Prevention.

CHAPTER ONE

INTRODUCTION

Background and Need

Like most hospitals and nursing care units, this orthopedic unit was struggling with increasing patient fall rates and fall related injuries. This orthopedic patient population presents as an injured, not sick, hospitalized patient. Many come in suffering from limited mobility and pain, restrictions placed on their daily activities, and potentially disrupted sleep. Flexibility, strength, and stability are needed for standing and activities like walking, running, squatting, jumping, and turning. When a joint problem affects your ability to engage in daily activities, it can have a significant impact on one's life and independence.

Patients admitted to the hospital are at a disadvantage of being ill while in an unfamiliar environment, with different routines, lighting, and pathways to the restroom. Their desire to maintain a sense of independence and not be a bother can create hazards that at home are non-existent. Evidence-based patient and consumer information are crucial components in engaging patients in their care, safety, and fall prevention measures. Decreasing patient fall injuries during hospitalization continues to be a challenge at the bedside. Shared responsibility and accountability between the patient and direct care providers create active partnerships with a focus on safe quality care (Tzeng & Yin, 2014).

A large majority of the orthopedic unit's patients are admitted for a total joint replacement of the; hip or knee. Age range varies, from the young who may have injured a joint playing sports over the years, to the elderly who suffer from arthritis. Patients who progress to requiring surgical intervention have failed more conservative intervention: anti-inflammatory medications, steroid injections, and physical therapy (National Institutes of Health, 2016). These are all well intended interventions to ensure the patient is receiving the most appropriate treatment, but each intervention only delays the inevitable for these particular patients, causing frustration and depression, which turns into excitement when the surgical procedure is completed. This excitement leads to a feeling of relief and a desire to take back their independence. All too often, immediately after surgery, when the nerve block and pain medications are still on board, the patient feels energized and wants to try out their new joint, they get out of bed without assistance, and this is when they are most likely to fall and injure themselves. Injuries associated with falls are not only physical, but there is an emotional impact on the patient as well (Wilson, 1998).

Patient falls had become what seemed like a common occurrence on the unit and leadership was scrambling for an intervention that frontline staff would embrace, would connect with their patients, and impact outcomes. Standard fall prevention strategies already in place; a fall risk scoring tool and process, yellow socks and "fall risk" arm bands, identifying markers at the patient's room entrance to signify risk and bed alarms were not enough.

Assessing patients for the risk of falls while in the hospital starts on admission. Initial assessment includes recording the patient's medical and psychosocial history, a

physical assessment and completing a fall risk scoring tool. This organization uses the Morse Fall Scale (MFS), a valid and reliable tool designed to quickly assess a patient's likelihood of falling. The MFS assesses 6 risk factors: history of falls; secondary diagnosis; ambulatory aid; venous access line; gait/transferring; and mental status. Each risk factor is associated with a score. All 6 risk factor scores are added up to determine if the patient is a low, moderate, or high risk for falls.

MFS is a simple, easy to use fall risk assessment tool, but it is not all inclusive. Factors such as environment of care, medications which impair mentation or alter physiological responses, urinary urgency, and fear of incontinence, can also contribute to hospital falls. Each contributing factor impacts an individual patient's fall risk. Standard fall prevention measures can alleviate some of the influencing factors, but a more effective approach to risk reduction comes about by individualizing a patient's plan of care based their specific needs, limitations, and learning style. *A pragmatic study of the predictive values of the Morse Fall score,* authored by Healey and Haines in 2013, concluded that to be successful in reducing falls, "hospitals should consider directly assessing and acting on individual patients' specific modifiable risk factors for falls" (Healey & Haines, 2013).

Regular reviews of current practices used in hospitals to prevent patient falls, provides health care leaders with an opportunity to modify interventions to accommodate specific patient needs, reducing risk and optimizing the care experience. Structure, process, and outcomes measures can be used to evaluate interventions and identify best practices (Chun & Chao Bafford, 2014). In quality improvement work, structure can be defined as the systems in place to deliver care, how this care is delivered, organized, and

resourced. Structure is related to people, equipment, and policies and procedures. Process speaks to how the systems works, identifying the steps or tasks preformed that are intended produce a specific outcome. Outcomes are the end results and reflect the impact of the prescribed interventions. (Montalvo, 2007)

A core team of staff, leaders and physicians came together to review fall events and discuss opportunities for improvement. Through case review and patient interviews, unit staff and leadership determined patients were falling because they were not complying with safety initiatives designed to keep them safe while in the hospital. We needed to determine if the initiatives were effective and if the nurses were educating patients on these safety measures. Patients who were interviewed after a fall, revealed that they patients did not always understand fall prevention measures and their risk for falling.

In speaking with patients on the unit post fall, many stated they felt so good post procedure they thought they could get out of bed and be mobile without assistance. Others commented that they were hesitant to inconvenience the nurse and wanted to be independent, without considering the consequences of their actions. Despite reinforcement of standard fall prevention measures, patient falls continued at an alarming rate, prompting a call to action and the creation of a Patient Safety Agreement (PSA). The intent of the PSA is to draw the patient into a partnership with the care team to engage them in their care and prevent injury.

Implementing a Patient Safety Agreement program (PSA) can empower patients to become active participants in their own safety and fall prevention measures while in

the hospital (Tzeng & Yin, 2014). There is little evidence to show the effectiveness of approaches that engage patients in fall prevention care for reducing fall incidents during hospital stays (Tzeng & Yin, 2014). Decreasing patient fall injuries during hospitalization continues to be a challenge at the bedside.

The intent of this evaluation study is to assess the impact of a Patient Safety Agreement program on engaging patients' in their own care and hospital fall rates. The hypothesis is if patients' understand their care environment, physiological and structural limitations, and how to access assistance when needed while in the hospital, inpatient fall rates will decrease.

A recent article by Tzeng & Yin, 2015 suggests that patient engagement could be a possible approach to reducing falls. Patient engagement is directly impacted by nurse's understanding of patient centeredness philosophy and its application in practice. To engage patients in their own care and fall prevention, it is necessary to bring them into the conversation. This approach provides them the opportunity to contribute to an individualized plan of care shared by the team providing services. Incorporating the patient's voice in creating solutions that directly impact them makes it more likely the intervention will be impactful. However, many of the current fall prevention intervention program elements employed to reduce patient falls require little to no active participation from the patient.

Studies accessed and available for review include systematic reviews, meta-analysis, and evaluation. Many of the studies focused on fall prevention evaluate the implementation of bundled interventions, making it difficult to identify which measure

has the most impact. There is an abundance of information available identifying fall risks and the evaluation of assessment tools in a variety of settings.

Falls are among the most common, yet potentially avoidable, adverse events experienced by patients in hospitals. The target patient population for this quality improvement initiative encompasses all hospitalized adult patients admitted to any of the 11 inpatient care units within the boundaries of Hospital A. The time span for this study will be 1 year to include fall rates pre- and post-implementation. Four types of patient care units participated (acute medical and surgical, progressive or intermediate, and critical care areas), in the implementation of the PSA. Adult patients are defined by Hospital A as any patient over the age of 14 years old.

All patients admitted to the acute care units were educated on the PSA, and asked to sign the agreement as a show of understanding of their role in their personal safety and fall prevention while in the hospital.

The main assumptions of this work are the PSA will reduce fall rates on the nursing units that executed the PSA as designed for specific patient populations within the overall population evaluated. The anticipated results will be a reduction in patient fall rates calculated as number of patient falls/1,000 patient days. Several factors will impact the adoption and execution of the PSA by each unit including: staff engagement and leadership support, staff and patient acceptability, nursing unit and organizational culture. “Patient engagement in their health care could translate into measurable improvements in safety and quality” (Tzeng & Yin, 2014). Potential limitations to the study include staff adoption of the PSA, language and comprehension barriers, and inconsistent implementation.

Purpose/Objectives: Evaluation after Change

This study aims to evaluate the impact of implementing a Patient Safety Agreement on admission to the hospital on inpatient fall rates. Despite implementation of numerous interventions, patients continued to fall. The program goal is to decrease patient falls in the acute care hospital by implementing a PSA program that engages the patient in their plan of care. The combination of defined standards, data aggregation, and analysis enables us to set and measure goals based on national benchmarks. Many of the current fall prevention intervention program elements employed to reduce patient falls require little active participation from the patient.

Definitions

Key definitions in this evaluation study are:

1) PSA: Patient Safety Agreement
2) MFS: Morse Fall Score
3) NDNQI: National Database of Nursing Quality Indicators

CHAPTER TWO

LITERATURE REVIEW

A fall is defined as an unplanned decent from a higher level to a lower level landing. A fall can occur from a standing, sitting, or supine position resulting in a broad spectrum of injuries, from no physical injury to major injury or death (Hicks, 2015). "Falls are a leading cause of nonfatal injuries and trauma-related hospitalizations in the United States, and have been linked directly with the quality of nursing care in the hospital setting" (Hicks, 2015). The Agency for Healthcare Research and Quality (AHRQ) reports that nearly 1 million patient falls are recorded in U.S. hospitals every year, equating to 2–10% of hospital inpatients falling sometime during their hospital stay (Hefner, Scheck McAlearney, Mansfield, Knupp, & Moffatt-Bruce, 2015).

A recent U.S. study showed that 92% of all inpatient hospital falls could be prevented. Forty-three percent of all inpatient falls are accidental falls caused by environmental factors that can be proactively removed. Anticipated physiological falls related to intrinsic factors account for 49% of all hospital falls. Only 8% are unanticipated physiological or intentional falls. (Tzeng & Yin, 2014)

Although death from a fall occurs less than 1% of the time, falls account for nearly 11,000 deaths in hospital settings each year (Hefner, Scheck McAlearney, Mansfield, Knupp, & Moffatt-Bruce, 2015). Physical complications are not the sole consequence of patient falls. Anxiety, depression, loss of independence and confidence, and fear of falling, along with increasing costs for additional testing, increased length of

stay (LOS) and readmissions also result from these potentially preventable falls (Oliver, Hopper, & Seed, 2000).

Prevention of patient falls in the acute care setting has gained a lot of interest over the last decade as one of the most frequent adverse events reported in hospitals (Hicks, 2015). Literature on fall prevention in hospital settings can be found as far back as 1947 (Hayt, 1947). This literature review examines specific interventions, fall bundles, fall risk assessment tools, and staff attitudes towards patient safety. The subject of fall prevention is broad and when searched, produces a tremendous amount of information.

Conversely, there is not a significant amount of research available on specific fall prevention initiatives. Much of the literature analyzes fall prevention initiatives as a bundle, consisting of multiple interventions, making it difficult to narrow down the impact of just one intervention. Falls and falls with injury in a hospital setting create such a sense of urgency that often-times multiple initiatives are implemented simultaneously in an effort to prevent the next patient from falling.

Studies accessed and available for review include systematic reviews, meta-analysis, and evaluations. Literature reviewed included local and international work. Fall prevention research has been conducted in a wide variety of settings: long term care and rehabilitation, acute care hospitals and dialysis centers. Available literature categorized fall predictors, risk factors, contributors, and interventions.

Keywords searched on PubMED, OvidSP, CINAHL, and ProQuest included Falls, Patient Falls, Hospital, Patient Engagement, Contracting, Patient Contracting, Fall

Risk, Empowerment; Patient, Falls, Prevention, Engagement, Patient Contract, and Patient Contracting.

Predicting Falls

Predicting falls in the hospital setting is a key element to prevention. A multi-site study analyzed secondary data to identify three key predictors of falls: fall within the past 6 months (odds ratio= 2.98), confusion (odds ratio=2.05), and toileting issues (odds ratio=1.54). The results did not vary much based on hospital location, rural or urban, or unit distinction. (Moe, Brockopp, McCowan, Merritt, & Hall, 2015) Much of the literature revealed hospital falls occurred frequently on the way to the bathroom or while in the bathroom. While assessing risk for falls is a priority and *The Joint Commission* has mandated hospitals implement a fall prevention program, this alone does not prevent falls. If it did, hospitals would not continue to be challenged with this problem. Risk assessment tools allow the nurse to identify fall risk criteria based on evidence and enables them to target patient specific interventions to prevent in-hospital falls.

There is an abundance of information available identifying fall risks and the evaluation of assessment tools in a variety of settings. Specificity and sensitivity of the variety of risk assessment tools can be limiting based on the environment they were developed and used for (Moe, Brockopp, McCowan, Merritt, & Hall, 2015). Fall risk instruments are available for adults and children, long term care, psychiatric and acute care hospital settings. Their viability is dependent on the end user and their ability to interpret the tool as intended, creating a standard approach to use and eliminating individual variability.

Morse Falls Scale (MFS) for adults, Humpty Dumpty Fall Scale (HDFS) for pediatrics, STRATIFY (St. Thomas Risk Assessment Tool in Falling Elderly Inpatients) and the Hendrich II Fall Model are all examples of frequently used fall risk assessment tools. Strong predictors of falls based on information gathered from these and other fall risk instruments include; "age, history of recent falls, impaired mobility, urinary incontinence or frequency, medication, dementia, nurses' clinical judgement, and postural hypotension" (Moe, Brockopp, McCowan, Merritt, & Hall, 2015, p. 499).

The National Database of Nursing Quality Indicators (NDNQI) reports structure, process, and outcome indicators to evaluate nursing care at the unit level. NDNQI reports out on 10 nurse sensitive quality metrics spanning from nursing hours per patient day, to pressure ulcer prevalence and patient falls (see Table 1). Patient falls and patient falls with injury are two specific indicators NDNQI collects data and reports out on both process and outcome measures.

Table 1: *National Database of Nursing Quality Indicators*

NDNQI Indicators		
Indicator	**Sub-indicator**	**Measure(s)**
1. Nursing Hours per Patient Day[1,2]	a. Registered Nurses (RN) b. Licensed Practical/Vocational Nurses (LPN/LVN) c. Unlicensed Assistive Personnel (UAP)	Structure
2. Patient Falls[1,2]		Process & Outcome
3. Patient Falls with Injury[1,2]	a. Injury Level	Process & Outcome
4. Pediatric Pain Assessment, Intervention, Reassessment (AIR) Cycle		Process
5. Pediatric Peripheral Intravenous Infiltration Rate		Outcome
6. Pressure Ulcer Prevalence[1]	a. Community Acquired	Process & Outcome

	b. Hospital Acquired c. Unit Acquired	
7. Psychiatric Physical/Sexual Assault Rate		Outcome
8. Restraint Prevalence[2]		Outcome
9. RN Education /Certification		Structure
10. Annual RN Satisfaction Survey Options[1]	a. Job Satisfaction Scales b. Job Satisfaction Scales – Short Form c. Practice Environment Scale (PES)[2]	Process & Outcome
11. Skill Mix: Percent of total nursing hours supplied by[1,2]	a. RN's b. LPN/LVN's c. UAP d. % of total nursing hours supplied by Agency Staff	Structure
12. Voluntary Nurse Turnover[2]		Structure
13. Nurse Vacancy Rate		Structure
14. Nosocomial Infections(Pending for 2007) a. Urinary catheter-associated urinary tract infection (UTI)[2] b. Central line catheter associated blood stream infection (CABSI)[1,2] c. Ventilator-associated pneumonia (VAP)[2]		Outcome
[1] Original ANA Nursing-Sensitive Indicator [2] NQF Endorsed Nursing-Sensitive Indicator "NQF-15"		

(Montalvo, 2007)

NDNQI defines a fall as an unplanned descent to the floor or extension of the floor, e.g., trash can or other piece of equipment, with or without injury (Press Ganey Associates, Inc., 2016). A fall can be the result of a physiological event or environmental elements. Falls are categorized by NDNQI as anticipated, unanticipated, or accidental depending on the contributing factors. Injury associated with a fall can be devastating to the patient and the care provider. A standard definition for falls allows for comparisons

of fall rates and outcome measurement. Patient injury rate, noted to be most often caused by falls, is a direct reflection of quality, linking patient outcomes with nursing interventions (Montalvo, 2007).

Nursing interventions directed at fall prevention start on admission to the hospital with a fall risk assessment. Next steps include developing and implementing an interdisciplinary risk reduction care plan that is individualized to the patient and then evaluating the effectiveness of fall prevention programs and initiatives. Fall prevention interventions can be unit specific and population based, or generalized across health systems and patient populations (Montalvo, 2007). Best practices in fall reduction and fall related injury prevention have emerged over time based on program evaluations and in depth data analysis. Protecting patients from falls and fall related injuries is a shared responsibility between health care providers (nurses, physician, and administrators) and the patient.

Patients admitted to the hospital are at a disadvantage of being ill while in an unfamiliar environment, with different routines, lighting, and pathways to the restroom. Their desire to maintain a sense of independence and not be a bother sets them up in a space of hazards that are non-existent at home. Evidence-based patient and consumer information are crucial components of engaging patients' in their care, safety, and fall prevention measures. Shared responsibility and accountability between the patient and direct care providers create active partnerships with a focus of safe quality care (Tzeng & Yin, 2014).

Educating Teams

Patient falls and subsequent injuries are significant events, both for the patient and the hospital. A 2002 study conducted by Murphy, Williams and Gill, reveals falls in general are the leading cause of injury and death in older people. Upwards of 33% of older hip fracture patients die within a year and depending on the population being studied, 25% to 75% lose functionality and their ability to walk independently within a year (Rauch, Balascio, & Gilbert, 2009). Economic repercussions form falls and falls with injury are also disturbing. The Centers for Medicare and Medicaid Services (CMS) no longer reimburse hospitals for costs associated with preventable falls or medical errors.

Fall prevention programs can only be effective if the team education and implementation behind them is successful. The University Medical Center at Princeton instituted a fall prevention program in 2007, where it used both verbal and written communication for care planning, assessment, equipment, education, and staffing (Rauch, Balascio, & Gilbert, 2009). Care team engagement and involvement in the development of the program was vital for success. The program included selecting a risk assessment tool and developing standardized interventions for the degree of risk. Interventions were visual identifiers, documentation requirements, equipment, and medication evaluation. Bed alarms, pressure pads, floor pads, low beds and activity aprons were introduced.

Joint Commission highlights communication or the lack thereof as a leading cause of patient harm. The visual identifier outside a patient's room and chart alerts produced by documentation of risk factors were two communication tools used in this program. All

patients admitted to the hospital were also given an information sheet on falls and fall prevention. (Rauch, Balascio, & Gilbert, 2009) New initiatives and the reasons behind them are important aspects to include in team education to gain buy-in and support for the change.

Acknowledging hospitals function around the clock and staff schedules start and stop at varied times, the University Medical Center adjusted its education schedule to meet the needs of the team. Training was conducted 24/7. Pockets cards were given to staff with the fall risk assessment on one side, and interventions on the other. Each unit had its own fall champion. The program was rolled out in one unit at a time and after 8 weeks of fine tuning it was rolled out into other units. Early results showed a reduction in fall rates from 43% to 14% over the course of a year. (Rauch, Balascio, & Gilbert, 2009)

Patient Engagement

Patient engagement has become a key strategy in improving health care outcomes. Actions taken by patients and care providers promote informed decision making and changes behavior. The importance of "patient engagement" has been widely researched in recent years and associated with lowering healthcare costs and improving patient outcomes (Moe, Brockopp, McCowan, Merritt, & Hall, 2015). Despite all the recent energy behind "patient engagement", it is not a new concept, but an underutilized approach to patient safety. Communicating effectively with patients and their family means giving them easy access to relevant information. Typically, the best and most complete information about a patient's condition and care plan is exchanged during daily rounds, from which family members have traditionally been excluded.

Empowering patients to engage in their own care is a newer approach to preventing hospital acquired conditions and falls while in the hospital. Results of a recent qualitative study conducted at the University of New South Wales in Australia explored health care worker's understandings and attitudes towards empowering patients and found a belief that supporting patient engagement and involvement in one's own care prompted fewer preventable events. The majority of the study participants agreed that encouraging patents to actively engage in their care generates a better understanding of their illness and/or disability, treatment plan, and limitations, and generated better outcomes. (Seale, et al., 2016)

This study focused specifically on involving all key stakeholders in the prevention of hospital acquired infections, with an intervention that could be spread to prevent other hospital acquired conditions such as insult and injury from a preventable fall while hospitalized. Previous studies have focused on giving patients more knowledge, not necessarily having the patient partner with health care providers to avert preventable hospital acquired infection as demonstrated by this study or fall prevention initiatives (Seale, et al., 2016).

As with any new intervention or program, frontline health care providers' perceptions of limited time and busy workloads can create a barrier to successful implementation (Seale, et al., 2016). Involving patients in their own care promotes learning, opens communication, and can decrease the direct care provider's work load. The patient becomes a partner in decision making, which promotes ownership for self-management and safety (Seale, et al., 2016).

Ninety-two percent of all falls in the hospital setting can be prevented (Tzeng & Yin, 2014). Hospitals need to address the individualized needs of each patient to understand the level of information and education a patient would benefit from to keep them from falling during their stay. Methods of patient education include teaching verbally, using handouts, and engaging the patient and family. Much of the teaching can be completed during the provision of care; while conducting a physical assessment, competing the hospital admission and history documentation, and with each interaction throughout the patient's stay to reinforce learnings. Patient education should be presented in a method that best suits the individual patient's learning style, using standard technology available in most health care settings today (Tzeng & Yin, 2014).

Patient safety agreements or contracts have been used in a variety of situations in the past. The literature reveals many of the uses have been focused on behavior management; dealing with a difficult patient or student, managing complex medical treatments plans, and often in the scope of psychiatry. In the past, dialysis centers have used behavioral contracts to reinforce supportive behaviors and manage disruptive patient actions impacting overall health and compliance with dialysis treatments. Used as a sincere effort to formalize a pact which benefits both parties, the patient and the care provider, the Patient Safety Agreement can be a helpful tool to outline expectations and consequences in the event of straying from the plan of care. It can also be used as a written record or point of reference of the mutually agreed upon actions.

Contracting is defined as "a mutual agreement between patient and nurse concerning their expectations of each other during a hospital stay" (Zangari & Duffy, 1980). Contracting calls out expectations, goals, and responsibilities. It creates a

partnership between the patient and health care provider, with identified responsibilities towards a common goal, sharing accountability. (Zangari & Duffy, 1980)

Benefits of improved patient engagement include decreased costs, decreased length of hospital stay, compliance with medication regime and therapy. Patient engagement promotes an understanding of care. Engaged patient are more confident regarding their illness, plan of care, and course of treatment. The patients become involved in decision making, which allows them to keep a sense of independence and control throughout their hospital stay. (Zangari & Duffy, 1980)

One example of encouraging engagement to improve outcomes was demonstrated by a Lowes initiative. Lowes employs 260,000 people and they have attempted several strategies to engage their employee in their own health care. Lowes' first attempt to assist employees with chronic illnesses, the plan provider proactively called each employee to offer assistance and guidance to maintain a healthy lifestyle. The employees felt the calls to be intrusive and over a 5-year period there was minimal participation. The next initiative included a behavioral approach to pharmacy benefits. Employees were asked to request generic medications form their physicians in return for a dollar incentive. The use of generics increased 28%. Additional incentives were offered with success. In making the experience about the employee and not the company, employees gained trust and engaged in the process of accepting assistance and guidance to manage their health. Health care is not just about the treatment of disease, but rather the patient. (Ihrie & Spiro, 2015)

Contracting Literature

Relationships in health care are changing, moving more to a shared responsibility and accountability model between patients and care providers (Zangari & Duffy, 1980). Patients are requesting and expecting accurate and inclusive information from their care providers. Health care professionals are drawing patients into their care by providing information and instructions on health and disease management. The move to shared responsibility in hospital fall prevention opens the door for contracting, or the creation of a Patient Safety Agreement (PSA). The contract or PSA is based on the premise that patient and care provider/s are equal partners, with distinct responsibilities toward common goals, in this case, fall prevention. Contracting allows the patient to keep a level of control and involvement in safe practices.

Contracts can be verbal in nature or written and signed. The intent of the contract is for the patient and care provider to discuss expectations and resources. This promotes patient education in real time and encourages questions. Patients who participate in their own care while in the hospital are better armed to care for themselves post discharge (Zangari & Duffy, 1980). The spirit of the contract is as important as the content. The Patient Safety Agreement for fall prevention is not intended to be a means for controlling patient behavior, but rather an informative reminder for the patient and family about physical limitations, routines, and available resources.

There is an abundance of fall prevention literature; most of which reflects the implementation of visible signage, implementing fall risk scoring tools, and bundled interventions such as alarms and alerts, distinctive yellow socks and room signage, but

what is not reflected in the literature is contracting with patients for fall prevention while hospitalized. There is literature referencing contracting in a variety of other uses, infection prevention, pain management, and dialysis compliance. The opportunity presented itself to design a program that focused on engaging patients and decreasing falls in the hospital setting.

CHAPTER THREE

METHODOLOGY

Purpose/Objectives: Evaluation after Change

This study aims to evaluate the impact of implementing a Patient Safety Agreement (PSA) on admission to the hospital on fall rates. Despite implementation of numerous interventions, patients continued to fall. The program goal is to decrease patient falls in the acute care hospital by implementing a PSA that engages the patient in their plan of care. The combination of defined standards, data aggregation, and analysis enables us to set and measure goals based on national benchmarks. Many of the current fall prevention intervention program elements employed to reduce patient falls require little active participation from the patient.

The methodology employed to evaluate this quality improvement initiative is presented in this chapter. The chapter is organized by: 1) study design, 2) study site, 3) study group, 4) sample size, 5) instrumentation, 6) compliance with ethical guidelines, 7) data collection, and 8) limitations.

Study Design

This study was designed as a pre- and post-evaluation study of a quality improvement initiative in a hospital setting comprised of 11 inpatient care units, conducted to assess the effect of a PSA program on fall rates. Four types of patient care units participated (acute medical and surgical, progressive or intermediate, and critical

care areas), in the implementation of the PSA. Falls are among the most common, yet potentially avoidable, adverse events experienced by patients in hospitals. All patients admitted to the acute care units were educated on the PSA, and asked to sign the agreement as a show of understanding of their role in their personal safety and fall prevention while in the hospital.

Pre- and post-implementation data were abstracted from a variety of electronic sources and databases. Fall rate data was abstracted from the National Database of Nursing Quality Indicators (NDNQI) to ensure a standardized definition and categorization of falls, and uniform method of rate calculation. Primary data related to patient demographics, length of stay, and fall risk scoring were abstracted from the hospital's Electronic Medical Record (EMR) system, Cerner. The time span for this study was 1 year to include fall rates pre- and post-implementation.

This primary researcher evaluated the data to determine which patient populations potentially receive protection from a PSA program. Fall events were delineated between fall with or without injury; accidental; anticipated physiological; unanticipated physiologic. Fall risk scores reflect the result of patient assessment on admission using the Morse Fall Scale (MFS). The MFS developed by Janice Morse RN, PhD, FAAN, provides a rapid method for assessing a patient's likelihood of falling based on scores assigned to six variables: history of falling; secondary diagnosis; use of ambulatory aid; intravenous access; gait/transferring; mental status (see Table 2).

Table 2: *Morse Fall Scale*

Item	***Scale***	***Scoring***
1. History of falling; immediate or within 3 months	No 0 Yes 25	_____
2. Secondary diagnosis	No 0 Yes 15	_____
3. Ambulatory aid Bed rest/nurse assist Crutches/cane/walker Furniture	 0 15 30	_____
4. IV/Heparin Lock	No 0 Yes 20	_____
5. Gait/Transferring Normal/bedrest/immobile Weak Impaired	 0 10 20	_____
6. Mental status Oriented to own ability Forgets limitations	 0 15	_____

Study Site

This quality improvement initiative evaluation was conducted in one acute care hospital of a three-hospital system. The health system is a not-for-profit district system located in Northern San Diego County, California. The hospital's mission is to heal, comfort and promote health in the communities it serves, with a vision of being the health system of choice for patients, physicians, and employees, recognized nationally for the highest quality of clinical care and access to comprehensive services. This health system has grown to be the largest public health care district in California with one of the largest service areas in the United States and North County's only designated trauma center covering 2,200 square miles.

The primary and secondary service areas of the hospital extend over 850 square miles and include the full continuum of care: urgent care clinics, three acute care hospitals, a long term care facility, outpatient surgical and rehabilitation services, acute rehabilitation center, and Home Health services. This health district has over 4,400 employees, 840 active Medical Staff, and well over a thousand volunteers. The health district's annual gross revenue is $2.8 billion, with 244,100 weighted patient days and seeing over 120,000 Emergency Department visits. In an effort to ensure health care resources are brought to the community versus sending the community out, the organization has partnered with Radys Children's Hospital, Kaiser Permanente, and until recently was the only Mayo Clinic Care Network member in California. This coordinated approach to care delivery assures high quality, ideal outcomes, cost efficiency and patient satisfaction, allowing patients to receive their care near their homes in their communities.

The study hospital is a 288 bed acute care facility accredited by The Joint Commission and is recognized for several disease specific certifications: stroke and diabetes; a chest pain receiving center, and Centers of Excellence in Orthopedics, Spine, and Cardiovascular. This level II Trauma hospital serves a broad geography, spanning the miles between the desert and the ocean. The facility has been ranked #5 by Top Master's in Healthcare Administration's Most Technologically Advanced Hospitals in the World and ranked #12 by Soliant Health as one of the 20 Most Beautiful Hospitals in America. Operating statistics for the study year ending in June of 2016 are shown in Table 3.

Table 3: *Operating Statistics, FY 2016*

Adjusted Discharges	40,000
Patient Days	96,228
Average Daily Census	261
Observation Discharges	7,950
Inpatient Surgeries	8,696
Outpatient Surgeries	5,128
Emergency Department Visits	95,000
Emergency Department Conversion Rate	14%
Outpatient Registrations	86,494
Average Length of Stay	3.87

The study organization has identified five pillars to focus its operations and improvement initiatives: quality, experience, people, brand, and finance and has built a strategy map based on people, processes and outcomes. Quality encompasses patient safety, quality initiatives, pay for performance metrics, performance improvement, and zero patient harm. Zero patient harm centers on avoiding all preventable hospital acquired conditions and/or injuries during the patient's stay. Fall prevention and injury associated with a fall are elements of the zero patient harm bundle.

Study Group

The hospital has 11 inpatient care units totaling 264/288 acute care beds (see Table 4). One 24 bed unit was out of service during this study period. Four types of patient care units participated in the implementation of the PSA: acute medical and surgical, progressive or intermediate, and critical care units.

Examination of the patients who experienced a fall while in the hospital setting showed different patterns of fall risk based on mental cognition, length of stay, and prescribed medications. Variations in fall risk scores as reported by the Morse Fall Scale are prevalent. Patient falls will be analyzed by fall score and type of fall. Pre- and post-implementation data will be abstracted from the National Database of Nursing Quality Indicators (NDNQI) to ensure a standardized definition and categorization of falls, and a uniform method of rate calculation. Patient demographics, length of stay, and fall risk scoring will be abstracted from the EMR for all patients admitted over the course of a 1 year period. The time span for this study will be 1 year. May 1, 2015 to April 30, 2016 and will include fall rates pre implementation and post implementation, allowing for an implementation adoption period of 3 months.

Table 4: *General Acute Care Nursing Units*

Nursing Unit Location	Level of Care	Number of Beds
4 East	Medical Surgical	30
4 North West	Progressive Care (Trauma)	12
4 South West	Intensive Care (Trauma)	12
5 East	Progressive Care (Telemetry)	30
5 West	Intensive Care (Cardiovascular)	24
6 East	Medical Surgical with Telemetry	30
6 West	Progressive Care (Pulmonary)	24
7 East	Medical Surgical (Orthopedic)	30
7 West	Progressive Care (Neurosciences)	24
8 East	Medical Surgical	24
8 West	Out of Service During Study Dates	0
9 East	Medical Oncology	24

Inclusion Criteria were:

1. All patients admitted between the dates of January 1, 2015 to April 30, 2016 were included in the PSA program and general data analysis.

Exclusion Criteria were:

1. No patients admitted to the study hospital between the dates of January 1, 2015 to April 30, 2016 and assigned to the units noted in Table 4 were excluded from the PSA program.
2. Patients admitted to the Orthopedic floor (7E) were excluded from the data analysis due to the fact this unit was the pilot unit for the design and implementation of the PSA program beginning in December of 2014 through system implementation in May of 2015.

Sample Size and Representativeness

The sample size for this study will be inclusive of all patients admitted to the study hospital between January, 2015 and April 30, 2016. In order to capture a relevant representation of the population being studied, the sample will draw from all the inpatient nursing units and across various levels of care. Power analysis is the process for determining the appropriate sample size for a study that will detect the true impact or effect (UCLA, 2016).

Regression models measure associations, predict outcomes, and control for confounding variable effects (Stolzfus, 2011). Logistic regression may include one or multiple independent variables. Exploring the effects of multiple variables is often more informative, since it exposes the unique influence of each variable. The outcome, expressed as a probability will be denoted as a “1” if the patient experienced a fall during their hospitalization and a “0” if they did not.

Statistical analysis will include descriptive statistics on the number of falls that have been documented in patient medical records, and completed incident reports. Using a logistical regression approach, the data description of multiple independent variables and the dependent variable will be provided in a table. Logistic regression is the model most often used for modeling dichotomous health outcomes. Logistic regression predicts the relative probability of an outcome occurring and expresses the relationship between variables.

Three logistic regression models are available for the study based on the independent variables selected. Each model with a different emphasis and purpose: direct, sequential, and stepwise. The direct approach enters all independent variables into the model at the same time and makes no assumptions about priorities or value of those variables (Stolzfus, 2011). In the direct approach, all the variables have equal worth. Sequential or hierarchical regression is where variables are added in sequence, based on a predetermined priority, to see if they further improve the model. Stepwise regression identifies independent variables to keep or remove from the model and those with no significant contribution to the outcome are dropped.

Compliance with Ethical Guidelines

Confidentiality and privacy of the data was maintained through de-identification. Institutional Review Board Approval is not required for Quality Improvement initiatives utilizing de-identified data. Permission to utilize this hospital's data was obtained from the Chief Operating Officer. In addition, the American Psychological Association's (APA) Ethical Guidelines for research were followed.

Data Collection

Several data sources were used for this pre and post evaluation study. Cerner, the sample site's Electronic Health Record (EHR) application, known as Clarity was accessed for patient demographics, admit and discharge dates, length of stay, primary diagnosis and DRGs, and initial fall risk scores. Fall incident reports were pulled from the sample site's electronic incident reporting application: Midas. Elements recruited from Midas include date of fall, type of fall and any associated level of injury, fall bundle components in place at the time of the fall, and incident location. Standard definitions and method of fall rate calculations followed guidelines supported by the National Database of Nursing Quality Indicators (NDNQI). Data from noted sources were compiled in preparation for statistical analysis. Upon securing all of the data elements for this study, the data was analyzed for varied descriptors using excel and exported to SPSS for statistical analysis to determine the relationship between a PSA program and fall rates in the hospital setting.

CHAPTER FOUR

RESULTS

Results/Findings

During the study period (January 1, 2015 to May 30, 2016), a total of 23,911 patients were admitted to the inpatient units identified (see Table 4). Since the Orthopedic Unit (7 East) Nursing leadership team and staff developed and piloted the PSA from January 1, 2015 to May 1, 2015; all patient admissions to the unit (7 East) were removed from this study prior to statistical analysis. The PSA was implemented on May 1, 2015 across all inpatient units, consequently a 3 month adoption into practice period (May1, 2015-July 31, 2015) post go-live was allocated for implementation and assimilation into practice. Patient admissions and associated data from the 3 month adoption period were removed from the data set prior to statistical analysis, leaving a sample size of eligible patients equaling 16,992 with a wide variety of DRGs.

Of the 16,992 eligible patients admitted to the study units, there were 4,476 patients in the pre-implementation group and 12,516 in the post-implementation group. During the study period of January 2015 through May 2016 there were a total of 156 patient falls across all the inpatient units. Once the Orthopedic unit (7E) patients were removed based on their involvement in the initial design and implementation of the PSA, there were 121 patient falls remaining during the study period; 26 in the pre phase and 95 in the post evaluation period. The pre-implementation fall rate per 1,000 patient days equaled 1.263 and post- implementation equaled 1.680. The average length of stay in the

hospital for the pre and post group was relatively consistent at 4.60 and 4.52 days respectively.

Based on the total sample of 23,911 patients admitted to the hospital site during the pre and post evaluation period, the median age was 66, ratio of male versus female was 49.37% to 50.63% respectively, with the majority of the patients, 88.88% documented as speaking English. The average length of hospital stay for the full sample was 4.3044 days. Patients at risk for falls, those with a Morse Fall Score (MFS) of 55 or greater was at 17.50% on initial evaluation at admission and 82.25% had MFS of less than 55. There were 0.25% of patients not assessed for MFS on admission. An assumption that all patients admitted during the post evaluation study period received and signed a PSA on admission, 79.97% of the total number of patients admitted during the pre-post study period.

For the pre-implementation study group of 4,476 patients, the median age was 66, 50.31% (2,252) of sample were female and 49.66% (2,223) were male, 88.56% spoke English and 9.09% were Spanish speaking. The average length of stay was 4.5549 days, with 66.62% (2,982) staying less than 4 days. Seventeen percent (766) of patients in the pre-implementation period had a MFS of 55 or greater and were at risk for a fall. Of the 26 falls which occurred in pre-evaluation period, 11 were females and 15 were male. The greatest number of falls occurred in patients who were between the ages of 50-64.

The post-implementation group consisted of 12,516 patients admitted to the inpatient units during August 1, 2015 to May 2016. Patients' median age was 66, with 49.72% (6,223) being female and 50.27% (6,292) male. Eighty-eight percent (11,038) of the patients were documented English speakers, 9.59% (1,200) Spanish speakers and

2.22% (278) fell into the language category of other. The average length of hospital stay for the post-implementation group was relatively similar to the pre-implementation group at 4.57 days. Nearly 17% (2,124) of the patients in the post period scored 55 or greater on the MFS and were considered a fall risk on admission to the hospital. Since the education for the PSA program implementation set the standard for each patient to receive a Patient Safety Agreement on admission, the assumption for this period is that all patients had a PSA. Of the 95 documented patient falls which occurred during August 1, 2015 and May 2016, 44 were female and 51 were male, with the greatest number of falls occurring in patients between the ages of 50-64.

The falls data was tested for difference in proportions using a two-tailed Z-test with a significance level of 0.05. The results showed no significant difference between the proportions (falls per patient day) pre-implementation and post-implementation of the Patient Safety Agreement (PSA).

Null hypothesis: the population proportion equals the hypothesized proportion

Alternative hypothesis: the population mean differs from the hypothesized mean

Table 5: *Pre and Post Implementation Fall Rate/1,000 Patient Days*

Sample	Falls	Patient Days	Proportion (Fall Rate)	Fall Rate/ 1,000 Patient Days
Pre-Implementation	26	20,583	0.00126	1.263
Post-Implementation	95	56,558	0.00168	1.680

Results: Z score = -1.2929 $p = 0.19706$ Significance level = 0.05

The two-tailed Z-test looks for differences in proportions in either direction: higher or lower. With a significance level of $p < 0.05$, the probability of rejecting the null hypothesis (that the two proportions are equal; fall rates pre- and post-implementation)

when it is true, means that a 5% risk of concluding a difference exists, when none does. A two tailed- test identifies the area in the middle of a distribution. The rejection region, where one would reject the null hypothesis, is in both tails. For a significance level of 0.05, a two-tailed test designates half of the alpha to testing the statistical significance in one direction and half in the other direction. When using a two-tailed test, the researcher is testing for the possibility of the relationship in both directions. (UCLA, 2017)

A p-value of 0.19706 is the probability of obtaining an effect at least as extreme as the one in the sample data, assuming the truth of the null hypothesis. A high p-value means that the data are likely with a true null hypothesis. In this case, even if the significance level was set to 0.10 instead of 0.05, the same conclusion would be reached; there is no significant difference in the pre- and post- proportions/fall rates.

Further testing for difference after stratifying for age < 54 y/o vs > 55 y/o and language: English vs Not English was performed. Neither of these stratifications showed any difference in fall rates pre- and post-implementation of the Patient Safety Agreement (PSA). Results of pre- and post-implementation testing on several variables (see Table 6) revealed a statistically significant difference in one measure, the patients with Morse Fall Scale Score > 55, at the $p < .05$ level.

Table 6: *Significance Testing Results*

		Pre-Implementation			Post Implementation					
Variable	Category	Days	Falls	Rate	Days	Falls	Rate	Z-score	p-value	Significant @ p < 0.05
Age	< 60 y/o	9607	14	0.0015	27658	51	0.0018	-0.7825	0.4354	No
	>= 60 y/o	10975	12	0.0011	28900	44	0.0015	-1.0219	0.30772	No
	< 55 y/o	5611	6	0.0011	16534	24	0.0015	-0.6726	0.50286	No
	>= 55 y/o	14972	20	0.0013	40024	71	0.0018	-1.1252	0.25488	No
Language	English	17934	23	0.0013	49579	87	0.0018	-1.3439	0.18024	No
	Not English	2648	3	0.0011	6980	8	0.0011	-0.0171	0.98404	No
Morse Fall Scale	<= 55	3699	17	0.0046	10355	77	0.0074	-1.8191	0.06876	No
	> 55	766	9	0.0117	10228	18	0.0018	5.3877	0	Yes
Admit Type	Medical	14759	20	0.0014	38212	70	0.0018	-1.1945	0.23404	No
	Surgical	5824	6	0.001	18347	25	0.0014	-0.6175	0.53526	No
Length of Stay	< 2.918	4040	7	0.0017	11154	14	0.0013	0.7	0.48392	No
	>= 2.918	16543	19	0.0011	45404	81	0.0018	-1.743	0.08186	No
	< 3.9	6306	9	0.0014	17147	27	0.0016	-0.2557	0.79486	No
	>= 3.9	14276	17	0.0012	39411	68	0.0017	-1.3765	0.16758	No
Fall Injury Rate	Injured	26	5	0.1923	95	31	0.3263	-1.3244	0.18684	No

CHAPTER FIVE

DISCUSSION

Discussion of Results

Multiple regression analysis was used to determine the relationship between using a Patient Safety Agreement program and falls in the hospital setting. Based on the statistical analysis performed, there was no statistically significant difference in patient falls while in the hospital during the pre- and post-evaluation period. There was no effect realized for patients with a Morse Fall Score (MFS) of 0 on admission. The PSA may have a protective effect, but there is not a statistically significant difference in effect until patient's have an admission Morse Fall Scale score > 55, at the $p < .05$ level. Additionally, there is an increase in falls in patients who have a MFS score between 5 and 45 on admission, with double the risk of falling for patients post PSA implementation. This may be related to the patients' keen desire to remain independent despite hospitalization, feeling as though the fall precautions and safety measures did not apply to them.

There are several confounding factors which may have impacted study results, several of which are listed as limitations. Education for frontline care providers and patients plays an important role in adoption of the PSA tool and overall application of the fall prevention initiative. A tool is only as effective as the foundation behind the evidence used to develop it and focused education as to the why it is important, its purpose, and the expected outcome.

Patients and family members responded positively to the PSA program, many stating the conversation heightened their awareness of fall risks within the hospital and the required signature reinforced partnership in safety and care. After signature, the PSA was to be kept at the bedside, visible to the patient and family members/significant others to remind the patient of safety measures in place, precautions and limitations on mobility, and to call for the nurse prior to getting out of bed. During random rounds, patients were able to speak to the PSA and fall prevention bundle elements in place, but there was no formal approach to routine audits across the units to ensure all patients were educated on the PSA program on admission and shift to shift.

Limitations

Limitations are factors and/or influencers that may have an impact on the interpretation of the findings, which the researcher cannot control. These factors or influencers can surface as a result of study design, data source and analysis, sample size, and /or bias (Chasan-Taber, 2014). Limitations for this study include the assumption that each patient received a Patient Safety Agreement on admission to the inpatient hospital setting. The PSA program was designed for all patients who were hospitalized, without consideration of admitting location, patient acuity, or fall risk score. This study assumes each patient received the same level of instruction and education by their primary care provider about the PSA program and fall prevention initiatives put in place to prevent falls during their stay. There was not an in-depth review of how bedside care providers engaged each patient in their care or assessed patient understanding of employed fall prevention initiatives. During this study, the signed PSA was not considered a formal part

of the patient's medical record, therefore a review of compliance with the initiative was difficult to assess.

Considerations for Future Research

The Joint Commission Center for Transforming Healthcare Project identified three key drivers of a successful in-hospital fall prevention program: the consistent use of a fall risk assessment tool; proactive toileting; and patient education (Joint Commission Center for Transforming Healthcare, 2017). Each of these three key areas lends themselves to future research as to most appropriate fall risk scale for hospital patients, approaches to toileting programs while maintaining independence and dignity, and adult learning principles in the setting of illness.

Future research can advance the field of fall prevention in hospitals by determining if an optimal fall prevention bundle exists or if a single prevention strategy, individualized for each patient provides the greater impact (Miake-Lye, Hempel, Ganz, & Shekelle, 2013). The unanswered question remains; does a single intervention have the power to positively impact fall rates, or is it the carefully designed implementation and deployment methodology which leads to successful deployment, engagement and adoption?

Conclusions/Implications

It is no secret that falls happen in hospitals across the nation on a daily basis. The purpose of this pre- and post-evaluation study was to assess the effectiveness of a Patient Safety Agreement program in preventing patient falls while in the hospital. We know patients fall in the hospital at an astonishing rate, causing injury, fear, increased length of stay, and higher costs. 30-35% of those who fall will sustain an injury at some level,

ranging from the simple skin tear to major fractures (Joint Commission Center for Transforming Healthcare, 2017).

Fall prevention bundles, designed as a select combination of initiatives layered on top of each other, have been in use for some time, but the question of which element/s impact fall rates remains a mystery. In order for hospitals to reduce patient falls and injuries, they must explore contributing factors and then design specific interventions (American Association of Critical Care Nurses, 2017). This study focused on one intervention, the Patient Safety Agreement, designed with the intent of engaging patients in safety measures deployed to keep them safe while hospitalized.

Falls are the most prevalent in-hospital adverse event, adding an additional 6.3 days to a patient's stay and up to $13,000 in extra costs (Tzeng & Yin, 2015). Patients are at a disadvantage when ill and in an unfamiliar environment. Reasons for in-hospital falls are many; environmental, physiological, accidental (Press Ganey Associates, Inc., 2016). Some falls can be predicted based on known contributing factors and a patient's fall risk score, yet others are unanticipated and without warning. Multifaceted interventions for fall prevention in hospitals may decrease falls, but evidence fails to identify key interventions with the most impact (Tzeng & Yin, 2015).

Recent literature suggests patient and family education can reduce falls during hospital stays. Patient education includes instruction and return demonstration of call light use, orientation to hospital room and care processes, determinants of fall risk assessment and bed alarms, and the purpose of hourly rounding (Tzeng & Yin, 2015). Knowledge supports transformation in care, translating evidence into practice and

engaging patients in their individualized plan of care and safety (Tetroe, Graham, & Scott, 2011).

A 2009 survey of patients 65 years and older suggests falls occur in the hospital due to: nurse availability or lack of, high bed height, narrow beds, clutter in the path to the restroom, and simply leaving printed educational materials in the room without any explanation (Tzeng & Yin, 2015). Comments from patients highlighted the need for frequent repetition of instructions to ensure understanding, application, and compliance with set guidelines (Tzeng & Yin, 2015). Repetition and reminders reinforce education and draw patients into partnerships with their health providers. It is widely accepted that patients who are informed and engaged as active partners in their care, with their physicians and care providers experience better health outcomes (Quevedo & Gold, 2010).

A review of the literature reveals various definitions of the term "patient engagement"; however, in its most basic form, patient engagement refers to patients and providers working together to improve health (HIMSS, 2015). The Agency for Healthcare Research and Quality (AHRQ), as quoted by Irizarry, Dabbs and Curran (2015), defined patient engagement as "the involvement in their own care by individuals (and others they designate to engage on their behalf), with the goal that they make competent, well-informed decisions about their health and healthcare and take action to support those decisions" (para.1).

Summary

Decreasing in-hospital falls and sustaining the impact of fall prevention programs remains a challenge at the bedside. Prevention of patient falls in the hospital setting has

gained a lot of interest over the last decade and is noted as the most frequent adverse events that are reported in hospitals (Hicks, 2015). Empowering patients to become active participants in fall prevention could be the answer, if knowledge is shared and knowledge transfer is successful across diverse populations. This approach pushes the bedside care provider to shift from being the director of care to being the enabler in hospital safety and fall prevention.

Instilling a culture of safety that recognizes the importance of individualization and promoting a holistic approach to patient care is a must for hospital administrators. Healthcare leaders should work to create an environment that heightens awareness of the benefits of patient-provider interactions and encourages patients to engage in their own care. Investment in education at the frontlines is essential to process improvement. Education enhances knowledge, promoting knowledge translation and implementation at the bedside. Knowledge translation is the act of turning new knowledge into readily available information, which strengthens health care delivery and outcomes (Tetroe, Graham, & Scott, 2011). Knowledge translation is "a dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically-sound application of knowledge to improve health (Sudsawad, 2016)".

The subject of fall prevention is expansive and when searched, produces a tremendous amount of information. There is an enormous body of research on fall prevention in the hospital setting, going back as far as 1947. The literature spans across decades and encompasses national and international studies. The current research and evidence-based interventions are useful, but further synthesis is needed to identify and fill knowledge gaps, understand which prevention strategies make the greatest impact: a

single intervention or prevention bundles, and find ways to implement those successful strategies across all heath care settings.

References

American Association of Critical Care Nurses. (2017, January). Take Action to Prevent Patient Falls. *Bold Voices*, p. 10. Retrieved from http://www.nxtbook.com/nxtbooks/aacn/boldvoices_201701/

Audulv, A. (2013). The over time development of chronic illness self-management patterns: a longitudinal qualitative study. *13*, 452. doi:doi:10.1186/1471-2458-13-452

Chasan-Taber, L. (2014, April 24). How to present limitations and alternatives. *Writing Dissertation and Grant Proposals*. Retrieved from http://people.umass.edu/lisact/textbook/Chapter13.pdf

Chun, J., & Chao Bafford, A. (2014, March). History and Background of Quality Measurement . *Clinicas in Colon and Rectal Surgery, 27*(1), 5-9. doi:10.1055/s-0034-1366912

Hayt, E. (1947, June 2154-9). Bed falls and pitfalls. *Hospitals, 54*(9). Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/20242595

Healey, F., & Haines, T. (2013, May 12). A pragmatic study of the predictive valaues of the Morse Fall score. *Age and Ageing*, 462-468. doi:10.1093/ageing/aft049

Healthcare Information and Management Systems Society (HIMSS). (2015). Retrieved from Patient Engaagement: what is patient engagement?: http://www.himss.org

Hefner, J. L., Scheck McAlearney, A., Mansfield, J., Knupp, A. M., & Moffatt-Bruce, S. D. (2015, November/December). A falls wheel in a large academic medical center: An innovation to reduce patient falls with harm. *Journal for Healthcare Quality, 37*(6), 374-380. Retrieved May 2016

Hicks , D. (2015, January-February). Can rounding reduce patient falls in acute care? An integrative literature review. *MedSurg Nursing, 24*, 51. Retrieved June 4, 2016, from http://go.galegroup.com.ezproxy-v.musc.edu/ps/retrieve.do?sort=RELEVANCE&docType=Report&tabID=T002&prodId=PPNU&searchId=R1&resultListType=RESULT_LIST&searchType=AdvancedSearchForm&contentSegment=&currentPosition=1&searchResultsType=SingleTab&inPS=true&use

Hill, A.-M., Steven, M. M., Nicholas, W., Etherton-Beer, C., Ingram, K., Flicker, L., . . . Haines, T. P. (2015, June 27). Fall rates in hospital rehabilitation units after individualized patient and staff education programmes: a pragmatic, stepped-

wedge, cluster-randomized controled trial. *The Lancet, 385*, 25922599. Retrieved from www.thelancet.com

Ihrie, B., & Spiro, A. (2015, February 18). Engaging Healh Care Consumers: The Lowe's Experience. *Health Affairs Blog*. Retrieved September 30, 2016, from http://healthaffairs.org/blog/2015/02/18/engaging-health-care-consumers-the-lowes-experience/

Irizarry, T., Dabbs, A., & Curran, C. (2015). Patient Portals and Patient Engagement: A State of the Science Review. *Journal of Medical Internet Research, 17*(6), 148. doi:doi:10.2196/jmir.4255

Joint Commission Center for Transforming Healthcare. (2017). *Targeted Solution Tools for Preventing Falls*. Retrieved from Joint Commission Center for Transforming Healthcare: http://www.centerfortransforminghealthcare.org/tst_pfi.aspx

Lins, S., Icks, A., & Meyer, G. (2011). Understanding, comprehensibility and acceptance of an evidence-based consumer information brochure on fall prevention in old age: a focus group study. *BMC Geriatrics, 11:26*. Retrieved June 4, 2016, from http://www.biomedcentral.com/1471-2318/11/26

Miake-Lye, I., Hempel, S., Ganz, D., & Shekelle, P. (2013, March 5). Inpatient fall prevention programs as a patient safety strategy. *Annals of Internal Medicine, 158*(5), 390-396. Retrieved from http://annals.org

Moe, K., Brockopp, D., McCowan, D., Merritt, S., & Hall, B. (2015, October). Major predictors of Inpatient falls. A multisite study. *The Journal of Nursing Administration, 45*(10), 498-502. doi:10.1097/NNA.0000000000000241

Montalvo, I. (2007, September). The National Database of Nursing Quality Indicators (NDNQI). *The Online Journal of Nursing Issues in Nursing, 12*(3). doi: 10.3912/OJIN.Vol12No03Man02

National Institutes of Health. (2016, March). *Nationl Institute of Arthritis and Musculoskeletal and Skin Diseases*. Retrieved from National Institute of Health: http://www.niams.nih.gov/Health_info/knee_problems/default.asp

Oliver, D., Hopper, A., & Seed, P. (2000, December). Do hospital fall prevention programs work? A systematic review. *Journal of American Geriactics Society, 48*(12), 1679-1689. doi:10.1111/j.1532-5415.2000.tb03883.x

Press Ganey Associates, Inc. (2016). *Nursing Quality (NDNQI)*. Retrieved from Press Ganey: http://www.pressganey.com/solutions/clinical-quality/nursing-quality

Quevedo, S., & Gold, A. (2010, October). *Transforming Patient Engagement:Health IT in the patient-centered medical home*. Retrieved from Center for Integrated Health Solutions: http://www.integration.samhsa.gov

Quigley, P., Neily, J., Watson, M., Wright, M., & Strobel, K. (2007). Measuring Fall PRgram Outcomes. *The Online Journal of Issues in Nursing, 12*(2). doi:10.3912/OJIN.Vol12No02PPT01

Rauch, K., Balascio, J., & Gilbert, P. (2009). Excellence in Action: Developing and implementing a fall prevention program. *Journal for Healthcare Quality, 31*(1), 36-42.

Seale, H., Chughtai, A., Kaur, R., Phillipson, L., Novytska, Y., & Travaglia, J. (2016, March). Empowering patients in teh hospital as a new approach to reducing the burden of health care associated infections: The attitudes of hospital health care workers. *American Journal of Infection Control, 1*(44), 263-8. doi:10.1016/j.ajic.2015.10.003

Stolzfus, J. (2011, October). Logistic regression: a brief primer. *Academic Emergency Medicine, 18*(10), 1099-104. doi:10.1111/j.1553-2712.2011.01185.x.

Sudsawad, P. (2016, October). *Knowledge Translation: Introduction to Models, Strategies, and Measures*. Retrieved from Center of Knowledge Translation: http://ktdrr.org/ktlibrary/articles_pubs/ktmodels/

Tetroe, J. M., Graham, I. D., & Scott, V. (2011). What does it mean to transform knowledge into action in falls prevention research? Perspectives from the Canadian Institutes of Health Research. *Journal of Safety Research*, 423-426. doi:http://dx.doi.org/10.1016/j.jsr.2011.08.005

Tzeng, H., & Yin, C. (2015, Nov-Dec). Patient engagement in hopsital fall prevention. *Nursing Economics*, 326-34.

Tzeng, H.-M., & Yin, C.-Y. (2014, May 13). i Engaging as an innovative approach to engage patients in their own fall prevention care. *Patient Preference and Adherence, 4:8*, 693-700. doi:10.2147/PPA.S62746

U.S. Department of Health & Human Services. (2013, May). *Preventing falls in hospitals*. Retrieved from Agency for Healthcare Research and Quality. Advancing Excellence in Healthcare: https://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/webinar/fallspxtoolkitwebinar

UCLA. (2016, October 28). *Stata data analysis examples. Logistic regression power analysis*. Retrieved from Institute for Digital Research and Education: http://www.ats.ucla.edu/stat/stata/dae/logit_power.htm

UCLA. (2017). *What are the differences between one-tailed and two-tailed tests?* Retrieved from UCLA Institute for Digital Research and Education: http://stats.idre.ucla.edu/

Wilson, E. (1998). Preventing Patient falls. *AACN Clinical Issues: Avanced Practice in Acute & Critical Care*, 100-108.

Zangari, M.-E., & Duffy, P. (1980, March). Contractig with Patients in Day-to-Day Practice. *The American Journal of Nursing*, *80*(3), 451-55. doi:10.2307/3469910

APPENDIX

Appendix A. Data Analysis: Regression using SAS

Patients with Morse Score of 0 on Admission 80
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Model Information

Data Set	C.SUDALLOWRISK
Response Variable	Fall
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	2681
Number of Observations Used	2681

Response Profile

Ordered Value	Fall	Total Frequency
1	1	15
2	0	2666

Probability modeled is fall=1.

Class Level Information

Class	Value	Design Variables
MED1SURG	1	1
	2	-1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	187.493	173.672
SC	193.387	203.142
-2 Log L	185.493	163.672

Patients with Morse Score of 0 on Admission 81
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	21.8209	4	0.0002
Score	22.4898	4	0.0002
Wald	21.2738	4	0.0003

The likelihood ratio chi-square of 21.8209 with p-value of 0.0002 tells us that the model as a whole fits significantly better than an empty model (i.e. a model with no predictors)

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
PtAgree	1	0.0266	0.8704
AGE	1	4.2642	0.0389
LogLOS	1	16.7220	<.0001
MED1SURG	1	0.0004	0.9843

Pt Agree and Med/Sug are not statistically significant. But Age and LOS are.

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-8.9209	1.3162	45.9414	<.0001
PtAgree	1	0.0905	0.5547	0.0266	0.8704
AGE	1	0.0317	0.0154	4.2642	0.0389
LogLOS	1	1.2469	0.3049	16.7220	<.0001
MED1SURG 1	1	0.00619	0.3151	0.0004	0.9843

Coefficients give the change in the log odds of the outcome for a one unit increase in the predictor value.

For every 1 unit change in Age, the log odds of fall (versus non-fall) increases 0.0317.

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
PtAgree	1.095	0.369	3.247
AGE	1.032	1.002	1.064
LogLOS	3.480	1.914	6.326
MED1SURG 1 vs 2	1.012	0.294	3.482

For a unit increase of in Age, the odds of fall (versus non-fall) increase by a factor of 1.032.

Association of Predicted Probabilities and Observed Responses

Percent Concordant	79.3	Somers' D	0.586
Percent Discordant	20.7	Gamma	0.586
Percent Tied	0.0	Tau-a	0.007
Pairs	39990	c	0.793

Patients with Morse Score Greater than 50 on Admission 82
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Model Information

Data Set	C.SUDAKHIGHRISK
Response Variable	Fall
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	3283
Number of Observations Used	3283

Response Profile

Ordered Value	Fall	Total Frequency
1	1	30
2	0	3253

Probability modeled is Fall=1.

Class Level Information

Class	Value	Design Variables
MED1SURG	1	1
	2	-1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	343.444	337.601
SC	349.540	374.180
-2 Log L	341.444	325.601

Patients with Morse Score Greater than 50 on Admission 83
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	15.8430	5	0.0073
Score	18.3905	5	0.0025
Wald	18.0772	5	0.0029

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
PtAgree	1	0.3163	0.5739
AGE	1	1.7192	0.1898
LogLOS	1	9.2019	0.0024
FALLRISK	1	0.3911	0.5317
MED1SURG	1	1.0852	0.2975

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-5.0649	1.3417	14.2515	0.0002
PtAgree	1	-0.2214	0.3936	0.3163	0.5739
AGE	1	-0.0135	0.0103	1.7192	0.1898
LogLOS	1	0.6573	0.2167	9.2019	0.0024
FALLRISK	1	0.00931	0.0149	0.3911	0.5317
MED1SURG 1	1	-0.2221	0.2132	1.0852	0.2975

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
PtAgree	0.801	0.371	1.733
AGE	0.987	0.967	1.007
LogLOS	1.930	1.262	2.951
FALLRISK	1.009	0.980	1.039
MED1SURG 1 vs 2	0.641	0.278	1.479

Patients with Morse Score Greater than 50 on Admission 84
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Association of Predicted Probabilities and Observed Responses

Percent Concordant	70.9	Somers' D	0.417
Percent Discordant	29.1	Gamma	0.417
Percent Tied	0.0	Tau-a	0.008
Pairs	97590	c	0.709

Patients with Morse Score between 5 and 50 on Admission 85
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Model Information

Data Set	C.SUDAKMODRISK
Response Variable	Fall
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	10419
Number of Observations Used	10373

Response Profile

Ordered Value	Fall	Total Frequency
1	1	76
2	0	10297

Probability modeled is Fall=1.

NOTE: 46 observations were deleted due to missing values for the response or explanatory variables.

Class Level Information

Class	Value	Design Variables
MED1SURG	1	1
	2	-1

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Patients with Morse Score between 5 and 50 on Admission 86
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Model Fit Statistics

	Intercept	Intercept and

Criterion	Only	Covariates
AIC	900.708	826.770
SC	907.955	870.252
-2 Log L	898.708	814.770

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	83.9382	5	<.0001
Score	93.5373	5	<.0001
Wald	93.1150	5	<.0001

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
PtAgree	1	5.0670	0.0244
AGE	1	1.8463	0.1742
LogLOS	1	75.8268	<.0001
FALLRISK	1	2.4898	0.1146
MED1SURG	1	1.0987	0.2945

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-7.1464	0.6157	134.7414	<.0001
PtAgree	1	0.7434	0.3303	5.0670	0.0244
AGE	1	-0.00837	0.00616	1.8463	0.1742
LogLOS	1	1.0342	0.1188	75.8268	<.0001
FALLRISK	1	0.0160	0.0101	2.4898	0.1146
MED1SURG 1	1	0.1499	0.1430	1.0987	0.2945

Patients with Morse Score between 5 and 50 on Admission 87
08:14 Thursday, March 2, 2017

The LOGISTIC Procedure

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
PtAgree	2.103	1.101	4.018
AGE	0.992	0.980	1.004
LogLOS	2.813	2.229	3.550
FALLRISK	1.016	0.996	1.036
MED1SURG 1 vs 2	1.350	0.770	2.365

For a unit increase of in PtAgree, the odds of fall (versus non-fall) increase by a factor of 2.103.

Association of Predicted Probabilities and Observed Responses

Percent Concordant	78.4	Somers' D	0.568
Percent Discordant	21.6	Gamma	0.568
Percent Tied	0.0	Tau-a	0.008
Pairs	782572	c	0.784

Appendix B: Fall Intervention Dissertation Project: Data Facts

		# of Admissions	# of Falls	Patient Days	Avg. LOS	Fall Rate	Fall Rate/1000 pt. days
A	All acute care hospital admissions from January 2015 – May 2016	23,911	156	102,923	4.30	0.0015157	1.516
B	Total #: All 7E admissions removed January 1, 2015- May 2016 due 7E Ortho unit pilot project from December 1, 2014 – May 2016 [a]	3,186					
C	Number removed for implementation and adaption period May 1, 2015 – July 31, 2015 by admit date [b]	3,733					
D=A-B-C	Total admission included in review	16,992	121	77,141	4.54	0.0015686	1.569
E	Acute Care hospital admissions pre implementation January 1, 2015 – April 30, 2015 (minus 7E #s)	4,476	26	20583	4.60	0.0012632	1.263
F	Acute Care hospital admissions post implementation August 1,2015- May 31, 2016 (minus 7E #s)	12,516	95	56558	4.52	0.0016797	1.680

NOTES:

a) 7E (based on the First Inpatient Unit) admissions were removed for the period of 1/1/2015-5/31/2016
b) Admissions for adaption period from 5/1/2015-7/31/2015 (based on Admit to Inpatient Unit Date/Time) were removed

Appendix C: Fall Intervention Dissertation Project: Data Elements

Last updated: 1/6/2017

Data file include all admissions for the period.

Date range: 1/1/2015 - 5/31/2016

* Data available only for the patients who had falls during the stay

Data Element	Source	Notes
Admit Date	Clarity EHR	Date that a patient was admitted to an inpatient unit
Discharge Date	Clarity EHR	Date that a patient was discharged from hospital
Fall Date	Midas	Event date that was documented in Midas. Manually add it to the report.
* Type of Fall	Midas	Manually add it to the report.
* Level of Injury	Midas	Manually add it to the report.
Mental Status on Admission	Clarity EHR	IView > Morse Fall Risk Scale > Mental Status Morse (one of the Fall Risk Score elements) First documented Mental Status during the stay
* Mental Status at Time of Fall	Clarity EHR	Based on the time of fall, it will have to be manually added to the report
* Patient ID	Auto-assigned	De-identified. Do not use MRN or FIN
Fall Risk Score on Admission	Clarity EHR	First documented fall risk score during the stay for all inpatients
* Fall Risk Score at Time of Fall - Breakdown by Element	Clarity EHR	The risk score is made up of several elements the RN documents to...pull each element and the score. Elements include: - Hx of Falls in Last 3 Months Morse - Secondary Diagnosis Morse - Ambulatory Aid Morse - IV Morse - Gait Transfer Morse - Mental Status Morse
Age	Clarity EHR	Age at the time of visit
Gender	Clarity EHR	
Language	Clarity EHR	
LOS	Clarity EHR	Length of stay from admit to discharge

Data Element	Source	Notes
Medical or Surgical Admit	Clarity EHR	Use Surgical MS-DRG codes from AHRQ to determine. 001;002;003;004;005;006;007;008;009;010;011;012;013;014;015;016;017;020;021;022;023;024;025;026;027;028;029;030;031;032;033;034;035;036;037;038;039;040;041;042;113;114;115;116;117;129;130;131;132;133;134;135;136;137;138;139;163;164;165;166;167;168;215;216;217;218;219;220;221;222;223;224;225;226;227;228;229;230;231;232;233;234;235;236;237;238;239;240;241;242;243;244;245;246;247;248;249;250;251;252;253;254;255;256;257;258;259;260;261;262;263;264;265;326;327;328;329;330;331;332;333;334;335;336;337;338;339;340;341;342;343;344;345;346;347;348;349;350;351;352;353;354;355;356;357;358;405;406;407;408;409;410;411;412;413;414;415;416;417;418;419;420;421;422;423;424;425;453;454;455;456;457;458;459;460;461;462;463;464;465;466;467;468;469;470;471;472;473;474;475;476;477;478;479;480;481;482;483;484;485;486;487;488;489;490;491;492;493;494;495;496;497;498;499;500;501;502;503;504;505;506;507;508;509;510;511;512;513;514;515;516;517;570;571;572;573;574;575;576;577;578;579;580;581;582;583;584;585;614;615;616;617;618;619;620;621;622;623;624;625;626;627;628;629;630;652;653;654;655;656;657;658;659;660;661;662;663;664;665;666;667;668;669;670;671;672;673;674;675;707;708;709;710;711;712;713;714;715;716;717;718;734;735;736;737;738;739;740;741;742;743;744;745;746;747;748;749;750;765;766;767;768;769;770;799;800;801;802;803;804;820;821;822;823;824;825;826;827;828;829;830;853;854;855;856;857;858;876;901;902;903;904;905;906;907;908;909;927;928;929;939;940;941;955;956;957;958;959;969;970;981;982;983;984;985;986;987;988;989
Payer	Clarity EHR	Primary insurance plan financial class
Fall /No Fall	Midas	Data comes from Midas. Manually add it to the report.
* Fall Bundle Documentation	Clarity EHR	IView > MS Safety/Nutrition/ADLs>Safety ADLs>Standard Safety Bundle includes: - Fall alarm - Yellow armband applied - Bed in low position - Upper/Half-length side-rails up - Wheels locked - Call device within reach - Corridor light initiated (pmc-w only) - Monitor/alarms verified - Non-slip footwear - Oriented to room - Fall LEAF Placed Exclude Sitter, wheelchair alarm

Data Element	Source	Notes
Admitted Inpatient Unit	Clarity EHR	
* Location of Fall Occurred	Midas	Data comes from Midas. Manually add it to the report.
With/Without Patient Safety Agreement		Implementation of Patient Safety Agreement started on 5/1/2015 (Date value of 5/1/2015=42125).
Primary Diagnosis	Clarity EHR	
DRG	Clarity EHR	
	Notes:	*Clarity: Sample site version Cerner used as the patient Electronic Medical Record (EHR)* *Midas: Sample site application for electronic incident reporting*

Appendix D

Fall Intervention Dissertation Project_ Total Eligible Admissions = 16,992

1. Age Group

Median Age = 66

	# of Patients	Percent
<20	263	1.55%
20-34	1403	8.26%
35-49	2056	12.10%
50-64	4311	25.37%
65-80	4873	28.68%
>80	4086	24.05%
Grand Total	**16992**	**100.00%**

2. Gender

	# of Patient	Percent
Female	8475	49.88%
Male	8515	50.11%
Male to Female	2	0.01%
Grand Total	**16992**	**100.00%**

3. Language

	# of Patients	Percent
English	**15002**	**88.29%**
Spanish	**1607**	**9.46%**
Other	**383**	**2.25%**
Grand Total	**16992**	**100.00%**

4. LOS (in days)

ALOS = 4.5398

	# of Patients	Percent
0-2	5384	31.69%
2-4	5827	34.29%
4-6	2569	15.12%
6-8	1220	7.18%
8-10	697	4.10%
>10	1295	7.62%
Grand Total	**16992**	**100.00%**

5. Morse Fall Risk Score (MFS)		
	# of Patients	**Percent**
0	2791	16.43%
10	166	0.98%
15	1462	8.60%
20	2054	12.09%
25	536	3.15%
30	458	2.70%
35	3261	19.19%
40	537	3.16%
45	1111	6.54%
50	1186	6.98%
55	492	2.90%
60	1080	6.36%
65	180	1.06%
70	504	2.97%
75	487	2.87%
80	142	0.84%
85	247	1.45%
90	26	0.15%
95	141	0.83%
100	57	0.34%
105	1	0.01%
110	25	0.15%
N/A	48	0.28%
Grand Total	**16992**	**100.00%**

6. % of Patients at Risk (Morse Fall Risk Score>55)		
	# of Patients	**Percent**
At Risk	2890	17.01%
Not At Risk	14054	82.71%
N/A	48	0.28%
Grand Total	**16992**	**100.00%**

7. Patient Safety Agreement		
	# of Patients	**Percent**
Yes	12516	73.66%
No	4476	26.34%
Grand Total	**16992**	**100.00%**

Falls by Gender		
	# of Patients	**Percent**
Fall	**121**	**0.71%**
Female	55	0.32%
Male	66	0.39%
No Fall	**16871**	**99.29%**
Female	8420	49.55%
Male	8449	49.72%
Male to Female	2	0.01%
Grand Total	**16992**	**100.00%**

Falls by Age Group		
	# of Patients	**Percent**
Fall	**121**	**0.71%**
20-34	6	0.04%
35-49	14	0.08%
50-64	45	0.26%
65-80	32	0.19%
>80	24	0.14%
No Fall	**16871**	**99.29%**
<20	263	1.55%
20-34	1397	8.22%
35-49	2042	12.02%
50-64	4266	25.11%
65-80	4841	28.49%
>80	4062	23.91%
Grand Total	**16992**	**100.00%**

Appendix E

Total eligible admissions from 1/1/2015 to 4/30/2015 (Pre)= 4,476

1. Age Group

Median Age = 66

Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
<20	61	1.36%
20-34	361	8.07%
35-49	565	12.62%
50-64	1097	24.51%
65-80	1187	26.52%
>80	1205	26.92%
Grand Total	**4476**	**100.00%**

2. Gender

Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
Female	2252	50.31%
Male	2223	49.66%
Male to Female	1	0.02%
Grand Total	**4476**	**100.00%**

3. Language

Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
English	**3964**	**88.56%**
Spanish	**407**	**9.09%**
Other	**105**	**2.35%**
Grand Total	**4476**	**100.00%**

4. LOS (in days)

ALOS = 4.5549

Pre (1/1/2015-4/30/2015)	1

Row Labels	# of Patients	Percent
0-2	1409	31.48%
2-4	1573	35.14%
4-6	677	15.13%
6-8	317	7.08%
8-10	157	3.51%
>10	343	7.66%
Grand Total	**4476**	**100.00%**

5. Morse Fall Risk Score (MFS)	
Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
0	924	20.64%
10	66	1.47%
15	411	9.18%
20	461	10.30%
25	196	4.38%
30	128	2.86%
35	649	14.50%
40	149	3.33%
45	286	6.39%
50	309	6.90%
55	120	2.68%
60	278	6.21%
65	48	1.07%
70	144	3.22%
75	121	2.70%
80	34	0.76%
85	69	1.54%
90	6	0.13%
95	42	0.94%
100	16	0.36%
110	8	0.18%
N/A	11	0.25%
Grand Total	**4476**	**100.00%**

6. % of Patients at Risk (Morse Fall Risk Score>55)	
Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
At Risk	766	17.11%
Not At Risk	3699	82.64%
N/A	11	0.25%
Grand Total	**4476**	**100.00%**

7. Patient Safety Agreement	
Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
No	4476	100.00%
Grand Total	**4476**	**100.00%**

Falls by Gender

Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
Fall	**26**	**0.58%**
Female	11	0.25%
Male	15	0.34%
No Fall	**4450**	**99.42%**
Female	2241	50.07%
Male	2208	49.33%
Male to Female	1	0.02%
Grand Total	**4476**	**100.00%**

Falls by Age Group

Pre (1/1/2015-4/30/2015)	1

	# of Patients	Percent
Fall	**26**	**0.58%**
35-49	4	0.09%
50-64	10	0.22%
65-80	7	0.16%
>80	5	0.11%
No Fall	**4450**	**99.42%**
<20	61	1.36%
20-34	361	8.07%
35-49	561	12.53%
50-64	1087	24.29%
65-80	1180	26.36%
>80	1200	26.81%
Grand Total	**4476**	**100.00%**

Appendix F

Total eligible admissions from 8/1/2015 to 5/31/2016 (Post)= 12,516

1. Age Group

Median Age = 66

Post (8/1/2015-5/31/2016)	1

	# of Patients	Percent
<20	202	1.61%
20-34	1042	8.33%
35-49	1491	11.91%
50-64	3214	25.68%
65-80	3686	29.45%
>80	2881	23.02%
Grand Total	**12516**	**100.00%**

2. Gender

Post (8/1/2015-5/31/2016)	1

	# of Patients	Percent
Female	6223	49.72%
Male	6292	50.27%
Male to Female	1	0.01%
Grand Total	**12516**	**100.00%**

3. Language

Post (8/1/2015-5/31/2016)	1

	# of Patients	Percent
English	**11038**	**88.19%**
Spanish	**1200**	**9.59%**
Other	**278**	**2.22%**
Grand Total	**12516**	**100.00%**

4. LOS (in days)

ALOS = 4.5793

Post (8/1/2015-5/31/2016)	1

Row Labels	# of Patients	Percent
0-2	3975	31.76%
2-4	4254	33.99%
4-6	1892	15.12%
6-8	903	7.21%
8-10	540	4.31%
>10	952	7.61%
Grand Total	**12516**	**100.00%**

5. Morse Fall Risk Score (MFS)

Post (8/1/2015-5/31/2016) 1

	# of Patients	Percent
0	1867	14.92%
10	100	0.80%
15	1051	8.40%
20	1593	12.73%
25	340	2.72%
30	330	2.64%
35	2612	20.87%
40	388	3.10%
45	825	6.59%
50	877	7.01%
55	372	2.97%
60	802	6.41%
65	132	1.05%
70	360	2.88%
75	366	2.92%
80	108	0.86%
85	178	1.42%
90	20	0.16%
95	99	0.79%
100	41	0.33%
105	1	0.01%
110	17	0.14%
N/A	37	0.30%
Grand Total	**12516**	**100.00%**

6. % of Patients at Risk (Morse Fall Risk Score>55)

Post (8/1/2015-5/31/2016) 1

	# of Patients	Percent
At Risk	2124	16.97%
Not At Risk	10355	82.73%
N/A	37	0.30%
Grand Total	**12516**	**100.00%**

7. Patient Safety Agreement

Post (8/1/2015-5/31/2016) 1

	# of Patients	Percent
Yes	12516	12516
Grand Total	**12516**	**12516**

Falls by Gender

Post (8/1/2015-5/31/2016)	1

	# of Patients	Percent
Fall	**95**	**0.76%**
Female	44	0.35%
Male	51	0.41%
No Fall	**12421**	**99.24%**
Female	6179	49.37%
Male	6241	49.86%
Male to Female	1	0.01%
Grand Total	**12516**	**100.00%**

Falls by Age Group

Post (8/1/2015-5/31/2016)	1

	# of Patients	Percent
Fall	**95**	**0.76%**
20-34	6	0.05%
35-49	10	0.08%
50-64	35	0.28%
65-80	25	0.20%
>80	19	0.15%
No Fall	**12421**	**99.24%**
<20	202	1.61%
20-34	1036	8.28%
35-49	1481	11.83%
50-64	3179	25.40%
65-80	3661	29.25%
>80	2862	22.87%
Grand Total	**12516**	**100.00%**