Implementation of a Fall Prevention Toolkit on a Medical Surgical Unit

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Abstract

Problem: In-hospital falls result in patient harm which includes minor injury, psychological distress and anxiety, and serious injuries like fractures, head trauma, and even death. The Joint Commission consistently ranks falls with serious injury as one of the top sentinel events. An acute care medical surgical unit in a community-based hospital experienced an increase in the number of falls with an overall fall rate higher than that of peer units.

Purpose: The purpose of this Quality Improvement (QI) project was to implement and evaluate the benefits of, and staff adherence to, the use of Fall TIPS (Tailoring Intervention for Patient Safety) toolkit to reduce falls on a medical surgical unit.

Methods: The Fall TIPS toolkit was designed to decrease the patient fall rate in hospitals and engage patients and their families in a 3-step fall prevention process including performing a fall risk assessment, creating a tailored fall prevention plan, and executing the plan regularly. Implementation of a Fall TIPS toolkit with auditing transpired weekly over 10 weeks on a medical surgical unit. Nurses' adherence to the Fall TIPS protocol was measured weekly during implementation.

Results: The results indicated that nurses' adherence to use of the Fall TIPS toolkit averaged 78%. The run chart analysis of nurses' adherence did not show any shifts or astronomical datapoints, and the number of runs was consistent with random variation. However, there was a 6-point upward trend in the data during weeks 2 to 7, indicating a special cause. Fall rates during the first two months of implementation were 3.39 and 2.41 per 1000 patient-days respectively, and dropped to zero during the third month.

Conclusion: Nurses' adherence to a Fall TIPS toolkit was demonstrated on a medical surgical unit, which likely resulted in a decreased patient fall rate during the final month of the project. Additional time will be needed to determine if the practice changes and outcomes are sustainable.

Introduction

Unfortunately, falling during hospitalization remains common. According to the Agency of Health Care Research (AHRQ, 2019) falls occurred at a rate of 3-5 per 1000 bed-days, and an estimated 700,000 to 1 million hospitalized patients fall annually in the United States. More than one-third of in-hospital falls result in patient harm which includes minor injury, psychological distress and anxiety, and serious injuries like fractures, head trauma, and even death (AHRQ, 2019). The Joint Commission's (2015) Sentinel Event database consistently ranks falls with serious injury in the top 10. The 2017 Maryland Hospital Patient Safety Program's Annual Report showed that falls (27%) were a top-five most adverse hospital event leading to death or serious disability (2017).

A medical surgical unit at a community-based hospital experienced an increased fall rate, higher than that of peer units. The unit staff were asked about their view of why patients fell in the unit. The staff responded that the patients' falls were due to communication problems of patients not calling for help when getting out of bed. The director of the unit also reported that there was inadequate and incomplete information at the bedside and variability among team members regarding the patients' fall risk status and the plan to prevent falls.

The Centers for Medicare and Medicaid Services (CMS; 2019) considers falls to be preventable. Therefore, they are no longer reimbursing costs associated with falls, deeming them to be events that should not occur during hospitalization. Fall TIPS is a tailored evidence-informed preventative bedside intervention tool to decrease falls in hospitalized patients (Dykes et al., 2019). The purpose of this QI project was to implement and evaluate the benefits of, and staff adherence to, Fall TIPS to reduce fall rates on a medical surgical unit.

Literature Review

The evidence review supported an implementation of Fall TIPS program focused on in-patient fall prevention, designed to implement patient safety, predominantly fall prevention. The literature review emphasized the following themes that supported the Fall TIPS protocol: (a) Fall TIPS lowered fall rates in hospitals; (b) patient, family, nursing, and leadership engagement was key to effectiveness of Fall TIPS; and (c) exposure to Fall TIPS positively influenced patient knowledge, skill, and confidence in managing their own health.

The need to implement patient safety and prevent falls is supported by various studies. A randomized controlled trial by Dykes et al. (2010) revealed that Fall TIPS by leveraging Health Information Technology significantly reduced falls by 25% in four acute care hospitals on more than 10,000 patients, and was particularly effective in patients aged sixty-five or older. Based on those results, Fall TIPS could prevent one fall per day, 7.5 falls every month, and 90 falls per year in the intervention units. Dykes et al. (2012) used data mining and modeling techniques to determine the factors related to falls on intervention units when Fall TIPS was in place. The results revealed that a fall prevention toolkit rationale was accurate to decrease falls, but strategies were required to improve patient and care team adherence to the fall prevention intervention suggested by Fall TIPS. Both studies found that the Fall TIPS intervention was associated with a significant reduction in the fall rate and injury rate (Dykes et al., 2017, 2020).

When patient engagement was added to the Fall TIPS protocol and tools were developed to encourage patient and family engagement, there was a decrease in fall and injury rates demonstrating an increase in effectiveness of Fall TIPS intervention as patient engagement increased (Dykes, et al., 2017, 2020). Both studies concluded that engaging hospital staff and clinical leadership was vital in transforming the evidence-based care into the clinical workflow. According to Duckworth et al. (2019), the three modalities of Fall

TIPS: Electronic Health Record (EHR) version, a laminated paper version, and the bedside display version suggest that each fall TIP modality is effective at engaging patients in the 3-step fall prevention process that includes:

1. Performing fall risk assessment.
2. Creating a tailored fall prevention plan.
3. Executing the tailored fall prevention plan regularly.

A mixed method study by Leung et al. (2017) found that fall risk and fall prevention icons for a beside toolkit facilitated patient, family and care team engagement to accurately assess fall risk and a tailored fall prevention plan, resulting in enhanced adherence to Fall TIPS and reduced falls. A multisite qualitative study conducted by Carter et al. (2020) supported that one of the barriers to Fall TIPS adoption was poor patient engagement routines among staff resulting in limited patients' active participation in fall prevention. Successful execution of Fall TIPS adoption required staff engagement of patients. Both studies revealed that patient engagement in the 3-step fall prevention process increased the effectiveness of Fall TIPS intervention and fall prevention (Carter et al., 2020; Duckworth et al., 2019).

Both studies by Dykes et al. (2017) and Fowler and Reising (2021) included pre- and post-survey results that showed that Fall TIPS adoption improved patients' knowledge of the falls risk factors and fall prevention plan. Improved patient knowledge resulted in a decrease in fall rates. A multisite study by Christiansen et al. (2020) showed patient activation, which refers to a patient's understanding, ability, and self-confidence in overseeing his or her own health, increased from pre-intervention to post-intervention at the three healthcare system sites with the access to Fall TIPS. However, it was vital that care team members engaged patients in their fall prevention plan to increase knowledge, confidence and skill.

Based on an evidence review, adoption of a Fall TIPS program on high fall-risk units lowered fall rates; improved patient, family, nursing and leadership engagement in the 3-step

fall prevention strategies; and influenced patients' confidence in managing their own health (see Appendix A).

Theoretical Framework

Kurt Lewin's Change theory was utilized to guide this quality improvement project. There were three main stages to Lewin's Change Theory: unfreezing, changing, and refreezing (Lewin, 1947). Unfreezing included creating a motivation to change the current practice and preparing for a change. According to Shirey (2013), a change agent is required. For instance, a nurse leader seeing a problem, and activating others to see the need for change. In the changing or moving stage, a comprehensive plan of action was created and staff were willing to try out the action plan. Refreezing entailed sustaining the change so that it became ingrained into the existing systems such as policies and practices.

The problem identified during the unfreezing stage was increased number of falls in the medical surgical unit. The change needed was to implement Fall TIPS—a fall prevention toolkit. The unfreezing stage consisted of identification of stakeholders who had a direct impact on the success of the project, engaging stakeholders in adopting the Fall TIPS toolkit (Falls TIPS Collaborative, n.d.), and sharing evidence-based findings on Fall TIPS with the stakeholders and QI team during the Fall Task Force meetings and huddles. Motivation was needed to change the current practice which lacked personalized fall risk assessment and a fall prevention plan. This was accomplished by engaging patients and their families in their personalized fall risk and fall prevention plans. The changing stage included the implementation of Fall TIPS. During this stage the stakeholders, champions and unit staff received education on implementation of Fall TIPS protocol. After training, the need for change was created and staff training on the Fall TIPS protocol was accomplished. The 3rd stage, refreezing, involved stabilization of the change when FALL TIPS became a standard

for the medical surgical population. The utilization of Lewin's Change Theory was vital to guiding the implementation of the QI project.

Methods

The purpose of this quality improvement project was to implement the Fall TIPS (Tailoring Interventions for Patient Safety) toolkit, developed by the Falls TIPS Collaborative at Brigham and Women's Hospital and Harvard Medical School (Falls TIPS Collaborative, n.d.). The project was carried out at a community-based hospital in a 32- bed acute care medical surgical unit with patients having orthopedic, neurological and oncology conditions. Inclusion criteria required that patients be hospitalized for at least one day and be alert and oriented. A 66-member care team was involved in this project. Included were day and night shift change champions (i.e., five Nurses, three Certified Nursing Assistants or CNA's, one Physical Therapist, one Occupational Therapist and two Housekeeping staff), 38-unit nurses and 16 CNA's.

The Fall TIPS readiness implementation checklist was used to guide hospital leadership and staff to prepare for the implementation (see Appendix B). The practice change was implemented by the nurses over 10 weeks following a 2-week period in which training was completed (see Appendix C). A completed description of implementation of the Fall TIPS process was shown in Table 1. A written commitment was obtained from change champions for adoption; and spread of the new innovation as shown in Appendix D. The lesson plan was executed for Fall TIPS education (see Appendix E). Pre-implementation training on the Fall TIPS protocol occurred for day and night shift in twelve separate formal presentations until the entire unit of 66 staff and stakeholders received education. Fall TIPS training included: a PowerPoint presentation, handouts, educational binders, performing an accurate Morse Fall Scale (MFS) assessment, the 3-step Fall prevention process, and one-to-

one case study review with role play of nurse-patient interaction. Nurses received the Fall Prevention Knowledge Test (FPKT) (see Appendix F) to evaluate perceived knowledge in fall prevention. The paired pretest and posttest FPKT were based on True and False response with the coding option of 1 for the right and 0 for the wrong answer. Permission to utilize the Fall TIPS toolkit was granted by the Fall TIPS study group as documented in Appendix G.

The practice change was initiated subsequent to 2-week training. Over the following 10 weeks, nurses utilized the laminated Fall TIPS poster (11x17 inches) to engage and educate eligible patients and their families in the three-step fall prevention process (see Appendix H). The poster was hung on the door across the patient's bed for visibility. Nurses updated the poster daily on the patient's current status and reviewed the information on the tool at least once per shift and as needed. The Fall TIPS Quality Audit Instruction was used to guide the audit process (see Appendix I). Data was collected through observation by change champions weekly using the Fall TIPS Quality Audit Tool, which measured the nurse's adherence to, and patients and families engagement in the fall risks and prevention plan (see Appendix J). The paper pencil tool extracted anonymous data. The first 3 questions require a yes/no response by the auditor. If there was a "no" response to any of the first 3 questions, then the auditor was asked if they had provided peer-to-peer feedback to the staff. The 3 questions included the Fall TIPS poster hanging on the door across from the patient's bed with a correct date, while patient and family were required to verbalize fall risk factors and the fall prevention plan. Peer-to-peer feedback was provided if any question was answered "No". The completed data was entered in the REDCap electronic data capture tools hosted at University of Maryland, Baltimore. The monthly fall rate per 1000 patient-days was tracked from Quality Services department.

The project leader retrieved the de-identified pretest and the posttest FPKT responses from REDCap; and ensured that responses were matched by using paired t-test. Nurse's

adherence to ensuring Fall TIPS toolkit was complete with correct date, risk factors and fall prevention plan and family engagement on knowledge of fall risk and prevention was calculated in percentages. A project summary was submitted to the University of Maryland Baltimore Human Research Protections Office (HRPO) for a Non-Human Subjects Research (NHSR) determination. The results of the Fall TIPS Quality Audit Tool was stored on an internal password protected computer.

Results

The pre-implementation education on Fall TIPS protocol occurred in 12 separate face-to-face formal sessions. A total of 43 nurses received education. Nurses received the FPKT to evaluate their perceived knowledge in fall prevention. A paired t-test was utilized to assess the nurses' perceived knowledge in fall prevention pre- and post-education. The results from the pre-test (M = 0.42, SD = 0.098) and post-test (M =0.42, SD =0.135) for the FPTK indicated that the training resulted in no significant improvement in the nurse's knowledge t=0.00 p = 1.00.

The nurse's adherence to fall TIPS on the 3 question yes/no response was analyzed on a weekly basis as shown in the run chart in Figure 1. Change champions performed a total of 259 Fall TIPS Quality Audits. The 194 observations recorded on the Fall TIPS audit were 100% complete. The overall nurse's adherence rate for the 10 weeks of implementation was 78%; the target goal was set at 100%. The preliminary adherence rate during the first three weeks of implementation was 56%, 61.5% and 73.9% respectively and progressively improved to 96% at the end of 10 weeks. Run chart analysis did not show any shifts or astronomical datapoints, and the number of runs was consistent with random variation. However, there was a 6-point upward trend in the data during weeks 2 to 7 demonstrating a non-random pattern due to a special cause (see Figure 1).

The monthly pre- and post-implementation of fall rate per 1000 patient-days data was tracked from the hospital Quality Services and analyzed in a run chart (Figure 2). Prior to implementation the fall rates for the months of July and August were 2.19 and 4.59 per 1000 patient-days respectively. Fall rates during implementation in the months of October and November were 3.39 and 2.41 per 1000 patient-days respectively. No falls occurred in the month of December. Run chart analysis did not show runs, shifts or trends. However, there was an astronomical point noted in the month of December when there were no falls.

Discussion

The aim of this project was to decrease falls by improving patient engagement in fall risks and fall prevention plan with communication across care team members. Although all the nurses were trained on the Fall TIPS protocol, their lack of improvement in scores on the post-test may have been due to nurses' fatigue. The project took place during the COVID-19 pandemic, and the medical surgical unit was experiencing increased patient acuity and census, high staff turnover, and shortage of staff, and constant change. Competing demands on nursing staff to complete annual competencies also created challenges and time constraints on the implementation. The barrier of lack of awareness and familiarity to the new protocol, despite being trained on Fall TIPS protocol, was addressed by the project leader and nurse champions providing "Just-in-time" training sessions to all staff, to remedy concerns and answer questions. This tactic was similar to one used by Dykes et al. (2017) who developed and implemented the Fall TIPS toolkit.

Strategies to overcome the low adherence rate to the protocol during the first three weeks of the project included, constant communication with the unit staff by spreading awareness, removing knowledge barriers by small group discussion and one-on-one education. Daily shift huddles, staff meetings, a fall prevention bulletin board, and study

references at both nurse's stations offered verbal and visual occasions for communication about falls. Engagement of leadership at the unit level improved awareness of the new evidence. These approaches were comparable to those used by Carter et al. (2020) who identified engagement of leadership commitment, staff and patients was key in transforming effective adoption of Fall TIPS. Involving unit change champions to provide peer-feedback, reeducation, and promoting consistent application and adoption of Fall TIPS improved awareness.

The results indicated that the strategies and tactics used had a positive impact on the nurses' adherence to the Falls TIPS toolkit. The nurses reached their highest adherence rate of 96% the first week of December. This may have been due to multiple reasons that included the unit director requiring nurses to complete the Fall TIPS poster at the bedside during the change of shift handoff. The Assistant Nurse Manager (ANM) and charge nurses also began performing random spot checks daily by observation during each shift, for completion of the Fall TIPS poster. The dramatic shift in the fall rate to no falls during the month of December was also likely related to this high adherence rate. Other reasons that may have contributed to these positive findings included the improvement of the fall communication among care teams, patients and families. Nurses were in agreement that the Fall TIPS was an effective prevention tool as it engaged patients and families in their prevention process. Patients increased their rate for calling for assistance for getting out of bed or with toileting, due to enhanced awareness of fall risks factors and the fall prevention plan. This result was comparable to the findings by Fowler and Reising (2021) who suggested that with the Fall TIPS adoption there was improved patients' knowledge of their fall risk factors and fall prevention strategies.

While there was a decline in the fall rate per 1000-patient days, from a high of 3.39 in October to zero in December, more time is needed to determine if this decline will continue

beyond implementation. It is probable that an increase in the nurses' adherence to the Fall TIPS protocol affected the unit fall rates. The results were comparable to the previous studies by Dykes et al. (2010) and Dykes et al. (2012), which demonstrated that the adoption of the Fall TIPS toolkit as associated with a decrease in fall rates. All fall risks patients were put on bed alarms as per hospital policy, which may have contributed to alarm fatigue and noise in the environment and possibly resulted in falls. This concern resulted in the decision by the project leader and stakeholders to not use bed alarms on every patient at risk for falls, which is consistent to the approach taken by Dykes et al., (2018) in their implementation of the toolkit. However, patients who were not reliable to call for help when required, were placed on a bed alarm.

The findings of this QI project are not generalizable to other settings and are limited to a single patient unit with medical surgical patients at the center. Due to the pandemic nurses expressed fatigue due to constant new changes, which may have limited their adherence to the fall prevention measures.

Conclusion

Overall, the Fall TIPS toolkit was beneficial and effective in enhancing the awareness of unit staff on the medical surgical unit and increasing nursing adherence to fall prevention measures. The Fall TIPS poster completion and engagement of patients and their families appeared to have an impact on reducing patient falls for the final month of the project. The project results also revealed increased engagement of patients and their families to identify fall risk factors and related prevention plan.

There is an increased prospect for sustainability of the project. The stakeholders have been involved from the start of the project and have shown great interest during the entire implementation process. There was significant leadership support and nurses taking the role of change champions by performing audits, providing peer-feedback, reeducating, and

promoting adoption and consistent application of Fall TIPS. The clinical nurse specialist continues to perform periodic spot checks 3-4 times per week on the unit for adherence to the Fall TIPS protocol. The unit secretaries are ensuring the availability of the Laminated Fall TIPS posters in English and Spanish and dry-eraser markers. While these enhanced engagements suggest a culture prepared to support a new evidence-based practice change, additional time will be needed to determine if the practice changes and outcomes are sustainable.

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Table 1

Description of Implementation Process of Fall TIPS toolkit

Motivating change	• Engaged stakeholders in adopting the laminated paper Fall TIPS poster as an evidence-based tool to decrease falls • Presentation of the evidence was performed in Fall Task Force meeting, leadership meeting and staff unit huddles • Quality Services involved for monthly fall rate information • Identified champions for day and night shift
Planning and set up	• Set up for adoption and spread was performed by targeting patient population in the medical surgical unit with high fall rate • Supported secured from unit level leadership which included unit director, ANM, and Charge Nurses • Fall TIPS readiness implementation checklist was used to guide the quality improvement project • Utilized native communication such as staff meetings and morning and evening huddles to spread the innovation
Education	• Unit staff received pre-implementation training on Fall TIPS protocol with Fall TIPS instruction sheet • Nurses completed the Fall pre and post paired FPKT • Nurses utilized the Laminated Fall TIPS poster to engage patients and their families in the three-step fall prevention process • Train-the-trainer sessions were utilized for new staff and staff identified as having poor completion rate for Fall TIPS • Fall TIPS information sheet was provided to patients
Establishing Care goals	• Change champions performed audits to measure adherence rate and patient compliance to Fall TIPS • Change champions provided prompt feedback to nurses as needed post audit • Change champions were taught to assist with training • Adherence to the Fall TIPS was performed by weekly spot checks in the unit to observe whether Fall TIPS is complete with correct date, risk factors and prevention plan
Continuous monitoring and feedback	• Continued the spread and utilization of Fall TIPS by engaging leadership, unit director, ANM charge nurses and clinical nurse specialist, • Biweekly report shared with unit staff, director and committee leaders on adherence to Fall TIPS protocol, patient/family engagement and fall rates • Staff meeting and huddle time was utilized to improve awareness and adherence rate

Figure 1

Medical Surgical RN Compliance to Fall TIPS Run Chart

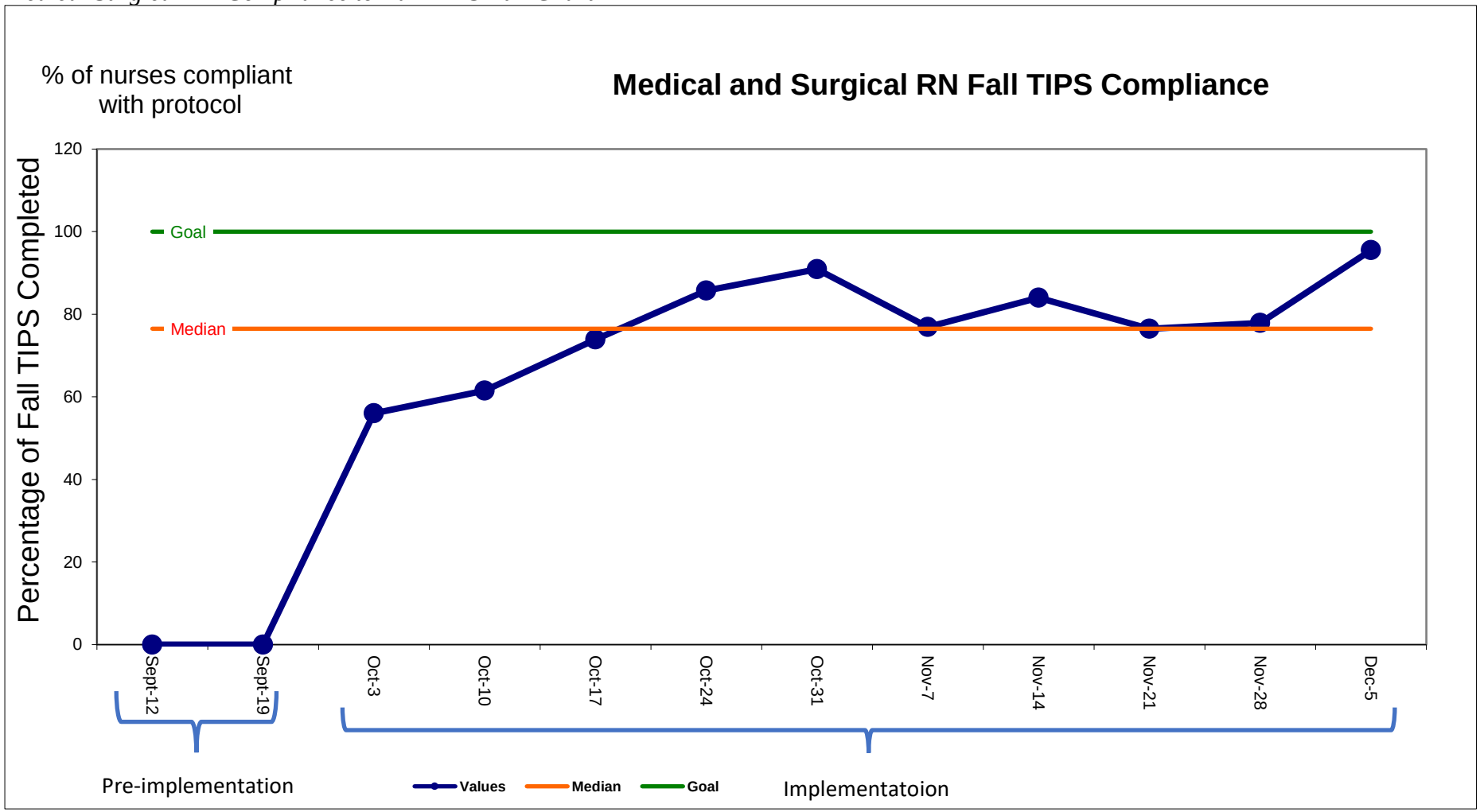
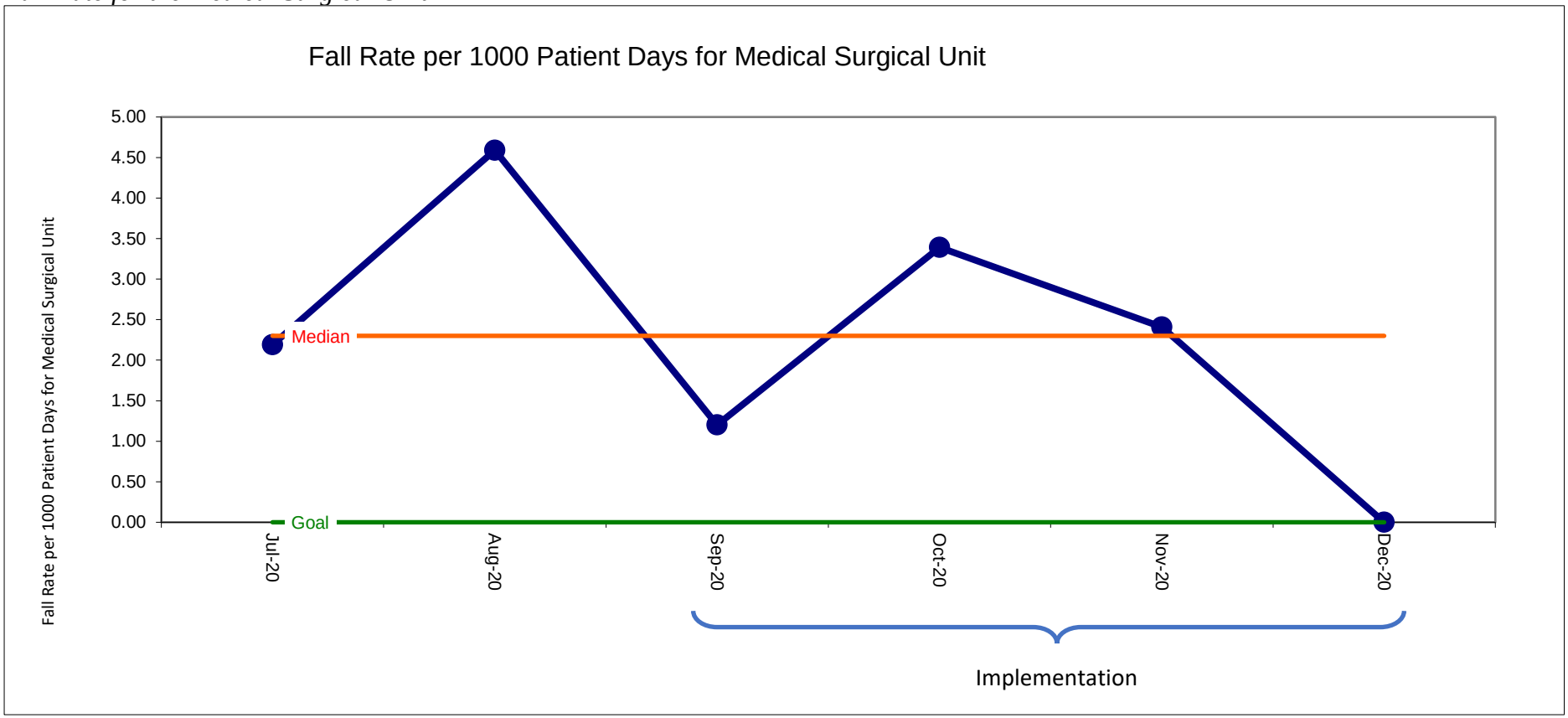


Figure 2

Fall Rate for the Medical Surgical Unit



Appendix A

Evidence Review Table that evaluates Fall TIPS and interventions among medical surgical patients

Carter E. J., Khasnabish, S., Adeleman, J. S., Bogaisky, M., Lindros, M. E., Alfieri, L., Scanlan, M., Hurley, A., Duckworth, M., Shelley, A., Cato, K., Shao P. Yu., Carroll, D., Jackson, E., Lipstiz, S., Bates, D. W., & Dykes, P. C. (2020). Adoption of a Patient-Tailored Fall Prevention Program in Academic Health Systems: A Qualitative Study of Barriers and Facilitators. OMB Geriatrics, 4(2), 1-15 http://www.lidsen.com/journals/geriatrics/geriatrics-04-02-119					Level VI
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"We aimed to identify dominant facilitators and barriers to Fall TIPS adoption"	A Multisite qualitative study design	**Sample Technique:** Convenient sampling **Eligible:** Staff N-71 Patients N=50 and Family members N=7 **Eligible participants:** Patients were considered eligible if they spoke English or had a family member who spoke English and who were alert and oriented. Eligible patients were chosen by healthcare team. They had to have no prior relationship with the study examiner. **Excluded:** none reported **Accepted:** A sum of 71 staff took part in 11 focus groups. There were 50 patients and 7 family members individually	**Intervention Protocol:** Patients' families were interviewed individually for 15-60 minutes. The focus groups that ranged from 3-10 participants interview extended 30-60 minutes **Intervention fidelity:** Staff focus and patients interview conducted in 2 phases Phase 1- principal barriers and facilitators for Fall TIPS identified Findings discussed with major stakeholders to examine for accuracy. Phase 2 – Continued till findings from phase 1 were validated or rejected. Two to three investigators performed the interviews and focus groups at each study.	**Dependent variable**: Fall TIPS adoption barriers and facilitators **Measures:** The dependent variables were measured after participants consented verbally, audio recordings of interviews were made. Their responses were transcribed verbatim by an automated transcription aid. For transcription validity, transcripts were scrutinized by both the study coordinator and investigator. Researcher's job included mutual identification of codes, application of codes and discussion of any discrepancies to reach an agreement.	**Statistical results:** Interviews were analyzed utilizing Conventional Content Analysis. Coding was executed within NVivo using consensus approach. **Facilitator's** identified to Fall TIPS adoption included 1) Staff understanding of the previous limitation of fall prevention programs and recognizing fall prevention as a priority 2) Patients and their families took part in the fall prevention 3) Fall TIPS was incorporated in staff existing workflow. **Barriers** to fall TIPS adoption program included 1) Poor engagement practices among staff resulted in limited

		interviewed during the study period. **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error. **Group Homogeneity:** The study participant group homogeneity was presented in table 2, for demographics.	Investigators attended continued accepted education workshop directed by two qualitative research experts. Patient confidentiality was maintained during individual interviews. Group exchange and dialogue was promoted in the staff focus groups.	For ensuring validity of the results, researchers peer debriefed biweekly to seek objectivity of findings, member checking, involved discussion of qualitative findings with patients and staff for accuracy.	patients' activation in fall prevention 2) Using the one size fits all viewpoint in fall prevention 3) Patient's willfulness of not following the fall plans.
Christiansen, T. L., Lipsitz, S., Scanlan, M., Yu, S. P., Lindros, M. E., Leung, W. Y., Adelman, J., Bates, D. W., & Dykes, P. C. (2020). Patient Activation Related to Fall Prevention: A Multisite Study. The Joint Commission Journal on Quality and Patient Safety, 46(3), 129–135. https://doi10.1016/j.jcjq.2019.11.010					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The primary aim of this study was to determine if exposure to the Fall TIPS program influences patient activation related to fall prevention"	Pre and post implementation design, a multi-site study	**Sample Technique:** Simple random sample technique **Eligible participants:** Adult patients, aged ≥ 18 years admitted to the study units for a minimum of 24 hours. Patients who were mentally and physically able to participate. Participants were alert and oriented, able to speak English, gave verbal consent to take the survey, and voluntarily participated. **Excluded:** were 7 patients who did not respond to the survey	**Intervention Protocol:** Patient activation was graded by surveying a random sample of adult patients before and after employment of Fall TIPS at three health care system. **Intervention Fidelity:** Researchers used the short form Patient Activation Measure (PAM– 13) adapted for fall prevention. The 13-item survey assessed a patient knowledge, skill, and self-reliance in managing his or her fall prevention.	**Dependent Variable(s)**: Patient activation refers to a patient's knowledge, skills and confidence in managing his or her own health. **Measurement tool (reliability), time, procedure:** Patient's activation was measured by the The PAM is a 13-item (short form) assessed patient activation in four different levels. Level 1 is the lowest level of activation and level 4 is the highest Patients with a score of 1 are considered	**Statistical Procedures(s):** A reliability analysis using Cronbach' alpha was used for reliability analysis and showed that scale is reliable (α = 0.870 pre; α 0.870 post) The robust ordinal t-test revealed an increase in PAM scores between groups overall, with the preintervention mean scores at 63.82 (SD ± 17.35) The post intervention means scores at 80.88 (SD ± 17.48), $p < 0.0001$

		(response rate of 98.0%). **Exclusion criteria:** Patients, who were not mentally and physically able to participate, who were below 18 years of age and discharged before 24 hours after admission. **Accepted:** 343 patients across three sites n=158 preintervention; n=185 postintervention. **Intervention:** 343 patients were randomly assigned. **Power Analysis:** No reported power analysis, increasing the risk of a Type II error. **Group Homogeneity:** The pre and post intervention group homogeneity is presented in Table 1 & 2 which represents descriptive statistics of patients' baseline characteristics.		overwhelmed and disengaged, in managing their health. The short form is both valid and reliable instrument. The PAM 13 uses a 4-point Likert scale (1= strongly disagree and 4 = strongly agree).	**Results:** Patient's activation increased from pre to postintervention at all sites Brigham and Women's Hospital (BWH), $p < 0.0001$; Montefiore Medical Center (MMC), $p < 0.0001$ and New York-Presbyterians (NYP), $p = 0.0373$
Duckworth, M., Adelman, J., Belategui, K., Feliciano, Z., Jackson, E., Khasnabish, S., Lehman, I.-F. S., Lindros, M. E., Mortimer, H., Ryan, K., Scanlan, M., Berger Spivack, L., Yu, S. P., Bates, D. W., & Dykes, P. C. (2019). Assessing the Effectiveness of Engaging Patients and Their Families in the Three-Step Fall Prevention Process Across Modalities of an Evidence-Based Fall Prevention Toolkit: An Implementation Science Study. Journal of Medical Internet Research, 21(1), e10008. https://doi.org/10.2196/10008					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results

"The purpose of this study is to assess the effectiveness for engaging patients and family in the 3-step fall prevention process (as defined by patient/family knowledge of their personalized fall risk factors and prevention plan) of each of the Fall TIPS modalities"	Single Qualitative Descriptive Study	**Sample Techniques:** Random sample of Audits conducted by Champions across all data collection sites 6 Neurology units 7 medical or medical-surgical units **Eligible Participants:** N=1209 **Accepted:** 1209 audits on patient engagement 1401 audits for the presence of the Fall TIPS poster at the bedside. **Inclusion Criteria:** Patients must be aged ≥ 18 years, alert and oriented or have a family member present and being involved in the care, English or Spanish speaking; and Length of Stay (LOS) in hospital > 24 hours. **Excluded criteria:** Patients who were < 18 years and not alert and oriented and did not have a family at the bedside were excluded from the study. **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error.	**Intervention Protocol:** Engagement of patient in the 3-step fall prevention process across the 3 Fall TIPS modalities, patients were questioned about their knowledge of their fall prevention plan. **Intervention Fidelity:** Each site incorporated the Fall TIPS prevention process into practice, built the clinical decision support by Fall TIPS into the electronic health record (EHR) Nurses completed the fall TIPS risk assessment and tailored plan and recorded in her at each site of data collection. The 3 modalities utilized to present and communicate the patient's falls risk factors and fall prevention plan included 1. The laminated Fall TIPS poster 2. Electronic Fall TIPS poster 3. Paperless patient safety bedside display	**Dependent variable:** Patients and family's knowledge about their personal fall risks factors and their fall prevention plan around the 3 Fall TIPS modalities. Protocol adherence measured as the display of fall prevention plan at bedside **Measurement tool (reliability), time, procedure:** Random audits performed to check the effectiveness of engaging patients in the 3-step fall prevention across the 3 modalities by asking does patient/family know their fall prevention plan? Radom audits were performed to measure protocol adherence by checking if Fall TIPS at the bedside Nurse champion selected patients for audits. Unannounced audit was performed weekly. Display of the personalized fall prevention plan at the patient's bedside was	**Results:** Each Fall TIPS modalities was efficiently to assist patient engagement in the 3-step fall prevention method rate (> 80%) of adherence for both measures. i.e., of patient engagement and of adhering to protocol of Fall TIPS. Recommendations are that all 3 modalities can be incorporated in the clinical workflow.

		Group Homogeneity: The sample population consisted of a diverse group of patients. At Brigham's and Women's Hospital (BWH), Montefiore Medical (MMC) 37.78% comprised of Hispanics. Average age groups of patients at the 3 study hospitals (namely, BWH, MMC, and New York Presbyterian Hospital) were 60.5, 60.1 and 63.3 years, respectively.		an indication of adherence to the Fall TIPS protocol	
Dykes, P. C., Burns, Z., Adelman, J., Benneyan, J., Bogaisky, M., Carter, E., Ergai, A., Lindros, M. E., Lipsitz, S. R., Scanlan, M., Shaykevich, S., & Bates, D. W. (2020). Evaluation of a Patient-Centered Fall-Prevention Tool Kit to Reduce Falls and Injuries: A Nonrandomized Controlled Trial. JAMA Network Open, 3(11), 1-10. https://doi.org/10.1001/jamanetworkopen.2020.25889					*Level III*
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The goal of the trial was to assess whether a fall-prevention tool kit that engages patients and families in the fall-prevention process throughout hospitalization is associated with reduced falls and injurious falls".	A Nonrandomized Controlled Trial with pre- and post-intervention study	**Sampling Technique** Convenient sample design at 14 medical units including 3 academic medical centers. **Eligible Participants:** N=37231 **Eligible criteria**: All adult inpatients who were hospitalized were involved in the study. **Excluded**: None **Sample size**: N-37,231 pre-intervention 17948 and post intervention 19283	**Intervention** Participants were continuously engaged by nurses in the 3-step fall prevention process. **Intervention Fidelity** A laminated Fall TIPS poster displayed at the bedside Nurses completed poster with dry eraser markers with patient /families at admission and during every. The research team assigned start dates to each unit with the Fall	**Dependent variables:** The two main outcomes included overall rate of patient falls per 1,000 s and overall rate of falls with injury per 1,000 days. **Measurement tool (reliability) time, procedure:** Nurse champions completed competencies training and monitored fidelity Unit nurse champions measured compliance to the Fall TIPS	A Poisson regression tool used to establish association between intervention and the rate of patient falls and falls with injury per 1,000 days. In addition, in secondary analysis adjusted Poisson regression model was used to assess changes before and after intervention included, fall rates with interaction involving age groups and period,

		Group Homogeneity Demographic characteristic of patient's was presented in Table **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error.	TIPS modality along with the constraints, based on the 3 modalities. Nurses identified the patients Fall risk by using the MFS and linking the risk factors with the suitable fall prevention plan. In the EHR-toolkit the clinical decision support spontaneously printed appropriate preventive interventions. Automatic displayed screen saver at bedside, were effective in testing patient engagement in the 3-step fall prevention protocol A 21-week pre-intervention period followed by 21-week post intervention period.	protocol including patient engagement and auditing 3 question 1) Is the Fall TIPS poster complete and has the correct information, 2) Can patient/family verbalize fall risk factors and 3) does the patient/Family verbalize the fall prevention plan. Nurses completed 5 random audits per month with the Fall TIPS Audit tool.	and interaction between site and period. An alpha level was set at p<005. There was an overall 15% adjusted decrease in falls post implementation of Fall prevention toolkit compared with implementation (2.92 vs 2.49 falls per 1000 patient-days [(95% Cl, 2.06-3.00 fall per 1000 patient-days)]. An adjusted 34% decreased injury rate (0.73 vs 0.48 injurious falls per 1000 patient-days [95% Cl. 0.34 - 0.70 injurious falls per 1000 patient-days]; adjusted rate ratio 0.66; 95% Cl. 0.53-0.88; p=. 003). **Conclusion:** Implementation of Fall prevention Tool kit was related with a significant decrease in falls and related injury.
Citation: Dykes PC, Carroll DL, Hurley A, Lipsitz S, Benoit A, Chang F, … Middleton. (2010). Fall prevention in acute care hospitals: a randomized trial. *JAMA: Journal of the American Medical Association*, *304*(17), 1912–1918. https://doi.org/10.1001/jama.2010.1567					Level II
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"To investigate whether a fall	Cluster randomized trial design	**Sampling Techniques:** Convenient sampling	**Control Protocol**:	**Dependent variable:**	**Statistical results:**

prevention tool kit (FPTK) using health information technology (HIT) decreases patient falls in hospitals".		from Medical units with fall rates higher than the mean for the institution the year before the study were matched to units with similar fall rates and patient-days. **Eligible:** N=10264 patients **Eligibility Criteria:** Units that matched and were not involved specifically in other fall prevention improvement projects were deemed eligible. **Excluded:** 8 units did not meet eligibility criteria. **Accepted:** 10264 patients in the medical units with high fall rates. Randomization located patients in the in each of the control or the intervention group. **Control:** 5160 patients in 4 units that received standard care **Intervention:** 5160 patients in 4 units that received the intervention **Power analysis:** 10264 patients expected to meet 80% power (with α =.05) with fixed effects size. Power	Control units received routine care associated with fall prevention which included: Completed MFS using paper or electronic forms Placing high risk fall sign above patients' bed with MFS scores > 45 Education of patients/family on falls with a booklet or handout Documenting plan on electronic or paper **Intervention Protocol:** Included interventions: Completed MFS utilizing Fall Prevention Toolkit (FPTK) Personalized bedside posters were printed spontaneously and placed above patients' beds Educated patient/family with tailored handout Followed tailored plan generated spontaneously generated by FPTK from MFS assessment **Treatment Fidelity:** The research team developed software for the FPTK.	Falls per 1,000 patient-days Falls with injury per 1,000 patient-days in the targeted units Patient falls specified as an unplanned descent to the floor throughout the hospitalization **Measurement tool (reliability). Time, procedure:** The dependable variable measured by: reporting patients falls and falls with injury recorded in an event report system in the units by nurse taking care of the patient. Incidents were validated by hospital quality personnel and unit managers. Valid Fall Risk Assessment Scale (MFA) identified patient on high fall risks. Adherence to the Fall prevention protocol was measured by random review of MFS completion in control groups and use of FPTK components including MFS completion in the intervention groups.	To examine the difference in falls throughout intervention and control group the priori Poisson regression model utilized that contained a fixed effect and intervention effects for hospital. Patient characteristic was calculated utilizing proportions, means with standard deviation and median with interquartile ranges. Covariate balance was checked utilizing the stratified Wilcoxon test for continuous confounders and fixed-effects multinomial logistic regression for categorical confounders A priori Poisson regression model with fixed effect and intervention effect for hospitals was utilized to examine the difference in falls throughout intervention and control groups. The stratified Wilcoxon test was used to check the covariate balance. Factors tested were continuous confounders and fixed-effects

		analysis met to reduce risk for type II error. **Group Homogeneity:** The Participants characteristic of the control and interventional groups is based on descriptive statistics summarized in table 2.	The FPTK (Fall Prevention Toolkit) incorporated the current workflow patterns and communication in the Health Information Technology (HIT) operations. According to the Morse Fall Scale (MFS) risk assessment completed by the nurse, the FPTK software generated personalized fall prevention interventions per the patient's specific fall risk. The FPKT generated bed posters include, short text with associated icons, care plan, education handouts, and all patient specific notifications to patients to stakeholders. The FPTK included a compliance dashboard to assist monitoring.		multinomial logistic regression for categorical confounders. There were lesser patients with falls in the intervention units (n=67; range across units 10-28) compared with the control units (n= 87; range across units, 15-33). A significantly lower adjusted rate was found in the intervention units fall rate of 3.15 [95% confidence interval (Cl), 2.54 -3.90] per 1,000 patient-days). By comparison the control units' results were 4.18 [95% Cl, 3.45-5.06] per 1,000 patient-days, with rate variance of 1.03 (95% Cl, 0.57-2.01) per 1000 patient-days (p=.04). Patients aged 65 years or older derived the most benefit from the FPTK Adjusted rate difference, 2.08 [95% Cl, 0.61-3.56] per 1,000 patient-days p=.003). No significant effect was noted in the injury rates. In the 8 study units, including control and

					intervention, there were two 862 patient-days periods. Results showed that the FPTK can prevent 1 fall per 862 patient-days. Hence, the FPTK could possibly prevent approximately 90 falls every year in intervention units. equating to 7.5 falls every month and 1 fall every 4 days.
Dykes, P. C, I-Ching, E. H., Soukup, J. R., Chang, F., & Lipsitz, S. (2012). A case control study to improve accuracy of an electronic fall prevention toolkit. AMIA ... Annual Symposium Proceedings. AMIA Symposium, 2012, 170–179. https://www-ncbi-nlm-nih-gov.proxy-hs.researchport.umd.edu/pmc/articles/PMC3540550/					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The purpose of this case control study was to use data mining and modeling techniques to identify the factors associated with falls in hospitalized patients when the toolkit was in place. Our ultimate aim was to apply our findings to improve the toolkit logic and to generate practice recommendations"	A Case Control Study	**Sampling Technique** Cases included patients with a fall on intervention units at 4 partners HealthCare acute care hospitals. Controls randomly selected from intervention units without a fall **Eligible Participants** **Cases:** Inpatients that fell on the intervention unit in an acute care hospital where the Fall TIPS toolkit (FTTK) was in place for a 6-month period. Cases	**Intervention** Faller were matched with similar controls in regards to gender, age, first MFS, length of stay till the fall Reviewed patients' medical records and incident report of falls when FTTK in place Checked for problems with the FTTK software to be corrected Checked for the intervention plan suggested by FTTK was correct and was followed as by	**Dependent variables:** Factors associated with falls such as out of bed with assist, 1 and 2-person assist, Chair/Bed alarm, reorientation/frequent checks, bed close to the nursing station. **Measurement tool (reliability). Time, procedure:** **A nurse investigator** extracted clinical data for each case and controls from the FTTK database comprising demographics, and Morse Fall Scale (MFS)	Descriptive statistics by employing two-by-two tables were produced to explain demographic data of cases and controls including percentages in each case/control group. Conditional logistic regression was used to assess differences in patients' characteristic for cases and control. A priori variable measured for multivariate conditional logistic regression model comprised the following significant

		involved if they had 3 or more matches **Controls:** Randomly selected from patients admitted to the intervention units in the same 6 months and did not have a fall. Controls were paired for gender, age (within 5 years), first Morse Fall Scale (MFS) total score and length of stay in the unit (within 24 hours) up to the time of fall. **Excluded:** 1 patient was excluded due to incomplete data**.** **Sample size**: N-192 88 patients age 64 and younger 104 patients age 65 and older **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error. **Group Homogeneity:** Cases and controls with p value on table 4 for demographics and clinical characteristic	clinicians as recommended by FTTK Document prior fall, out of bed with assist, cane, bed/chair alarm, 1-person assist, 2-person assist, frequent checks/orientation, and bed close to nursing station.	total scores, nurse's interventions (proposed by the FTTK of patient's risk report and nurse's knowledge about the patient). The nurse investigator also collected the fall incident data from incident reporting system, comprising unit length of stay at the time of fall. **A second investigator** confirmed extraction for a random selection of 10% of cases and controls with agreement > 90%.	intervention variables ($p<0.05$). All P values were two tailed and a statistically significant p value was <0.05. **Falls:** total falls 67 in the intervention unit. Of remaining cases: 48 had 3 or more matches for gender, age (within 5 years), first Morse Fall Scale (MFS) total score and length for a total sample size of 192. Three research questions answered, The univariate conditional logistic regression analysis was completed to answer all 3 questions. **Question One** Why did some patients on the experimental units fall with access to the FTTK? The univariate conditional logistic regression analysis showed there was a significant association for the subsequent 7 interventions: document prior fall out of bed with assist ($p=.000$)

					bed/chair alarm (p=.003) 1-person assist (p=.040) 2-person assist (p=.006) frequent checks/reorientation (p=.025) bed close to nursing station (p=.042) frequent checks/Reorientation (p=.025) The 7 variables were entered into a conditional logistic equation and the findings recommended cases (fallers) were 5.7 times more likely than matched controls (non-fallers) among patients requiring assistance getting out of bed. **Question 2** What factors are linked with falls associated with younger patients? The univariate conditional logistic regression analysis showed significant association for the following 5 interventions, out of bed with assist (p=.010) bed/chair alarm (p=.003)

					1-person assist (p=.034) frequent checks/reorientation (p=.023) bed close to nursing station (p=.012) Nevertheless, after entering these variables into the conditional logistic regression model and adjusting for insurance and total MFS before the fall, none remained significant. **Question 3** What factors are associated with falls in older patients? The univariate conditional logistic regression analysis showed significant association for the following 3 interventions: ambulatory aid: cane (p=.047) out of bed (p=.004) two-person assist (p=.005) Findings suggest cases were significantly less likely than matched controls to be patients who prior to fall did not use a cane as an ambulatory aid.

					Fallers were also 10.1 times more liable than matched controls before the fall known to need assistance getting out of bed before the fall, and 14.26 times more liable than non-fallers before the fall to need 2 people for assistance when walking or getting out of bed. Results of evaluation suggested that the FTTK rational is accurate but strategies are needed to enhance adherence with the fall prevention intervention proposals generated by the electronic toolkit.
Dykes, P. C., Duckworth, M., Cunningham, S., Dubois, S., Driscoll, M., Feliciano, Z., Ferrazzi, M., Fevrin F.E., Lyons. S., Lindros M. E., Monahan A., Paley M.M., Jean-Pierre S., Scanlan, M. (2017). Pilot testing Fall TIPS (Tailoring Interventions for Patient Safety): a Patient-Centered Fall prevention Toolkit. The Joint Commission Journal on Quality and Patient Safety, 43(8), 403–413. https://doi.org/10.1016/j.jcjq.2017.05.002					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
Pilot testing the Fall TIPS (Tailoring Intervention for Patient Safety) on high-risk units at BWH and at MMC was to establish efficacy and a foundation for adoption and spread.	Pilot Study	**Sampling Technique:** Convenient sampling at two large medical centers **Eligible Participants:** At Brigham and women's Hospital (BWH) 31 patients answered the pre-survey 33 the post survey	**Intervention Protocol:** Conceptual model used was The Institute of Healthcare Improvement's (IHI) Framework for Spread (FFS). The four phases of FFS include: **Communication:** The expert team presented evidence on	**Dependent variable:** Fall rate and Fall with injury rates **Adherence to Protocol, Fall Rates/Injury Rates** Compliance to fall TIPS protocol was monitored via weekly spot checks on each unit	**Patient surveys** At BWH; Boston Changing levels of progress - from baseline to post Fall TIPS with scores - were shown by results of the Mann Whitney U test; as well as capability of patients in recognizing their fall risk (pre mean 3.7;

		At Montefiore Medical Center (MMC) 32 answered the pre survey 30 patients answered the post survey **Group Homogeneity:** The majority at BWH were patients in the pre and post survey were female (60%), age 55 years, or older (53%) and Caucasian (66%). The majority of patients in MMC were females (68%) age 55 years and older (53%) black or African American (53%) and Hispanic/Latino (32%) **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error.	Fall TIPS to leadership and quality and nursing grand rounds to gain support and communicate value of the Fall TIPS. **Planning and set up** Targeting relevant population: patients on units with fall rates above the mean and above the benchmark for the institution. **Spread within the target population** Secured support of unit level clinical leadership, unit-based practice council, and staff members Unit champions and stakeholders identified and given education and training for associated practice change. Training sessions were for all staff. **Continued monitoring and feedback** Implementing auditing to evaluate and provide feedback on practice adherence and patient outcomes	Falls TIPS was complete with patient name, proper date, risk factor and prevention plan. Patient fall and fall related injury rates was obtained through hospital quality department and monthly report was provided to clinical champions. **Patient Surveys** Baseline data collected regarding what patients knew about their personal risk of falling and their fall prevention plan. Survey employed the five-point Likert response format on the following: 1. Do I recognize my fall risks? 2. Am I aware of my fall prevention plan? Patient survey results for pre- and post-implementation of Fall TIPS were compared	post-mean 4.5, p=0.031), and conception knowledge of fall prevention (pre mean 3.7: post 4.4, p=0.264). **At MMC (**Bronx, New York) The Mann Whitney U test results showed progress from baseline to post Fall TIPS with scores; for patients' perceived ability to recognize fall risk (pre-mean 4.0; post 4.6., p=0.023) and knowledge of how to prevent a fall (pre-mean 3.6; post 4,7. p=0.001). **Protocol Adherence/Fall rates/Injury rates** **At BWH,** mean adherence was 82% to fall TIPS protocol. The mean fall rate was reduced from 3.28 per 1000 patient-days to 2.80 per 1,000 patient-days The mean fall-associated injury rate dropped from 1.00 per 1000 patient-days to 0.54 per 1,000 patient-days **At MMC**, according to the audit the mean

					adherence rate to fall TIPS protocol was 91%. The mean fall rate saw a slight increase from 3.04 to 3.10 per 1,000 patient -days The mean falls-associated injury rate dropped from 0.47 per 1,000 patient-days to 0.31 per 1,000 patient-days
Fowler, S. B., Reising, S. E. (2021). A Replication Study of Fall TIPS (Tailoring Interventions for Patient Safety): A Patient-Centered Fall Prevention Toolkit. MEDSURG Nursing, 30(1), 28–34. http://eds.a.ebscohost.com.proxy-hs.researchport.umd.edu/eds/pdfviewer/pdfviewer?vid=3&sid=5c483b22-5891-41c9-8096-3e9def02a892%40sessionmgr4007					*Level III*
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The primary purpose of this research was to replicate a published study to determine the suitability of a patient-centered fall prevention tool and its impact on patient knowledge of fall risk factors and prevention interventions, overall fall rates, and falls with injury. A secondary objective was to evaluate ease of use of the patient-centered fall prevention tool and the need for modifications"	Qualitative Study pre and post intervention design	**Sampling Technique** Four Convenient samples of 30 patients each period. **Eligible Participants** Inpatients on a medical telemetry unit. **Inclusion:** Patients who are alert and oriented and speaking English or Spanish. **Excluded**: Patients who were not alert and oriented and did not speak English or Spanish. **Sample size**: Pre-intervention (N-30) at 1 month	**Intervention:** Intervention in the study included patients interviewed pre-implementation at 1 month and during implementation at 3, and 6-months regarding knowledge of their fall risk and fall prevention plan **Intervention Fidelity** Alert and oriented patients selected by investigator with consent for the study Patients were asked two Likert-style statements pre and during implementation bout	**Dependent variables:** **The two main outcomes included** Patients' knowledge on Fall risk factors and fall prevention plan. Overall fall rates and Fall with injury rates **Measurement tool (reliability) time, procedure:** Patients' knowledge on fall risk factors and fall prevention plan was measured by the study team members by asking 2 questions, (a)	An independent t-test was employed to compare pre and post scores of patient knowledge of falls risk and fall prevention The mean scores of statements (a) identify falls risks increased from 4.13 to 4.6 at 1 month; It remained unaffected in month 3 and 6 months (4.57 and 4.47, individually The mean for question (b) how to prevent a fall increased from 3.97 to 4.67 at 1 month and remained unchanged at

		During the intervention (N-120) at 3 months and 6 months. **Group Homogeneity** None noted **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error.	the knowledge of fall risk and fall factors and prevention plan which include, (a) I am able to identify my risk for falling, (b) I know what I need to do to prevent from falling Nurses updated the laminated Fall TIPS poster at the bedside, patients were assessed for fall risks using the MFS, individualized teaching to patient and family was done using the Fall TIPS prevention tool Investigators checked compliance to documentation on the poster three time a week for patient name, date, risk factor and prevention plan.	Can you identify the risk for falls. (b) Are you aware of what needs to be done to prevent a fall? The 5-point Likert scale was used as a response format (1=strongly disagree and, 5=strongly. Overall, compliance of nurses to fall TIPS protocol was measured by Fall TIPS audit tool bi-weekly on the 5 data points patients name/bed umber, current date and time, verbalization of fall risk factor and fall prevention plan. Fall rates and injury rates were acquired from the hospital for the pre and post intervention period.	3 and 6 months (4.53 and 4.7, individually The patient's knowledge about falls at 1, 3 and 6 months compared to pre-implementation (p=0.001-0.05) The overall fall rate pre-intervention reduced from 3.3% to 1.9% post intervention. Staff adherence to the Laminated Fall TIPS was 85%.
Leung, W. Y., Adelman, J., Bates, D. W., Businger, A., Dykes, J. S., Ergai, A., Hurley, A., Katsulis, Z., Khorasani, S., Scanlan, M., Schenkel, L., Rai, A., & Dykes, P. C. (2017). Validating Fall Prevention Icons to Support Patient-Centered Education. Journal of Patient Safety. 1-10. doi: 10.1097/PTS.0000000000000354					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"The objective of this project was to refine fall risk and prevention icons for a patient-centric bedside toolkit to promote patient and nurse	Mixed method descriptive and qualitative study, which involved psychometric evaluation with pre- and post-test	**Sampling Technique:** Convenient sampling **Accepted participants:** 88 patients and 60 nurses from 2 academic medical centers.	**Intervention Protocol:** Patients n=88 and nurses n=60 from 2 academic medical centers contributed in 4 iterations of testing to upgrade 6 fall risk and	**Dependent Variable:** Fall risk and prevention icons for a toolkit at patient bedside. **Measure:** Content validity-visualization of Icon	**Results:** Content validity index scores enhanced after modification of icons. Icons that depicted several concepts

engagement in accurately assessing fall risks and developing a tailored fall prevention plan".		**Eligible participants** Included 88 patients who were physically and cognitively able to participate. Nurses n=60 from oncology and medical surgical units at BWH and MMC. **Group Homogeneity:** Demographic characteristic of patient's and nurses was presented in Table 1, which represents descriptive statistics. **Power Analysis:** No power analysis was reported which increased the risk of making a Type II error.	10 fall prevention icons. The methodological approach of determination and quantification of content validity was used. In individual interviews participants graded their satisfaction with the degree to which icons signified the concept on a 4-point Likert scale, aiding computation of a Content Validity Index (CVI) Comments and suggestions were provided by participants for improvement. **Treatment Fidelity:** Successive phases of iterative icon evaluation and refinement were carried out until all stakeholders agreed on icon's validity After reviewing CVI scores and feedback, the research team discussed with the illustrator to modify the ions	refinement process and outcomes**:** In the first iteration each of the preliminary 6 fall risk and 10 fall prevention icons was revised by 16 patients. The mean CV rating from 1.7 to 3.8 and both negative remarks about the picture for the research team to address and made suggestion All 16 items were improved. Second iteration: 12 patients and 30 nurses rated the 16 improved icons and second group of 30 patients and 30 nurses rated those icons that had been further improved. Third iteration: A slash through the CVI cell demonstrated that the improved icons were regarded acceptable. Fourth iteration: Was vital for 2 risk icons established on low CVI rating from the patients. The final round involved testing "forget to call" and "unsteady	required further iteration for acceptance. All 16 concepts were preserved and were perfected on the basis of nurses and patient response. Using icons to describe an accurate and easy to interpret fall risk assessment and intervention plan for care team members which includes patient and family was led to enhanced adherence with that plan and decreased falls.

				gait" with 30 extra patients and 30 extra nurses.	

Appendix B.

Fall TIPS Readiness Implementation Checklist

FALL T.I.P.S. READINESS FOR IMPLEMENTATION CHECKLIST

This form is intended to guide hospital staff/leadership as they prepare to implement Fall TIPS.

PROJECTED GO-LIVE DATE: 09/21/2020

1. WHAT YOU CAN DO **NOW**

- ☑ Meet with Nurse Directors/Managers to identify the ideal staff mix of Fall TIPS Champions (e.g. nurse leaders, clinical nurses, nurse assistants).
- ☑ Increase staff awareness regarding Fall TIPS program adoption (this is not a pilot program but a standard of care at the hospital).
- ☑ Identify and notify staff of the Fall TIPS Go-Live Date.

2. WHAT TO DO **BEFORE THE GO-LIVE**

- ☑ Confirm that Nurse Managers/Directors have identified Fall TIPS Champions for all inpatient units.
- ☑ Confirm that Fall TIPS Champions have attended Fall TIPS CE Training and completed Fall TIPS Educational Module (Healthstream online, binder, etc.).
- ☑ Confirm that Fall TIPS Champions have demonstrated competency in performing the 3-step fall prevention program, especially the patient engagement component.
- ☑ Confirm that Fall TIPS Champions have been trained in the Fall TIPS Auditing Process and have demonstrated accurate auditing skills.
- ☑ Confirm that Nurse Directors/Managers and Fall TIPS Champions have identified where in each patient room on the unit the Fall TIPS posters will be hung. This includes formal approval processes (such as approval from infection control).
- ☑ Confirm that necessary materials have been ordered and are available for Fall TIPS use:
  - To hang posters, you can use Velcro or magnets.
  - To complete laminated Fall TIPS posters, you can order dry erase markers and erasers.
- ☑ Confirm that a system is in place to update Fall TIPS posters or print outs between patients
  - EHR-generated Fall TIPS tool – hand the patient the Fall TIPS poster with their discharge packet OR dispose securely of it
  - Laminated Fall TIPS Tool – make sure paper towels/wipes are available to erase to tool between patients

3. WHAT TO DO **AFTER THE GO-LIVE**

- ☑ Engage in routinely scheduled meetings with Nurse Directors/Managers and Fall TIPS Champions to identify potential barriers & strategies for overcoming impediments to Fall TIPS implementation and review audit data.
- ☑ Remind Nurse Directors to follow up with Fall TIPS Champions regarding Fall TIPS Audits (submit via REDCap: https://redcap.partners.org/redcap/surveys/?s=CAREFRKFEF).
- ☑ Circulate Monthly Fall TIPS Reports to staff and leadership. Use the reports to provide targeted feedback.

Ongoing education and continuous reinforcement of the 3-step fall prevention process is necessary for Fall TIPS sustainability.

Contact PHSFallTIPS@partners.org with any questions.

Appendix C

The Project Timeline for Fall TIPS Implementation

Strategies and Tactics	Dates	Individuals or groups affected
Educational Strategies		
Pre-test on fall prevention	9/2/20- 9/10/20	Nurses
Formal education on Fall TIPS	9/11//20-9/18/20	Champions, Nurses, CNA's, and Stakeholders
Train the Trainer	9/20/20 – 12/04/20	Unit Champions
Post-test on fall prevention	10/25/20 – 11/06/20	Nurses
Develop educational material	9/2/20-9/10/20	Unit Staff
Data Strategies		
Complete audits and individual feedback	09/27/20 – 12/05/20	Nurses
Provide data report on unit bulletin board	Weekly	Nurses, CNA's
Identify barriers and facilitator	Weekly	Nurses, CNA's, Champions
Discourse strategies		
One-to-one discussion	Weekly	Nurses and CNA's
Remind unit staff on coming events	09/27/21-12/05/20	Nurses and CNA's
E-Mails	9/11/20-12/04/20	Nurses and CNA's
Rewards	10/25/20-12/05/20	Nurses and CNA's
Accountability		
Obtain formal Commitments	9/13/20-9/18/20	Champions
Provide Supervision	9/27/20-12/05/20	Nurses and CNA's
Collaboration and communication		
Meetings	09/22/20-12/04/20	Champions, Nurses, CNA's, and Stakeholders

Appendix D

Written Commitment from champions

Adoption and spread of the innovation – Fall TIPS
Education of patients and family on their fall risks and fall prevention plan

1. **Nurse champion**
   a. Fall TIPS is completed and updated daily with the patient's name, correct date, risk factors, and individualized fall prevention plan.
   b. Complete audits - FALL TIPS Quality Audit Tool and give individual and group feedback.
   c. Give awareness of the daily falls in the unit.
   d. Remind unit staff of upcoming events – Fall Prevention Knowledge Pre-test, education and training on Fall Prevention and Fall TIPS Toolkit, Fall Prevention Knowledge Post-test
   e. Train the trainer
   f. Identify barriers and facilitators
   g. One-to-one discussion
   h. Peer-to-peer feedback

2. **Certified Nursing Assistant**
   a. Fall TIPS in place, with markers and erasers.
   b. Patients have the correct mobility aids in the room such as walkers or cane.
   c. Bed alarms and chair alarms are working and kept on.
   d. Check the universal precautions are in place – Fall sign on, Yellow socks, yellow bands.
   e. Clearing the clutter in patients' room.
   f. Check Laminated Fall TIPS toolkit is available on admission.

3. **Physical and Occupational therapist**
   Communication to the care team on the mobility related concerns:
   a. Appropriate device needed for ambulation.
   b. The amount of assistance needed for Activities of Daily Living (ADL).
   c. Communicating to health team about the patient's strength and balance.
   d. Educate patients on falls prevention.

4. **Housekeepers** –
   a. Cleaning and disinfecting the Laminated Paper Fall TIPS at bedside upon discharge.
   b. Keeping a clean Fall TIPS ready for use.
   c. Clearing clutter and spills as soon as possible.

I agree to serve as a champion, to assist with the training, answer questions, and provide feedback to the healthcare team on 6 North unit

Name: _____
Signature: _____
Date: _____

Appendix E

Lesson plan for Fall TIPS Education Session

Learning Objectives	Content Outline	Method of Instruction	Time Spent	Method of Evaluation
Stakeholders, champions, Nurses and CNA's at the medical surgical unit will be knowledgeable on the evidence base for engaging patient in the fall prevention protocol.	• Problem of patient falls • Fall TIPS Findings: Two-year mixed method study and Randomized control trial (RCT) Qualitative results summary • Fall prevention lessons learned • The Fall TIPS toolkit • Bed poster • Patient engagement	• PowerPoint presentation	10 minutes	Discussion of why patient engagement is vital in fall prevention
Nurses will be informed on the information and illustrations of how to perform a fall risk assessment utilizing the Morse Fall Scale (MFS) and the fall TIPS protocol	• Evidence-based fall prevention strategies • Universal Fall Precautions • Three step fall prevention process • Conducting fall risk assessment (MFS) • Completing tailored fall prevention care plan • Consistently implementing the plan	• PowerPoint presentation • Discussion • Demonstration	10 minutes	Discussion and demonstrate of the accurate use of Morse Fall Scale
Nurses with an interactive case study, will be able to complete the three-step fall prevention process using the Fall TIPS	• Accurately performing an MFS assessment • Interactive case study - completing a 3-step fall prevention process by utilizing Fall TIPS toolkit.	• PowerPoint presentation • Return Demonstration	10 minutes	Return demonstration of MFS and the use of Fall TIPS toolkit

Appendix F

FPTK 11-item Answer Key

Item's raw correct score for conversion to 1 or 0	T	F
1. Bedside nurses know their patients and are better than a standardized screening scale at identifying patients likely to fall.		F
2. The 3-step fall prevention process is comprised of 1) screening for fall risks, 2) developing a tailored fall prevention plan, 3) completing fall prevention documentation.		F
3. A 75-year-old male with history of recent falls and osteoporosis is admitted for severe abdominal pain. He is at increased risk for injury if he falls due to his age.		F
4. A common reason why hospitalized patients fall is that their fall prevention plan is not followed.	T	
5. Falls can be prevented in patients who are susceptible to falling because of physiological problems by providing a safe environment; e.g., clear path to bathroom, room free of clutter, good footwear.		F
6. Patient engagement in fall prevention means that the nurse completes the fall risk assessment and prevention plan, and then teaches the patient about their personal fall risk factors and prevention plan.		F
7. All hospitals are different; therefore, they should develop their own fall risk assessment forms.		F
8. A fall risk screening scale identifies those patients who are likely to fall because they have one or more physiological problems.	T	
9. When nurses communicate with patients about their increased risk for injury if they fall, this improves the likelihood that patients will follow their personalized fall prevention plan.	T	
10. Patients at low risk for falls do not require a fall prevention plan.		F
11. Bed and chair alarms should be activated for all patients who screen positive for being at a high risk of falling.		F

Appendix G

Fall TIPS Copyright Permission

May 25, 2020

Usha Khandagale
DNP Candidate
University of Maryland
Adventist HealthCare White Oak Medical Center
11890 Healing Way, Silver Spring, MD 20904
www.AdventistWhiteOak.com

Dear Ms. Khandagale:

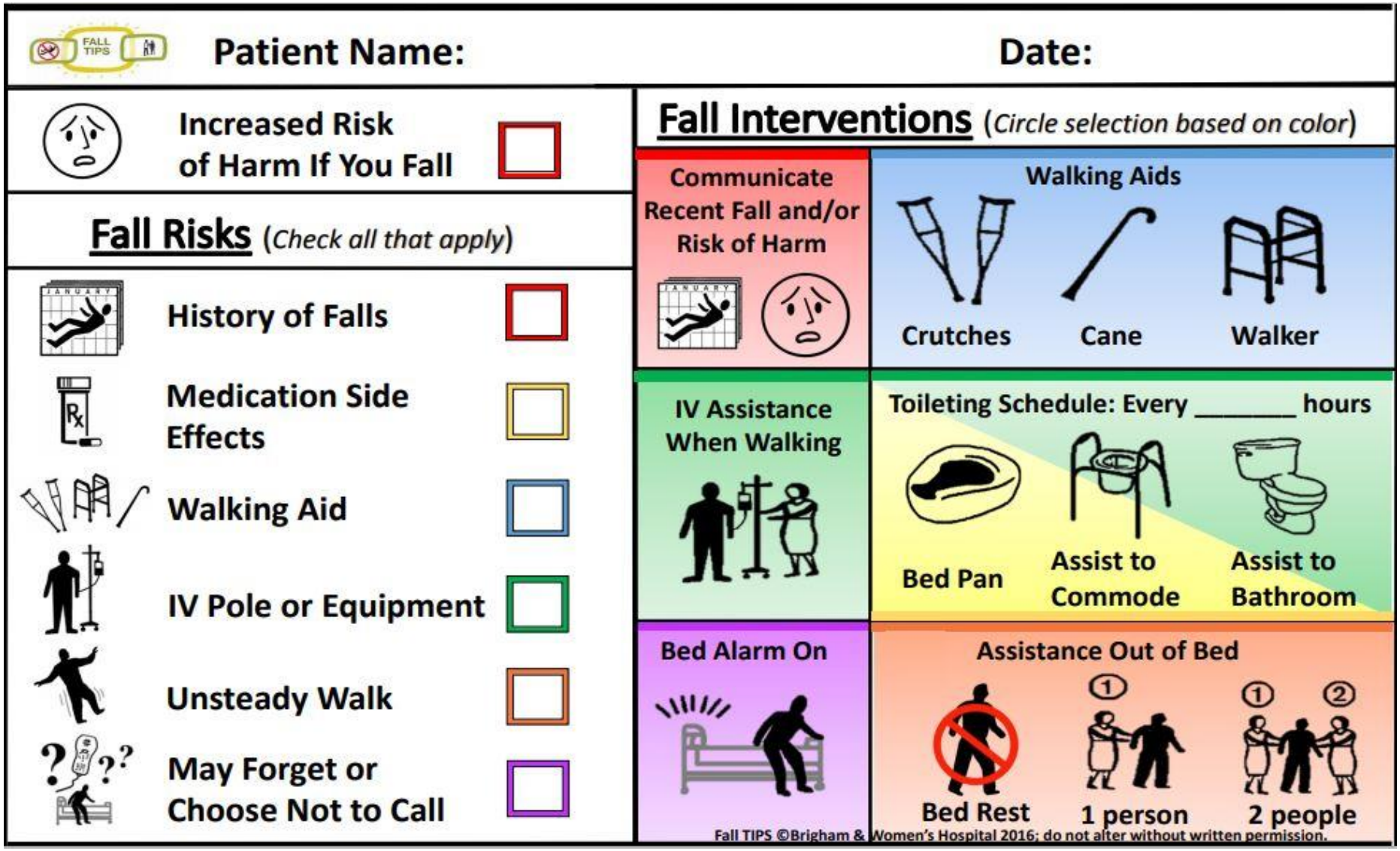
This letter serves as permission for your use of the Fall TIPS Toolkit in your quality improvement project on fall prevention on a medical surgical unit as a course requirement for the Doctor of Nursing Practice. You have permission to use the Fall TIPS (Tailoring Interventions for Preventions for Patient Safety) toolkit in the form of a laminated poster that staff complete and post it at the bedside. You will not make any changes to the Fall TIPS Toolkit (except for adding your institutional logo if desired) without a written permission.

Sincerely,

Patricia C Dykes PhD, MA, RN, FAAN, FACMI
Program Director Research
Center for Patient Safety, Research and Practice
Brigham & Women's Hospital
Associate Professor
Harvard Medical School
PDykes@BWH.Harvard.edu

Appendix H

Laminated Fall TIPS Poster in English



Appendix I

Fall TIPS Quality Audit Instructions

1) **Is the patient's Fall TIPS report hanging at the bedside?** Instructions: Record "Yes" if there is a Fall TIPS poster hanging at the bedside and it is for the correct patient. Record "No" if there is no Fall TIPS poster hanging at the bedside or if it is for the incorrect patient (i.e., wrong patient name).

2) **Can the patient/family verbalize the patient's fall risk factors?**
Instructions: Record "Yes" if the patient/family can verbalize any of the fall risk factors that are displayed on the Fall TIPS poster. Record "No" if the patient/family cannot verbalize any of the fall risk factors that are displayed on the Fall TIPS poster.
Record "N/A" if the patient is nonverbal or not alert and oriented, and no family is present.

3) **Can the patient/family verbalize the patient's personalized fall prevention plan?**
Instructions: Record "Yes" if the patient/family can verbalize any of the fall prevention interventions that are displayed on the Fall TIPS poster. Record "No" if the patient/family cannot verbalize any of the fall prevention interventions that are displayed on the Fall TIPS poster.
Record "N/A" if the patient is nonverbal or not alert and oriented, and no family is present.

4) **If you answered "No" to any question, did you provide peer-to-peer feedback?**

Instructions: Record "Yes" if you followed up with the nurse whose patient you audited. Record "No" if you did not follow up with the nurse whose patient you audited. Record "Other" if you would like to share why you did not provide peer-to-peer feedback. **We have found that the peer-to-peer feedback piece is especially important for implementation. By following up with the nurse, you can identify if there is a gap in knowledge or another barrier to Fall TIPS completion that we can address.

Appendix J

Fall TIPS Quality Audit Tool

Confidential

Page 1

Fall TIPS Audit

Please complete the audit form.

Thank you!

Name of the auditor	_____ (Last Name , First Name)
Date and time audit performed	_____ (Y-M-D H:M)
Is the patient's Fall TIPS report hanging at the bedside?	◯ Yes ◯ No (If Patient name or date is wrong select no)
Can the patient /family verbalize the patient's fall risk factors?	◯ Yes ◯ No ◯ NA (NA if the patient is nonverbal or not alert and oriented, and no family is present.)
Can the patient/family verbalize the patient's personalized fall prevention plan?	◯ Yes ◯ No ◯ NA (NA if the patient is nonverbal or not alert and oriented, and no family is present.)
If you answered "No" to any question, did you provide peer-to-peer feedback?	◯ Yes ◯ No ◯ Other (To explain why no feedback was provided select other)
Reason why peer-to-peer feedback not provided	_____