METHODS, TOOLS, AND STRATEGIES

Pilot Testing Fall TIPS (Tailoring Interventions for Patient Safety): a Patient-Centered Fall Prevention Toolkit

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Background: Patient falls during an acute hospitalization cause injury, reduced mobility, and increased costs. The laminated paper Fall TIPS Toolkit (Fall TIPS) provides clinical decision support at the bedside by linking each patient's fall risk assessment with evidence-based interventions. Strategies were needed to integrate this evidence into clinical practice.

Methods: The Institute for Healthcare Improvement's Framework for Spread is the conceptual model for pilot implementation of Fall TIPS at Brigham and Women's Hospital (BWH; Boston) and Montefiore Medical Center (MMC; Bronx, New York). The key to translating the evidence into practice was engaging stakeholders by leveraging existing shared governance structures, identifying unit champions, holding training sessions for all staff, and implementing auditing to assess and provide feedback on protocol adherence and patient outcomes.

Results: BWH unit compliance with using Fall TIPS averaged 82%, the mean fall rate decreased from 3.28 to 2.80 falls per 1,000 patient-days from January through June 2015 versus 2016, and the mean fall with injury rate for these periods decreased from 1.00 to 0.54 per 1,000 patient-days. At MMC, compliance averaged 91%, but the mean fall rate increased marginally from 3.04 to 3.10, while the mean fall with injury rate decreased from 0.47 to 0.31 per 1,000 patient-days. Patient knowledge survey results show improvement in knowledge of the risks for falls and the ways to prevent falls.

Conclusion: Engaging hospital and clinical leadership is critical in translating evidence-based care into clinical practice. Barriers to adoption of the protocol have been addressed and detailed to provide guidance for spread to other institutions.

Falls are a major public health problem, and hospitalization increases the risk for falls.[1,2] Up to one million hospitalized patients fall in the United States annually, and about a third of falls result in injury.[3] Common fall-related injuries include fractures, subdural hematomas, and excessive bleeding.[4] Falls with related injuries increase the length of hospital stays and associated costs.[4] For patients, even falls without injury can lead to a fear of falling, which can limit mobility and further increase risk for falls.[5,6] Reduced mobility from a fall can lead to a loss of autonomy and an increased dependence on family members. Nurses and other providers feel responsible for preventing falls and are persistently balancing a patient's integrity and autonomy with their risk of falling.[7]

Until recently, the most rigorous hospital-based fall prevention research had been done in the area of fall risk assessment, and the risk factors associated with falls are well established.[8–12] In response to the absence of evidence-based fall prevention intervention protocols for hospitalized patients, our team in Boston at Brigham and Women's Hospital (BWH) and Partners HealthCare conducted a qualitative study with patients who had fallen in the hospital and their care team members. Patients and professional and paraprofessional providers were asked about their perceptions of why hospitalized patients fall and what preventive interventions were both effective and feasible in busy hospital settings.[13,14] Through this work, we found that patient falls are a communication problem and that fall prevention is a three-step process: (1) conducting fall risk assessments, (2) developing a tailored or personalized fall prevention plan, and (3) implementing the tailored fall prevention plan consistently, along with universal precautions. We learned through our qualitative research that nurses routinely conduct fall risk assessments, but the degree to which the results of the assessment inform a tailored plan that is communicated to the care team, including patients and family members, is highly variable.[13]

In response to these findings, our team developed—from 2007 through 2009—the Fall TIPS (Tailoring Interventions for Patient Safety) Toolkit—a health information technology intervention that integrates the three-step fall prevention process into busy hospital work flows.[15] Using the Fall TIPS Toolkit (Fall TIPS), nurses complete the fall risk assessment online. The toolkit draws on the risk assessment data to provide decision support for identifying the fall prevention plan most likely to prevent a fall on the basis of each individual patient's risk profile. The nurse can then tailor the plan based on his or her knowledge of the individual

Laminated Paper Fall TIPS Toolkit (English Version, 11" x 17")

Figure 1: Fall risk assessment items are on the left side of the poster, and evidence-based interventions are on the right. Color provides clinical decision support to link areas of risk with the interventions most likely to prevent a fall based on an individual patient's fall risk profile. The bed poster is completed with the patient and family (if available) and then hung at the bedside. IV, intravenous. Fall TIPS©Brigham & Women's Hospital 2016; do not alter without written permission.

patient and clinical judgment. After the risk assessment and plan are filed, Fall TIPS produces personalized bed posters and handouts to communicate fall risk status and a tailored plan to ensure that all care team members, including patients and family, have the information that they need at the bedside to prevent falls.[15,16] Fall TIPS was tested in four hospitals on more than 10,000 patients. Results from the randomized control trial demonstrated that Fall TIPS significantly reduced falls and was particularly effective with older patients—those at the greatest risk for falling.[17] Fall TIPS changed the existing practice paradigm by addressing the lack of linkages between fall risk assessment and tailored interventions and by improving communication, which is a leading root cause of patient falls in hospitals.[18]

In a follow-up case control study, which our team conducted from August 2011 through February 2012, we investigated why some patients on the intervention units fell despite having access to Fall TIPS. We found that a common reason was that the patient did not follow the recommended fall prevention plan.[19] Bedside interviews revealed that patients may not believe that they are at risk for falling, particularly if they are independent at home.[14] This finding led our team to hypothesize that engaging the patient and family *after* the assessment and the fall prevention plan is developed is insufficient. To prevent falls, patients must be engaged in all three steps of the fall prevention process. Our team then developed a laminated paper version of Fall TIPS (Figures 1 and 2), which was designed in collaboration with

a multidisciplinary team that included systems engineers.[20]

From 2014 through 2016 we partnered with a team at Montefiore Medical Center (MMC; Bronx, New York), which has an ethnically/racially diverse patient and provider population, to ensure generalizability of the paper Fall TIPS beyond our less diverse setting. We used color to integrate clinical decision support into the toolkit to help nurses and patients identify the evidence-based interventions for each area of risk. Patient-friendly icons are used to communicate the fall prevention plan. A detailed description of the development and usability testing of the paper Fall TIPS is provided elsewhere,[20] but the initial findings were positive. Clinicians stated that it standardized communication of risk status and brought the fall prevention plan to the bedside in a format that is easily understood by team members and patients with diverse health care literacy levels.[20]

After stakeholders judged the Fall TIPS complete, our team pilot tested it on high-risk units at BWH and at MMC to establish efficacy and a foundation for adoption and spread. In this article, we describe the process that our team used for pilot testing and for then promoting adoption and spread of Fall TIPS.

METHODS
Framework for Spread

From January through June 2016, we pilot tested the paper Fall TIPS at two large, geographically and ethnically diverse

Laminated Paper Fall TIPS Toolkit (Spanish Version, 11" x 17")

Figure 2: Fall risk assessment items (left) and fall prevention interventions (right) are translated into Spanish. As with the English version, color provides clinical decision support to link areas of risk with the interventions most likely to prevent a fall based on an individual patient's fall risk profile. The bed poster is completed with the patient and family (if available) and then hung at the bedside. Fall TIPS©Brigham & Women's Hospital 2016; do not alter without written permission.

medical centers, BWH and MMC. Our approach was to use the Institute for Healthcare Improvement's (IHI) Framework for Spread (FFS)[21] as our conceptual model. The FFS is based on Rogers's classic diffusion research, which posits that new innovations are more likely to be successful if the impact on affected subgroups (both the costs and the benefits) is fleshed out and communicated to stakeholders, and if the stakeholders are involved in the process.[22] The FFS occurs over four phases: (1) communicating "better ideas," (2) planning and setup, (3) spread within the target population, and (4) continuous monitoring and feedback related to adoption and spread of the innovation. The main components of the FFS guided our process for engaging stakeholders in adopting the paper Fall TIPS Toolkit (Figure 3). For example, we presented the evidence base behind our work at leadership, quality, and nursing Grand Rounds to garner support from leadership and to communicate the value of the Fall TIPS Toolkit to stakeholders (for example, better ideas). We performed the setup for adoption and spread by targeting a relevant population: patients on units with fall rates above the mean for the institution and above the state benchmark. We secured support of unit-level clinical leadership and used native communication channels such as unit-based practice council and staff meetings to penetrate the social system. Stakeholder champions were identified and offered educational and technical support for associated practice changes.

As stated earlier, we met with the unit leadership and the unit practice councils to discuss current fall prevention strategies and to develop the case for using the evidence-based Fall TIPS approach. Two oncology, three neurology, and two medical units at BWH, and one large medical unit at MMC, agreed to participate (unit descriptions can be found in Table 1).

The practice council members at BWH and the fall prevention committee members at MMC agreed to serve as champions, to assist with training, and to provide baseline data before the pilot study and adherence data during the study. We developed a continuing educational competency program for champions and trained them as "super users." Our team provided in-service training on all shifts during the Fall TIPS go-live week (January 3–9, 2016). All staff were notified of the training in advance by unit leadership and were expected to attend a session.

The training module, which was used to train all staff on all participating units, consisted of the following three components:

1. The evidence base for patient engagement in the three-step fall prevention process
2. Information and examples of how to conduct a fall risk assessment using the Morse Fall Scale[23]
3. Interactive case studies, which provided an opportunity to complete the three-step fall prevention process using Fall TIPS during the training

The Components of the Framework for Spread as Applied to Engaging Stakeholders
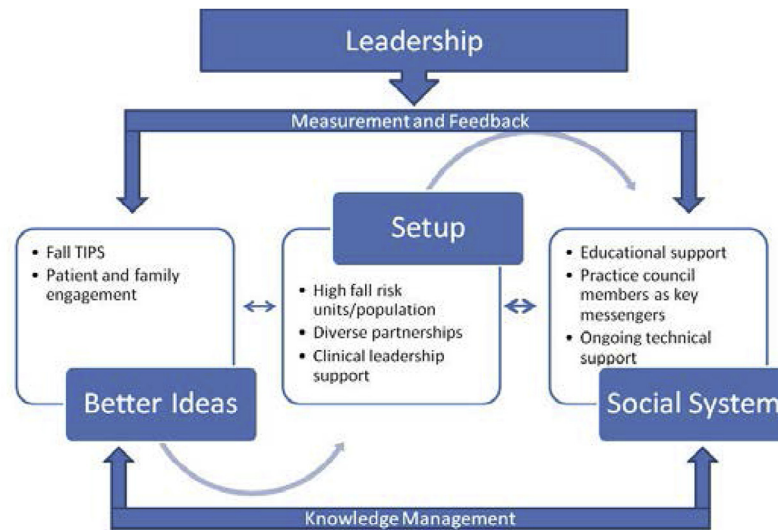
Figure 3: The main components of the Institute for Healthcare Improvement Framework for Spread (FFS; Massoud MR, et al. A Framework for Spread: From Local Improvements to System-Wide Change. IHI Innovation Series white paper. Cambridge, MA: Institute for Healthcare Improvement, 2006. Accessed May 16, 2017. http://www.ihi.org/resources/Pages/IHIWhitePapers/AFrameworkforSpreadWhitePaper.aspx) guided the process for engaging stakeholders in adopting the laminated paper Fall TIPS Toolkit. The FFS holds that that implementation and adoption of a new innovation requires a formal process whereby communication of leadership support, ideas to improve practice, and associated changes are negotiated through the social system and reinforced over time through measurement and feedback to stakeholders.

Patient Surveys

Prior to go-live, champions on the medical units at BWH and MMC completed baseline data collection related to patient knowledge of their personal fall risks and their fall prevention plan using a five-point Likert response format (1 = "Strongly disagree," 2 = "Disagree," 3 = "Neither agree nor disagree," 4 = "Agree," and 5 = "Strongly agree") for the following two items:

1. I am able to identify my risks for falling.
2. I know what I need to do to prevent myself from falling.

An independent samples Mann-Whitney U test was used to compare patient survey results pre- and postimplementation of Fall TIPS.

The week of go-live was designated as "Fall Prevention Week." Training for nurses and nursing assistants was offered on all shifts. Fall TIPS was printed at 11" × 17" and hung at the bedside. All nurses were asked to complete Fall TIPS with their patients during their shift after they completed the training. Unit champions assisted with training, relieved

staff so they could attend the training, answered questions, and provided feedback to peers related to completion of Fall TIPS.

Protocol Adherence, Patient Fall, and Fall-Related Injury Rates

Adherence to the Fall TIPS protocol was monitored via weekly spot checks on each unit to observe whether Fall TIPS was complete with patient name, correct date, risk factors, and prevention plan. Patient fall and patient fall with injury rates were secured through the hospital quality departments and provided monthly to clinical champions for communication.

RESULTS
Framework for Spread

The FFS provided the infrastructure needed to support communication, quality improvement, and the adoption and spread of Fall TIPS. Use of the "Spread for Change"

Table 1. Patient Care Unit Descriptions			
Site/No. of Units	Service	No. of Beds	Practice Committee Structure
BWH 3	Neuroscience Intermediate Care	43	Meets monthly; 10 nurses, including 2 co-chairs
BWH 2	Medical Intermediate Care	31	Meets monthly; 10 nurses, including 2 co-chairs
BWH 2	Oncology	20	Meets monthly; 20 members and 2 co-chairs; combined with Hematology
MMC 1	Medical Intermediate Care	36	Meets monthly; shared governance model of 6 councils that span units
BWH, Brigham and Women's Hospital; MMC, Montefiore Medical Center.			

components to promote effective spread of Fall TIPS is outlined in Sidebar 1.

Patient Surveys

At BWH, 31 patients on the medical units answered the pre surveys, and 33 patients answered the post surveys. The majority of patients were female (60%), age 55 years or older (53%), and Caucasian (66%). The results of the Mann-Whitney U test demonstrate varying levels of improvement from the baseline to post Fall TIPS with scores for perceived ability of patients to identify fall risk (pre mean 3.7; post 4.5, $p = 0.031$) and knowledge of how to prevent falls (pre mean 3.7; post 4.4, $p = 0.264$). At MMC, 32 patients on the medical unit answered the pre surveys, and 30 patients answered post surveys. The majority of patients were female (68%), age 55 years or older (53%), black or African American (53%) and Hispanic/Latino (32%). The results of the Mann-Whitney U test demonstrate improvement from

the baseline to post Fall TIPS scores for perceived ability of patients to identify fall risk (pre mean 4.0; post 4.6, $p = 0.023$) and knowledge of how to prevent falls (pre mean 3.6; post 4.7, $p = 0.001$).

Protocol Adherence, Patient Fall, and Fall-Related Injury Rates

The control charts with mean fall and fall-related injury rates for the pre- and postintervention periods are provided in Figures 4 and 5. At BWH, mean adherence to the Fall TIPS protocol was 82%. The mean fall rate decreased from 3.28 per 1,000 patient-days for January through June 2015 to 2.80 per 1,000 patient-days for January through June 2016. The mean fall-related injury rate for the same months decreased from 1.00 per 1,000 patient-days in 2015 to 0.54 per 1,000 patient-days in 2016.

At MMC, mean adherence to the Fall TIPS protocol was 90.5%. The mean fall rate slightly increased—from 3.04 per

Control Charts, Seven Care Units, Brigham and Women's Hospital,
January–June 2016 for (a) Average Fall Rates
and (b) Average Fall Injury Rates with Fall TIPS Completion Rates
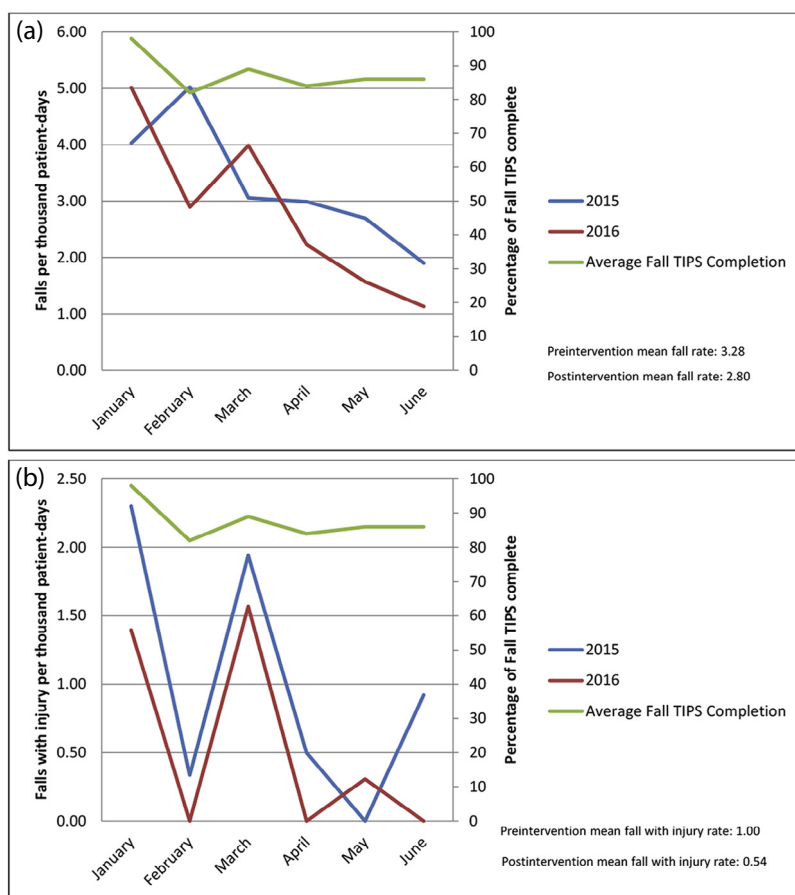
Figure 4: The control chart shown in Figure 4a demonstrates adherence to the Fall TIPS protocol at > 80% during the pilot study and a decrease in the mean fall rate from 3.28 to 2.80/1,000 patient-days. The control chart shown in Figure 4b demonstrates adherence to the Fall TIPS protocol at > 80% during the pilot study and a decrease in the mean fall-related injury rate from 1.00 to 0.54. As shown in Table 1, three neuroscience intermediate care units, two medical intermediate care units, and two oncology units participated in the pilot program.

Sidebar 1. "Spread for Change" Framework for the Fall TIPS Toolkit (Fall TIPS)

"Spread for Change" Component*	Fall TIPS Toolkit (Fall TIPS) Process
Leadership: Setting the agenda and assigning responsibility for spread	• Executive support from organizational departments of quality and safety set the expectation for falls reduction with "falls" and "falls with injury" as standard safety measures, which require systemwide and public reporting • Practice committees in a system of shared governance identified innovation of Fall TIPS and committed to spread • Unit-based nurse champions reinforced Fall TIPS protocol as day-to-day leaders
Setup for Spread: Identifying the target population and the initial strategy to reach all sites in the target population with the new ideas	• Targeted "high risk" units with fall and injury rates above mean for institution and benchmark • Use of unit-based practice committee members as clinical leadership to influence fall prevention attitudes in colleagues • Involvement of stakeholders in identification of Fall TIPS as an evidence-based method to decrease fall rates and fall rates with injury • Rollout of Fall TIPS by training champions who then trained peers • "Fall Prevention Week" to heighten awareness, to train and educate nurses on the technical skills and change in workflow to engage patients in fall risk assessment and prevention • "Just-in-time" training for professional and paraprofessional caregivers on use of Fall TIPS to ensure that both day and night staff were aware of new protocol; "train the trainer" sessions for new staff and staff identified as having poor completion rates for Fall TIPS
Better Ideas: A description of the new ideas and evidence to "make the case" to others	• 3-step fall prevention process directly linked to nursing fall risk assessment work flow with critical engagement of the patient in the development of a personalized fall prevention plan • Unique icons used to communicate the appropriate risks and interventions in a format that spans literacy levels, paired with simple, jargon-free text • Color-coded clinical decision is built in to support selecting the appropriate intervention based on individual patient fall risk profile • Staff unfamiliar with the patient can instantly know their mobility status and the best ways to keep them safe upon walking into the patient room • The increased risk of harm assessment (ABCS)[†] were added to the tool because patients reported that they are more likely to follow the plan if they know they will be injured in a fall • Feedback from end users used to refine Fall TIPS; e.g., Neurology nurses requested indicator to show if a patient has one-sided weakness; Medicine nurses requested icon for bed rest
Communication: Methods to share awareness and technical information about the new ideas	• Consistent, sustained message from unit-based practice committees and unit directors that building a culture of safety, evidenced by adoption of Fall TIPS, is a top hospital priority • Engaging stakeholders: unit-based practice committee meetings, "Fall TIPS Safety Rounds" by research assistants and nurse champions, focus groups with Patient Family Advisory Committee, unit secretaries reminding nurses daily to do Fall TIPS assessment alongside a standing patient acuity scores reminder, reminders to complete Fall TIPS in daily huddles and keeping a calendar to document each fall and illustrate the days between falls • Unit-based champions or "super users" provide peer feedback and reeducation while promoting accountability among colleagues
Social System: Understanding the relationships among the people who will be adopting the new ideas	• Champions as the clinical leadership promoting the adoption and consistent application of Fall TIPS among colleagues • Weekly rounding to support and promote integration of Fall TIPS into existing work flow • Transition to champions conducting spot checks for continued maintenance
Knowledge Management: Observing and using the best methods for spread as they emerge from the practice of the organization	• Continuing to spread the use of the paper Fall TIPS tool by engaging leadership: nurse directors, nurse educators, and practice committees • Attending practice committee meetings to help troubleshoot logistics preventing Fall TIPS from being operational (e.g., lack of erasable markers)
Measurement and Feedback: Collecting and using data about process and outcomes to better monitor and make adjustments to spread progress	• Providing data on fall rates and fall rates with injury to assess impact of Fall TIPS intervention • Biweekly poster sent to practice committee leaders and nurse directors to report on adherence to Fall TIPS protocol and provide feedback

*Adapted from Massoud MR, et al. A Framework for Spread: From Local Improvements to System-Wide Change. IHI Innovation Series white paper. Cambridge, MA: Institute for Healthcare Improvement, 2006. Accessed May 16, 2017. http://www.ihi.org/resources/Pages/IHIWhitePapers/AFrameworkforSpreadWhitePaper.aspx.

†A = Age or frailty, B = Bones (fracture risk or history), C = antiCoagulation (bleeding disorder), S = recent Surgery (during current episode of care). Source: Institute for Healthcare Improvement. How-to Guide: Reducing Patient Injuries from Falls, 2012. Accessed Jun 19, 2017. http://www.mghpcs.org/eed_portal/Documents/Falls/AttachmentJ.pdf.

Control Charts, Medical Intermediate Care Unit, Montefiore Medical Center,
January–June 2015 and 2016, for Average Fall Rates
(a) and Average Fall Injury Rates (b) with Fall TIPS Completion Rates
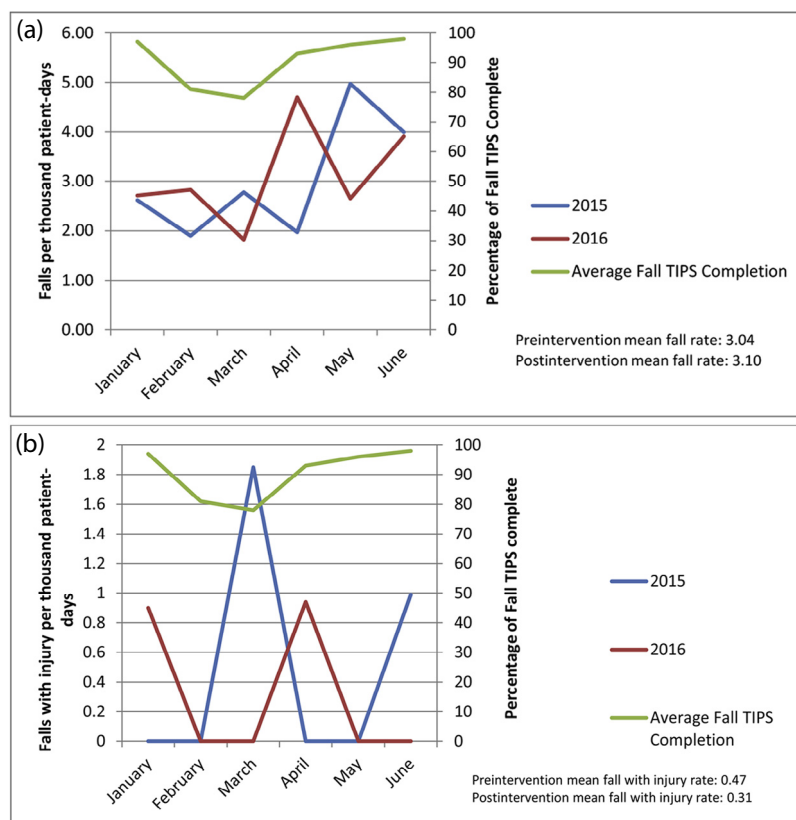
Figure 5: The control chart shown in Figure 5a demonstrates adherence to the Fall TIPS protocol at > 80% during the pilot study and a slight increase in the mean fall rate from 3.04 to 3.10/1,000 patient-days. The control chart shown in Figure 5b demonstrates adherence to the Fall TIPS protocol at > 80% during the pilot study and a decrease in the mean fall-related injury rate from 0.47 to 0.31.

1,000 patient-days for January through June 2015 to 3.10 per 1,000 patient-days for January through June 2016. The mean fall-related injury rate for the same months decreased from 0.47 per 1,000 patient-days in 2015 to 0.31 per 1,000 patient-days in 2016.

DISCUSSION

The aim of the Fall TIPS Toolkit is to educate and engage patients in the three-step fall prevention process. We found that the IHI FFS is an effective methodology for the implementation and adoption of a new innovation such as the paper Fall TIPS Toolkit. Our results suggest that patients were more aware of their fall risk factors and that the rate of fall-related injury decreased during the six-month pilot study. While the mean patient fall rate decreased at BWH, it increased slightly at MMC—perhaps because MMC's mean fall rate was relatively low at baseline (3.04 vs. 3.28). It has been noted that because of potential underreporting of falls, fall-related injury is a more accurate quality metric and that the efficacy of interventions should be evaluated on the basis of injury rates.[24]

This pilot project was conducted on eight care units at two different medical centers with diverse patient populations, and the results were promising at both sites. One goal of the project was to test whether the paper Fall TIPS was effective with diverse patient populations. By partnering with MMC, we were able to test the toolkit on a clinical unit where the majority of patients were Spanish speaking. We found that with the toolkit in place, patients at MMC were more confident that they could identify their fall risk factors and that they knew what they needed to do to prevent a fall. The findings were similar at BWH, except that the increase in scores pertaining to knowing what to do to prevent a fall was not significant.

Changing practice is difficult. We faced many barriers and challenges, which we addressed while following the principles of the FFS. The obstacles faced when working with clinicians to integrate the evidence-based Fall TIPS into practice were similar to those identified by Cabana and colleagues, who classified the following barriers to physician adherence to clinical practice guidelines (Table 2): lack of awareness, lack of familiarity, lack of agreement, lack of self-efficacy, lack

Table 2. Barriers to Adoption and Spread of the Fall TIPS Toolkit and Strategies for Overcoming Barriers

Barriers to Adoption and Spread*	Strategies for Overcoming the Barriers
Lack of Awareness *Clinician is unaware of new guideline or evidence.*	Leverage existing governance structures to train nurse leadership in new three-step fall prevention protocol. Support nurse leadership in holding concentrated training sessions to spread awareness of new protocol.
Lack of Familiarity *Clinician is unfamiliar with how to implement new guideline or evidence correctly.*	Have champions, "super-users," and nurse leaders perform in-the-moment training to correct misunderstandings and reeducate on the three-step fall prevention process using paper Fall TIPS.
Lack of Agreement *Clinician does not agree with new guideline or evidence.*	Emphasize that the three-step fall prevention process is the only evidence-based intervention protocol for preventing inpatient falls, share data supporting the intervention, and remind staff that Fall TIPS relies on tailoring the fall prevention plan at the individual level using clinical judgment.
Lack of Self-Efficacy *Clinician does not believe he or she can implement new guideline or evidence.*	Provide additional coaching and training, as well as feedback during rounds to staff who are not yet confident in their ability to implement and educate/engage patients in the evidence-based interventions.
Lack of Outcome Expectancy *Clinician does not believe that the new guideline or evidence will positively affect outcomes.*	Share data outcomes with nurse leadership to reinforce evidence for the paper Fall TIPS protocol. Distribute posters displaying protocol adherence rates and fall/fall with injury rates.
Inertia of Previous Practice *Clinician lacks motivation to depart from previous protocol and implement change.*	Improve motivation to change with sustained communication of the importance of the protocol in decreasing patient falls and related injuries. Institute rounding as a reminder of the change in fall prevention protocol. Have champions continue role of peer leader and model for the cultural change around including patients in the three-step fall prevention process.
External Barriers *Barriers that do not pertain to clinician knowledge or attitude: patient, guideline, and environmental factors*	To combat the lack of reminders to executing the new fall prevention work flow, implement an auditing schedule as well as a reminder system by partnering with the unit coordinator. Investigate nonadherence to the protocol; there may be an environmental barrier, such as a lack of dry-erase markers, which can be easily fixed. Patient-related factors, such as patients ignoring the interventions because they do not recognize the new paper Fall TIPS posters, can be remedied with consistent patient education and involvement in the three-step fall prevention process.

*Cabana MD, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA.1999 Oct 20;282:1458–1465.

of outcome expectancy, inertia of previous practice, and external barriers.[25] Each of these barriers affected adherence to the Fall TIPS protocol during the pilot study, and strategies to overcome the barriers were continuously refined in response.

For the initial barrier to adopting Fall TIPS—lack of awareness—existing shared governance structures were leveraged to introduce the new protocol, spread awareness, and remove any knowledge barriers. Involvement of leadership from the institutional to the unit levels is necessary for increasing awareness of a new clinical practice.[26] Although none of the units had additional personnel for implementing Fall TIPS, all units had a nurse–physician director dyad and practice councils (clinical nurses responsible for leading practice changes on their units). The nurse and physician leaders consistently communicated support for Fall TIPS to the practice council members and staff. Fall prevention was prioritized as a safety metric at the organizational level at both hospitals, which served as an impetus for the local adoption of the evidence-based Fall TIPS protocol, particularly because targeted units had fall rates that were above local benchmarks.

Lack of awareness was addressed by implementing training sessions during Fall Prevention Week, with a "train-the-trainer" model and training sessions for staff on all shifts to ensure awareness of the new protocol. Using this approach, we were able to train about 80% of nurses and nursing assistants on all units. "Lack of familiarity" is related to the lack of awareness barrier. Despite being aware of the Fall TIPS protocol and receiving training, some staff still expressed confusion regarding the correct way to use the tool. "Just-in-time" training was provided by nurse champions to answer questions and to remedy any confusion that led to nonadherence to the Fall TIPS protocol. This retraining was particularly important in correcting nurses' misperceptions and noncompliance with changing the date every day on the paper Fall TIPS posters. A current date communicates that the fall prevention plan is up to date, but many nurses mistakenly thought it should show the date of admission.

Initially, there was pushback from some nurses who did not buy into the new Fall TIPS protocol. This lack of agreement stemmed from a belief that the toolkit was not appropriate for every patient and that the evidence-based

algorithm for choosing interventions was restrictive. Education, again, was the strategy to overcome this barrier. It was necessary to emphasize that the Fall TIPS logic and interventions were validated in a clinical trial.[17] Consistent messaging was needed from unit leadership and peer champions that integrating this evidence-based intervention into clinical practice was the unit standard and required for all patients. The toolkit provided guidance on the evidence-based interventions but still allowed nurses to use clinical judgment when selecting the interventions for individual patients. Messaging also emphasized that, in addition to serving as a patient engagement and education tool, Fall TIPS provides the core set of information needed by any care team member who enters the room to safety assist the patient. For the toolkit to be a reliable source of fall prevention decision support, it must be completed and consistently updated for every patient. Nurses were encouraged to use the color-based decision support to identify the interventions most likely to prevent a fall, but to then use clinical judgment to tailor final selections based on their knowledge of each individual patient.

We found that nurses' lack of self-efficacy, or the belief that they could not incorporate the Fall TIPS protocol into their work flow, was sometimes an issue. This belief was related not only to the actual use of the toolkit but to the requirement that patients be engaged in all three steps of the fall prevention process. Nurse champions provided peer coaching, including modeling the strategies that they had used to successfully incorporate the Fall TIPS protocol into their own work flows. The protocol was revisited regularly at staff meetings to provide opportunities for nurses to talk about challenges in and successful strategies for integrating it into practice and about using the toolkit to engage patients and families in the three-step fall prevention process. We also found that ongoing reinforcement was needed regarding the fall risk factors and the rationale for the linkages between the individual risk factors and the corresponding interventions. As demonstrated by the adherence data, over time the nurses became more comfortable with Fall TIPS and with their ability to accurately and consistently adhere to the protocol. A main lesson learned from this project was that when implementing a new innovation that involves a practice change, variation needs to be anticipated and addressed as part of the process. This is where the IHI FFS was critical, as reflected in the Measurement and Feedback component shown in Sidebar 1.

There was also some resistance to the Fall TIPS protocol due to low expectations for positive outcomes. A small number of nurses, when approached during rounds about nonadherence, expressed doubt that the process would lead to improved fall rates and therefore did not integrate it into their work flow. This barrier is observed when providers cannot see positive change at the individual level and are overlooking the population-level successes.[26] Falls are adverse events that happen relatively infrequently, so it can be difficult to

assess the positive impact of an evidence-based intervention as a nurse on a single unit. This barrier was addressed through reminders from supportive leadership about protocol expectations and through sharing positive trends in data with the staff. Providing continued education and emphasizing the evidence supporting the Fall TIPS protocol[13,16,17] was necessary in addressing this barrier.

At both the institutional and unit level, some nurses resisted change despite the evidence that Fall TIPS is effective at reducing falls in the hospital.[15] A previous systemwide practice was affixing "high risk" fall signs on the doors of patients who scored as high risk on the Morse Fall Scale. Nurses told us that they ignored these signs because they were ubiquitous and only added more "noise," given that most patients on acute medical units are high risk for falls. The signs also did not indicate any specific interventions to prevent these high-risk patients from falling; they just communicated a high-risk warning. Still, some nurses wanted to retain use of the signs despite the lack of evidence to support their effectiveness.[24] In addition, engaging patients in the three-step fall prevention process requires that fall risk assessment and planning are done at the bedside with the patient and family. This was a change in practice for many nurses and a source of resistance. Time and the continued communication of the positive trends associated with the Fall TIPS intervention helped to overcome the inertia of previous practice and resistance to change.

External barriers, particularly physical ones, to consistently implementing Fall TIPS are continuously being addressed. Because the Fall TIPS is printed on a laminated board, nurses must have access to dry-erase markers, which are easily misplaced in the hospital. The most frequent reason nurses cited for not completing the paper Fall TIPS Toolkit is that there was no readily available marker. Solutions to this problem include distributing personal mini dry-erase markers that clip to nurse badges, as well as affixing markers with Velcro above every sign. There were also logistical issues around sign placement. Some of the units have spacious rooms, which required printing larger signs to ensure that they can be seen by patients from their beds and by staff when they enter the room. The laminated paper Fall TIPS Toolkit lacked a physical reminder system. To overcome this barrier, some units leveraged the existing "manual reminders" in their work flow, such as having the unit secretaries include a reminder to review and update the Fall TIPS Toolkit along with the standing daily reminder to complete patient acuity documentation.

Rogers noted that dissemination projects are more likely to be successful if the costs and benefits are fleshed out and communicated to stakeholders.[22] Our team estimates that the up-front costs associated with implementing the laminated Fall TIPS Toolkit on a 30-bed inpatient unit was approximately $4,600. The estimate includes the costs associated with the program as implemented, including the following: (1) engagement with practice committee members

over the course of 8 months, (2) training of nursing staff and intensive "champion training" for practice council members, (3) using the Fall TIPS Toolkit to engage patients for 15 minutes per day (as required by the training) during the Fall TIPS go-live week, and (4) the cost of the laminated paper Fall TIPS posters. Many of these costs can be classified as "opportunity costs" in that we engaged with practice committee members during regularly scheduled meetings and completed training during regular shifts. In addition, hospital policy requires that nurses complete fall risk assessments, personalized fall prevention plans, and fall prevention patient education on every shift. We made the decision to include opportunity costs because while nurses were engaging in Fall TIPS training and educating patients, their time could have been used for other purposes, even if they did not receive any extra pay as a result. Already very busy nurses have much to do on their shift—so that is a real cost even if the hospital does not have to pay them more money.

The cost of a serious fall-related injury in 2011 was approximately $14,000[4]—or about $15,100 in 2016 dollars. Prevention of one fall-related injury will pay for implementation of the Fall TIPS program. The cost of the program reflects intense engagement with stakeholders. As noted in Table 2, even with a high level of stakeholder engagement, many barriers to adoption exist. Using the FFS to inform strategies for overcoming barriers was essential to the success of this pilot study, as we applied it to address the many barriers to adoption of a new innovation on busy clinical units. Patient falls and fall-related injuries are rare events. An important limitation of this study is that it was of insufficient duration to enable us to determine the effectiveness of the Fall TIPS program on patient falls and fall-related injuries over time.

Patient falls and related injuries are serious problems in hospitals.[1,2] Falls are challenging to prevent, particularly in the hospital setting, but there is now good clinical trial evidence showing that falls are preventable.[27] Fall TIPS is evidence-based and provides a simple way to engage patients and families in the three-step fall prevention process at the bedside. However, the success of the toolkit for reducing falls and related injuries depends on consistent use by nursing staff and other bedside care providers. Even simple practice changes require a structured approach to consistently address and overcome barriers to adoption and use. The IHI FFS was used to overcome barriers and to integrate patient engagement in the three-step fall prevention process into the work flow.

CONCLUSION

Results from this pilot study suggest that the level of adoption of the Fall TIPS protocol on these high-risk units is reasonable. We believe that using this framework will help to maintain toolkit adoption, sustain evidence-based fall prevention practices, and ultimately prevent patient falls.

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