Taking the Fall for Kids: A Journey to Reducing Pediatric Falls

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A B S T R A C T

Purpose: To reduce harm related to pediatric falls, a quality improvement project was conducted at a children's hospital.
Design and methods: An interprofessional team designed and implemented evidence-based interventions to align with the hospital's journey to reduce patient harm. These interventions included selection and implementation of a fall risk assessment tool, implementation of fall bundle elements, and implementation of fall prevention education to patients and families. Surveys, audits, and rate of falls were used to evaluate the project.
Results: Fall bundle compliance increased from 27% to 88% and there were zero patient falls in five out of the six months after implementation a comprehensive pediatric fall prevention program.
Conclusions: Implementing pediatric-specific, evidence-based interventions can help to reduce patient falls. There was a substantial increase in fall bundle compliance and a decrease in falls and falls with injury.
Practice Implications: Engagement and empowerment of clinical nurses in the quality improvement process design and implementation can substantially improve patient outcomes and patient safety while reducing harm. Future research is needed to determine factors that promote enhanced reporting needed to determine the true incidence of patient falls in pediatric inpatient and outpatient settings.

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Introduction

A culture of safety in healthcare organizations involves reducing the risk of harm to patients by identifying potential risks of injury and mitigating those risks through patient safety prevention programs. Pediatric falls may result in harm of hospitalized patients and the causes are often misunderstood due to the nature of a child's growth and development which includes developmental falls. The National Database of Nursing Quality Indicators (NDNQI) defines a patient fall as "a sudden, unintentional descent, with or without injury to the patient, that results in the patient coming to rest on the floor, on or against some other surface (e.g., a counter), on another person, or on an object (e.g., a trash can)" (NDNQI, 2016). Hospitalized patients who fall may have life threatening consequences and nurses must identify patients at risk for falling and implement measures to minimize those risks. The Joint Commission urges hospitals to examine clinical practices and put into place organizational processes to identify and care for patients at risk for falling. The Joint Commission standards require hospitals to implement methods to assess fall risks and fall prevention programs (The Joint Commission, 2019). A multi-site survey conducted by the Children's Hospital Association revealed that most children's hospitals were tracking falls and using a fall risk assessment tool. Eighty one percent of these

hospitals reported using an institution-developed tool for fall risk assessment, while the others had adopted a validated fall risk assessment tool (Schaffer et al., 2012). Pediatric fall prevention programs varied greatly among the 29 children's hospitals (Schaffer et al., 2012). The Institute for Healthcare Improvement (IHI) created a framework, the Triple Aim, which includes optimizing the healthcare system performance to improve the patient experience, improve the health of populations and to reduce costs (IHI, 2012); a comprehensive falls prevention program for pediatrics would achieve all three.

Local problem

In 2013, an academic free-standing children's hospital launched a quality improvement project to reduce harm related to pediatric falls. The organization had joined the Children's Hospitals' Solutions for Patient Safety (SPS) program and identified the lack of an evidence-based pediatric falls prevention program that included a falls bundle. The SPS collaborative is a network of children's hospitals focused on improving pediatric quality care and patient safety by transforming the organizational culture into one that prioritizes and leads patient safety as a core value and implementing high reliability organizational practices. SPS disseminates knowledge of best evidence-based interventions, or bundles, to reduce pediatric hospital acquired conditions (HAC), that includes standardized definitions, approaches, and techniques (Agency for Healthcare Research and Quality, 2017). This organization adopted the high reliability practices set forth by the network and created a

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patient safety culture preoccupied with failure and the aim of zero harm. One by one, each HAC team was formed and began the evaluation and analysis of organizational performance compared to the network. The Falls HAC Team determined that the current state of falls data included event reporting only without apparent cause analysis and was insufficient compared to the network.

National benchmarking of pediatric falls was newly available and prior to 2013, pediatric falls were not benchmarked due to the lack of consensus in fall related risk factors for children and definition of pediatric fall related injury (Jamerson et al., 2014). This organization had recently joined the NDNQI national database as part of their Magnet journey and began to evaluate unit level benchmarking for pediatric falls. Upon analysis of the national comparative data, the organization's pediatric falls with injury exceeded the national average. The comparative pediatric data from peer children's hospitals further empowered the nurses to achieve excellence by reducing patient falls through a quality improvement project for a falls prevention program.

Project aims

The aim of this quality improvement project was to engage and empower frontline clinical nurses to embrace a culture of safety by implementing and evaluating a comprehensive evidence-based pediatric falls prevention program. A Key Driver Diagram (Fig. 1) was created to provide guidance to the Falls HAC Team as they began the journey of fall prevention.

Methods

Theoretical framework

The Model for Improvement was used to implement an evidence-based bundle of fall interventions in an effort to reduce the incidence of patient falls in the inpatient setting. This model was chosen to facilitate the development, implementation and evaluation of the planned changes of the SPS falls bundle and is a recognized methodology for efficient trial and error learning (Langley et al., 2009). The Falls HAC Team executed the Plan-Do-Study-Act (PDSA) methodology in the quality improvement efforts to answer these questions:

1. How can we reduce pediatric falls and mitigate the risks of falls in our organization?
2. How will we know we have improved patient outcomes as compared to our peers?
3. What tests of change will make the largest impact on reducing falls for our patient population?

Setting

This quality improvement project was conducted in a large academic children's hospital. Arkansas Children's, Inc. is the only health care system in the state solely dedicated to caring for children, which allows the organization to uniquely shape the landscape of pediatric care in Arkansas. An executive nurse leader was assigned as the SPS Falls Leader and assembled a quality improvement team including clinical nurses, clinical nurse specialists, nurse educators, and nurse leaders to evaluate and implement a comprehensive falls prevention program. This team completed the quality improvement project on two acute care units from April through December of 2013. The patient population on these units includes a wide variety of general medical patients and patients in need of subspecialty care, such as endocrine, nephrology, and pulmonology, with an age range of birth to 21 years of age. Following the pilot, the fall prevention program was spread throughout the organization to achieve sustainability of the improvement.

Interventions

Based on this organization's involvement in the SPS collaborative, the need to implement a fall prevention bundle was identified in April 2013.
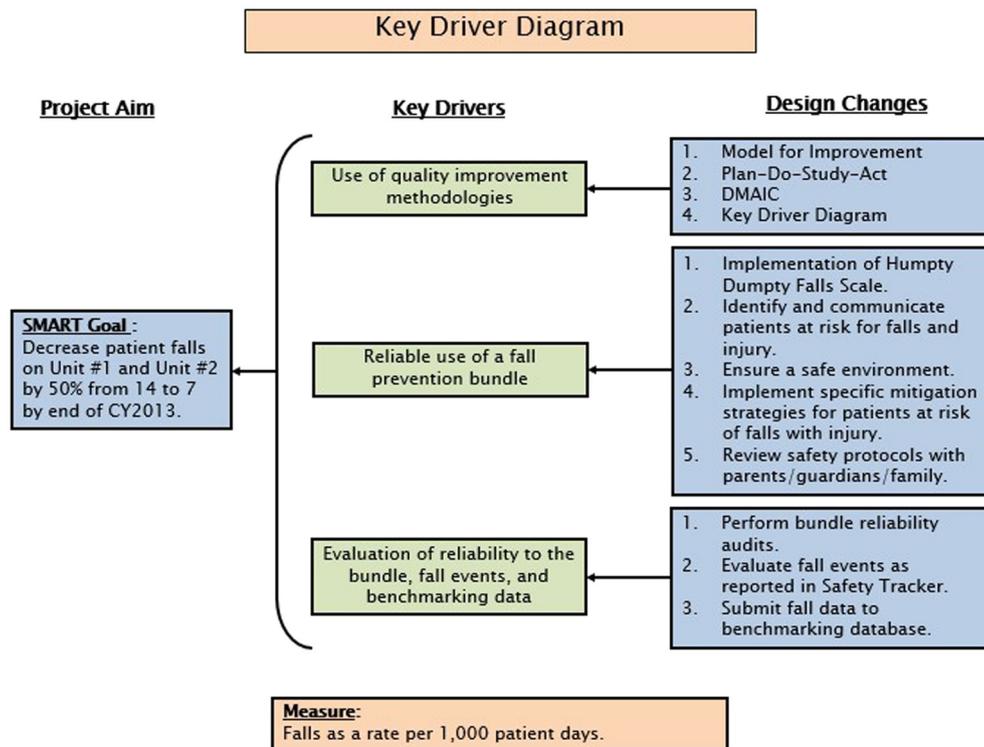

Fig. 1. Key driver diagram of pediatric falls.

Table 1

	Responsible Person(s):	Timeframe:
SMART Goal: decrease patient falls with injuries on Unit #1 and Unit #2 by 50% from 14 to 7 by end of CY2013.		
Description of TOC:	Falls HAC Team	July – August 2013
• Implementation of HDFS to screen patients for their risk of falls.		
Plan:	Falls HAC Team and Information Technology	July 2013 July 2013
• Integration of HDFS into EHR.	Falls HAC Team and nurses	
• Education on use of HDFS.		
Do:	Unit #1 and Unit #2 nurses	August 2013 August 2013
	Falls HAC Team	
• Use of HDFS to screen patients for their risk of falls		
• Collect data on compliance with and accuracy of documentation on HDFS		
Study:	Falls HAC Team	August – September 2013
	Falls HAC Team	
• Monitor fall events		
• Evaluate documentation data		August – September 2013
Act:	Falls HAC Team	September 2013
• Adopt TOC		

Selection of a fall risk assessment tool

Upon initial assessment of current practice, it became evident that the organization's home grown tool needed to be replaced by an evidence-based, pediatric specific, validated fall risk assessment tool. The team identified that the existing tool assumed that all pediatric patients were at risk for falls, therefore screening did not identify at risk patients. In addition, data revealed under reporting of patient falls which is a common finding as pediatric falls are often under reported by parents and nurses due to the nature of expected developmental falls versus those that are related to medical conditions or altered neurological state during hospitalization (Roberts-Turner, 2016). This further convinced the team that a comprehensive falls screening process to identify patients at risk would be required to heighten awareness and prevent patient harm. This led to the first step in implementing the SPS bundle, which was to identify a validated, pediatric specific fall risk assessment tool. A systematic review of the literature was performed to search for potential tools that met the needed criteria. The search resulted in two validated, pediatric specific tools: The Humpty Dumpty Falls Scale (HDFS) and the General Risk Assessment for Pediatric In-patient Falls Scale (GRAF-PIF) (Hill-Rodriquez et al., 2008). The team discussed and evaluated the needs of the hospital and the components and psychometrics of each tool. Due to the HDFS containing more inclusive questions, including a tool for the inpatient, outpatient, and emergency department settings, and being able to easily integrate the tool into the electronic health record (EHR), the decision was made by the group to select the HDFS. Pre- and post-surveys were used to evaluate the staff's knowledge and perceptions of clinical utility of the organization's home grown fall risk assessment tool as compared with the HDFS. The pre survey was sent in June 2013.

Implementation of a fall risk assessment tool

Table 1 outlines the PDSA cycle and the time frame of the first test of change (TOC) that involved implementation of the HDFS. The tool was integrated into the hospital's EHR so that nurses could perform the documentation electronically as they were accustomed to doing. Nurses were educated on how to use the HDFS prior to the implementation date. This TOC occurred in August 2013; during this time, additional information was provided to the nurses regarding tips for some of the issues that were detected during the continuous data collection process.

Implementation of fall bundle elements

In September 2013, a repeat survey was sent to the nurses. The second TOC that occurred during October 2013, involved implementation of the fall bundle elements. Nurses were educated on the elements (i.e. identifying and communicating patients at risk for falls, ensuring a safe environment, and implementing mitigation strategies) and examples of which interventions were included in each of the elements was given. Nurses continued to use the HDFS during the time periods of analysis and implementation of subsequent TOC. Next, the team planned for one final test of change and hospital wide dissemination of implementation of the fall bundle.

Implementation of fall prevention education to patients and families

The third TOC occurred in December 2013 and focused on educating patients and families on fall prevention. Nurses were educated on the methods of providing patient and family education and the available resources (i.e. educational materials in English and Spanish) for providing this education.

Beginning of the spread

Organizational wide dissemination consisted of removing the internally developed fall risk screening tool from the EHR, adding the HDFS into the EHR (since it had previously only been added to the two pilot units), and developing comprehensive education on implementation of all elements of the falls bundle in the inpatient, emergency department, and ambulatory settings. This dissemination occurred during December 2013 and hospital wide implementation went live in January 2014. In February 2014, a final survey was sent to the nurses.

Measures

The SPS evidence-based falls bundle, that included the recommendation to use a pediatric specific, validated fall risk assessment tool, was initially implemented on two acute care units and later implemented across the organization. Table 2 outlines the interventions of fall prevention before and after implementation of the fall bundle,

Table 2
Fall prevention before and after implementation of SPS falls bundle.

Before falls bundle	After falls bundle
Internally developed, non-pediatric specific, subjective fall screening questions	Validated, pediatric specific, fall assessment tool
High fall risk patients not identified or communicated in standardized methods	High fall risk patients identified and communicated in a variety of methods:
	• Humpty Dumpty sign at the door and/or bedside
	• Communicated at handoff
	• Fall precaution in electronic health record
	• Humpty Dumpty sticker on patient
Ensure safe environment	Ensure safe environment
Mitigation strategies not inclusive of fall prevention interventions	Mitigation strategies include fall prevention interventions:
	• Assess elimination need, assist as needed
	• Hourly rounds
	• Assist patient with ambulation as needed
	• Assess need for 1:1 supervision
	• Evaluate medication administration times
Fall prevention education not standardized	Standardized fall prevention education

Table 3
RN survey results (percentage of agree/strongly agree).

Survey questions	Pre-survey June 2013 ($n = 35$)	Post-survey September 2013 ($n = 27$)	Post-survey February 2014 ($n = 39$)
Pediatric patients are at risk for falls.	94%	82%	92%
The fall risk assessment tool is easy to use.	89%	81%	82%
The fall risk assessment tool is useful in predicting which patients fall.	57%	66%	64%
Using the fall risk assessment tool helps me better care for my patients.	69%	70%	56%
The fall risk assessment tool is based on current evidence-based practice.	86%	97%	87%
It is important to me to have a fall risk assessment tool that is evidence-based.	89%	55%	92%

with examples of nursing interventions to operationalize the bundle. Data from the surveys, bundle reliability audits, and rate of falls were used to measure the processes and outcomes of the fall prevention program. During the pilot testing, bundle reliability audits included collection and analysis of data on compliance with use of the tool, accuracy of documentation on the tool, and compliance with implementation of the documented interventions. To measure sustainability of processes and outcomes across the organization, bundle reliability and fall rate data are monitored on a monthly basis. Data are reported to SPS and NDNQI, who utilize the same definition for a fall, for means of comparison with other participating organizations.

Results

The survey and compliance data from the first TOC revealed a need to focus on implementation of the fall bundle elements, or the interventions to reduce falls. An evaluation of the second TOC revealed the need to focus on education of patients and families on fall prevention. At the completion of the third TOC, data analysis revealed successful implementation of an evidence-based fall bundle, including the use of a pediatric specific, validated fall risk assessment tool.

Surveys

Valuable information was obtained from the survey results. These included that most nurses understand that pediatric patients are at risk for falling, find the HDFS easy to use, think that the HDFS tool is a useful tool for identifying patients at risk for fall as compared to the internally developed tool, and understand the importance of using an evidence-based tool (Table 3).
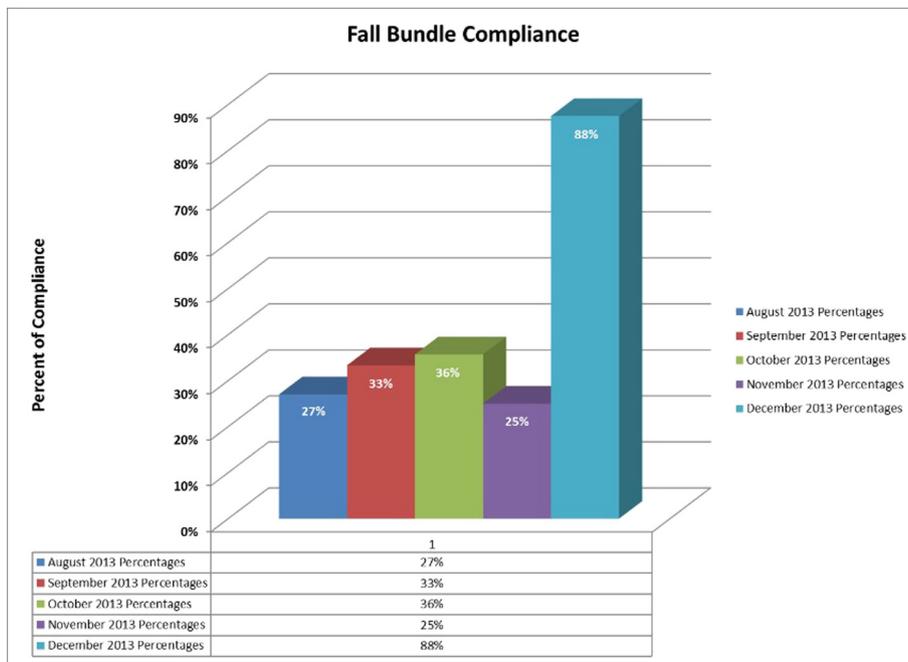
Bundle reliability audits

To measure compliance with implementation of the fall bundle, audits were performed on the documentation and actual implementation of the interventions. From August through November 2013, compliance ranged from 27 to 36%. However, in December 2013, compliance jumped to 88% (Fig. 2). The dramatic increase in compliance from November to December can be attributed to the engagement of nurses in implementation of the fall bundle through hospital wide education.

Rate of falls

The rate of falls per 1000 patient days was monitored on the two units during this project. There were zero patient falls in five out of the six months after implementation of all three tests of change, none of which were classified as falls with moderate or greater injury (Fig. 3).

Discussion

The Falls HAC Team's journey of quality improvement to implement an evidence-based fall bundle aimed to reduce patient falls in a children's hospital. Existing literature and collaboration with other children's hospitals provided this team with the needed support for a

Fall Bundle Compliance

	1
August 2013 Percentages	27%
September 2013 Percentages	33%
October 2013 Percentages	36%
November 2013 Percentages	25%
December 2013 Percentages	88%

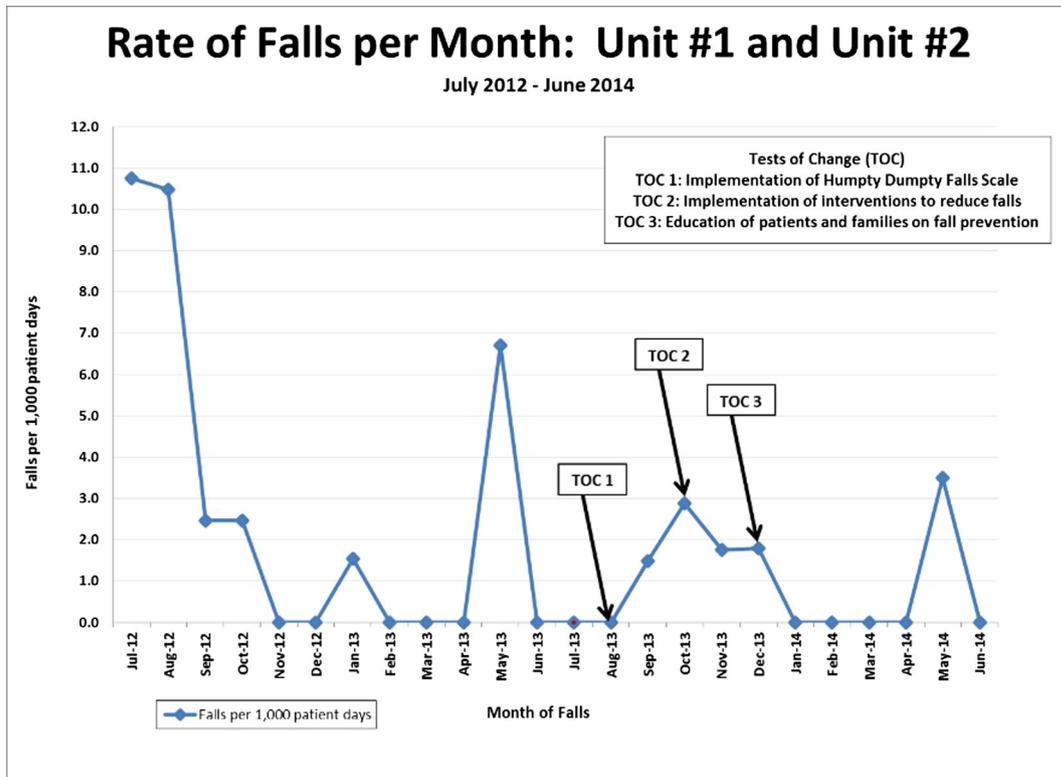**Fig. 2.** Fall bundle compliance between August and December 2013.

Fig. 3. Rate of pediatric falls in pilot units.

successful beginning to the journey. Success was also fostered by the use of quality improvement tools to guide and evaluate the changes and the development of standardized education on the fall prevention program. Measures of project success included an increase in adherence to the bundle and the associated decrease in rate of falls. However, the journey did not end there. The need for sustainability and spread led to implementation of the quality improvement initiative to hospital-wide oversight of a fall prevention and treatment program that would continue making strides towards zero harm.

Sustainability

The implementation of complex changes can be difficult; however, teamwork and the use of a structured plan can aid in sustainability of
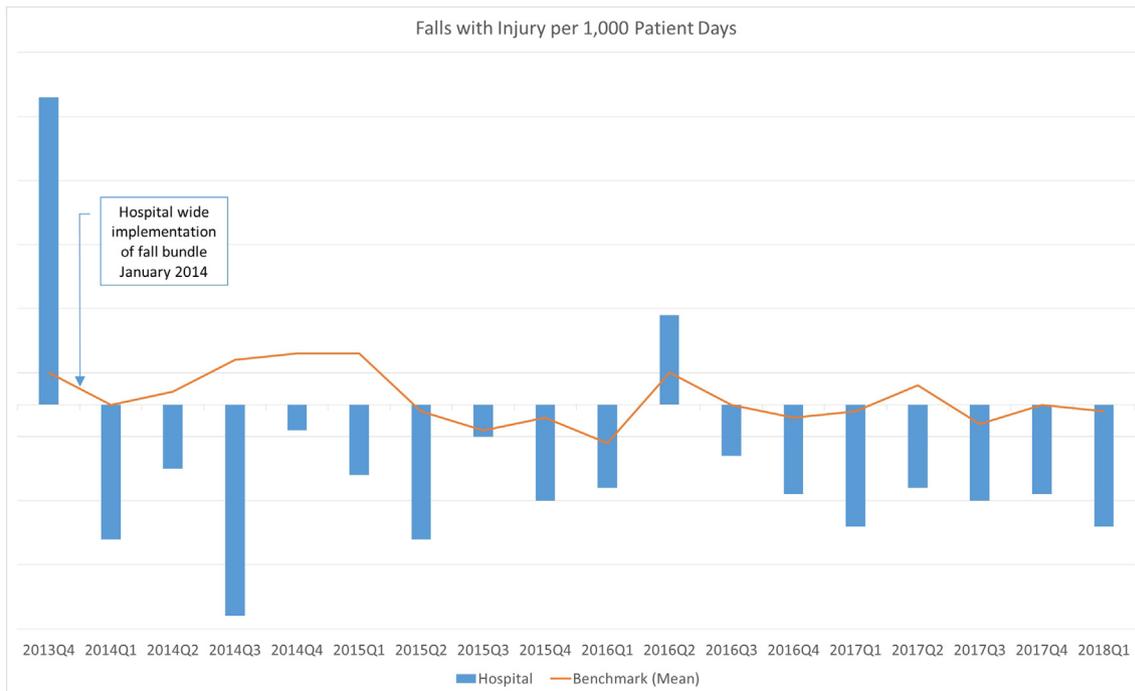

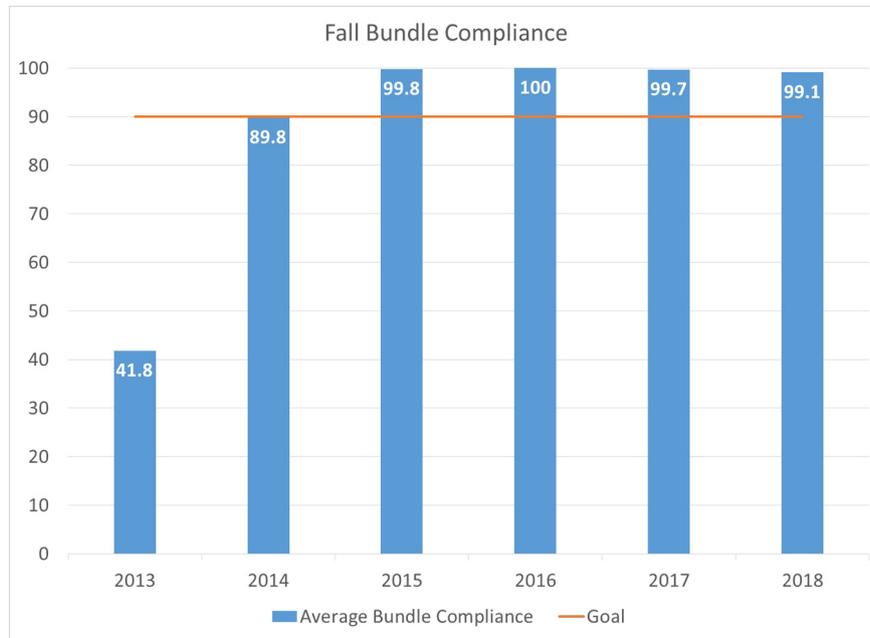**Fig. 4.** Falls with injury per 1000 patient days.

Fig. 5. Fall bundle compliance.

the change (Langley et al., 2009). The momentum the Falls HAC Team had from successful implementation of the fall bundle propelled the team along the journey of fall prevention. As the fall bundle was adopted throughout the organization, attention to fall prevention strategies increased and provided the team with opportunities to make ongoing improvements; however the bundle elements remain unchanged from initial implementation, which speaks to the evidence of sustainability. Involvement of interdisciplinary stakeholders on the Falls HAC Team and across the organization enabled fall prevention messages to be disseminated throughout the hospital to all necessary roles. Since implementation in 2013, the hospital has demonstrated

sustainability for over five years as evidenced by ongoing outperformance of the national benchmark for falls with injury (Fig. 4) and continued achievement of bundle compliance exceeding the goal (Fig. 5).

As opportunities were identified, the Falls HAC Team collected information and made a plan to address the issues. A useful tool that can assist with determining which initiatives to address includes the impact effort matrix (Andersen, Fagerhaug, & Beltz, 2010). By determining the amount of effort and impact an initiative will have enables the team to plan accordingly to successfully implement change. Initiatives identified as low effort, high impact should be done first. The high effort,
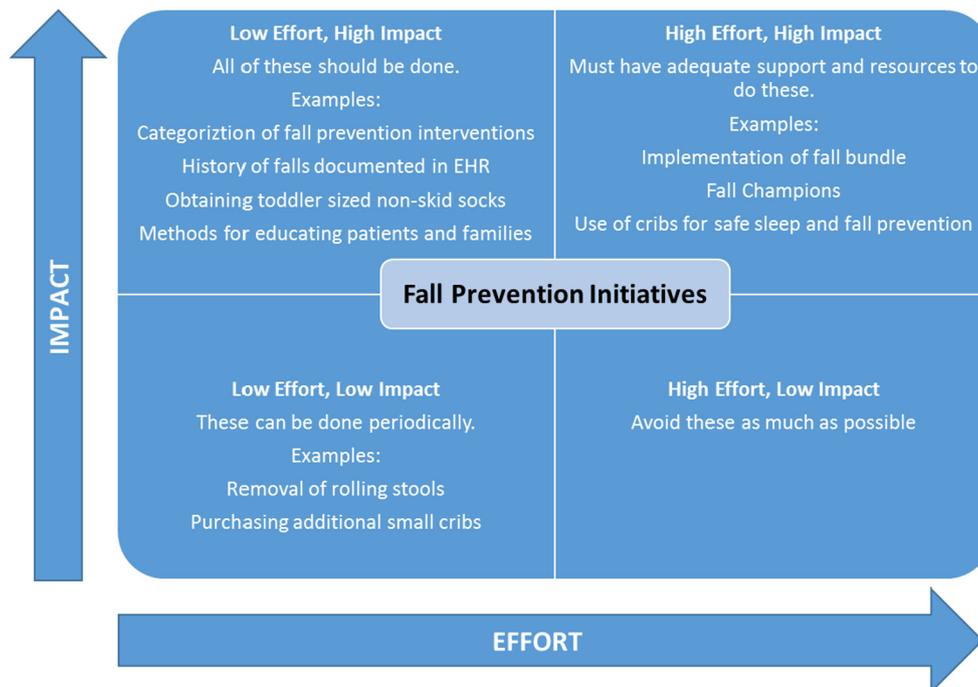

Fig. 6. Impact effort matrix for pediatric fall prevention.

high impact initiatives should also be done, but presence of the appropriate support and resources must be obtained or verified prior to implementation. A low effort, low impact initiative can periodically be done, but most of the initiatives should not be this type. If an initiative is identified as a high effort, low impact, it should be avoided. Examples of initiatives for the different types are shown in Fig. 6.

The following are descriptions of the initiatives included on the matrix:

Low effort, high impact initiatives

Categorization of fall prevention interventions. In February 2014, a barrier to documenting the fall risk interventions was detected by the Falls HAC Team. To be compliant with the falls bundle, an intervention for each element must be implemented. The issue was that the fall interventions were originally categorized into low risk and high risk interventions, which made it more difficult for nurses to ensure implementation of interventions for each element. The team discussed this barrier and made a change to the EHR that categorized each intervention under the associated bundle element (Table 4).

History of falls documented in EHR. In the first several months after hospital wide implementation of the falls bundle, the Falls HAC Team identified that after a patient fell, subsequent fall risk assessments did not include the patient's history of falls. Barriers to communicating this history were evaluated and it was determined that providing a place to document the date and time of a patient's fall event in the EHR would be helpful. Therefore, the Falls HAC Team collaborated with the Information Technology (IT) Department to build a place for this type of event to be documented in the EHR that would also flow over to the fall risk assessment tool screen. This allowed nurses to see the date and time of a patient's last fall when documenting the fall risk assessment.

Obtaining toddler sized non-skid socks. In February 2017, it was identified that the hospital carried non-skid socks in various sizes, but none were the appropriate size to fit toddlers. The team worked with the Purchasing Department to obtain toddler sized non-skid socks that were then stocked with all other non-skid socks throughout the hospital.

Methods for educating patients and families. A trend in patient falls occurring when caregivers were present but staff were not was detected by the Falls HAC Team. In June 2017, education was developed for staff that included specific points of education that staff could provide to the patient and family based on individual patient needs as identified by the fall risk assessment. Additionally, a 5 Tips of Fall Prevention poster was developed and put in patient rooms (Fig. 7).

High effort, high impact initiatives

Implementation of fall bundle. Discussed in the methods section of this article

Fall Champions. After hospital wide implementation of the fall bundle, it was identified that not all units or departments were represented on the Falls HAC Team. It was determined that having unit or department based experts could help in preventing falls across the hospital. So, the Fall Champion role was developed - which consisted of clinical nurses that are educated on the role and serve as the go to person in that area. They assist with education or dissemination of information in their areas and also help with data collection for bundle compliance.

Use of cribs for safe sleep and fall prevention. This example involves our hospital's journey in evaluating safe sleep practices along with fall prevention. Historically, it was permissible for a caregiver to request an adult bed for their infant. When requested, a form could be signed by the caregiver so that they could have an adult bed to sleep in with their infant instead of a crib. The Falls HAC Team collaborated with the Safe Sleep Taskforce and many other stakeholders, including legal, social work, and hospital administrators, to remove this practice, provide an evidence-based guide to pediatric bed selection, and improve the safety of the environment for our young patients.

Table 4
Categorization of fall prevention interventions.

Original categorization	New categorization
Low risk interventions	Identify and communicate patients at risk for falls & injury
• Orientation to room • Bed in low position, brakes on • Siderails x2 or x4 up, assess large gaps, such that a patient could get extremity or other body part entrapped • Use of non-skid footwear for ambulating patients, use of appropriate sized clothing to prevent risk of tripping • Assess elimination need, assist as needed • Assess for adequate lighting, leave night light on • Call light is within reach, educate patient/family on its functionality • Environment clear of unused equipment, furniture in place, clear of hazards • Patient and family education available to patient and parents • Document fall prevention teaching in education record	• Identify patient with a humpty dumpty sticker sign at the door and bedside, as a fall precaution on the dashboard, and place a humpty dumpty sticker on patient when necessary (i.e. leaving the room or unit).
High risk interventions	Ensure safe environment
• Identify patient with a humpty dumpty sticker at the bedside, as a fall precaution on the dashboard, and place a humpty dumpty sticker on patient when necessary (i.e. leaving the room or unit) • Educate patient/parents on fall precautions • Check patient minimum every 1 h • Accompany patient with ambulation • Developmentally place patient in appropriate bed • Consider moving patient closer to nurse's station • Assess need for 1:1 supervision • Evaluate medication administration times • Remove all unused equipment out of the room • Protective barriers to close off spaces, gaps in bed • Keep door open at all times unless specified isolation precautions are in use • Keep bed in lowest position, unless patient is directly attended • Document fall prevention teaching in education record	• Orientation to room • Bed in low position, brakes on • Siderails x2 or x4 up, assess large gaps, such that a patient could get extremity or other body part entrapped • Use of non-skid footwear for ambulating patients, use of appropriate sized clothing to prevent risk of tripping • Assess for adequate lighting, leave night light on • Call light is within reach, educate patient/family on its functionality • Environment clear of unused equipment, furniture in place, clear of hazards • Developmentally place patient in appropriate bed • Consider moving patient closer to nurses' station • Remove all unused equipment out of the room • Protective barriers to close off spaces, gaps in bed • Keep door open at all times unless specified isolation precautions are in use • Keep bed in lowest position, unless patient is directly attended Implement specific mitigation strategies for patients at risk of falls with injury • Assess elimination need, assist as needed • Check patient minimum every 1 • Accompany patient with ambulation • Assess need for 1:1 supervision • Evaluate medication administration times Review of safety protocols with parents/guardians/family • Patient and family education available to parents and patient • Document fall prevention teaching on education record • Educate patient/parents of fall precautions

Low effort, low impact initiatives

Removal of rolling stools. Another trend that was detected by the Falls HAC Team involved patient falls from rolling stools. Rolling stools were removed from patient care areas and were replaced with stools that do not roll when seated upon.

Purchasing additional small cribs. During a period of high census, staff had a difficult time finding cribs for all of the young patients that were being admitted. Bassinets were being used for many infants in the acute care areas. While this did not pose a risk in all units, it put patients at higher risk for falling on units that were not accustomed to using bassinets. An evaluation of crib availability and evidence on crib criteria and patient sizes was performed. This evaluation resulted in dissemination of a guide for staff in obtaining the appropriately sized cribs and an expansion of the number of small cribs available to accommodate infants.

Implications for practice

Implementation of a comprehensive pediatric fall prevention program based on quality improvement methodology revealed simple interventions with high impact and low effort. Involving nurses in shared decision making in both the selection of evidence-based tools

and nurse practice changes promoted the success of the fall prevention program. With continual evaluation of compliance with an evidence-based bundle of interventions to reduce falls and the involvement of nurses at all levels, pediatric fall prevention programs will improve patient safety. Future implications for practice involve collaboration with patients, families, and interprofessional team members to co-design fall prevention improvement activities in all hospital settings including the emergency department, ambulatory and surgical areas.

Future research is needed to determine ways to engage and empower caregivers to ensure implementation of reliable fall prevention measures and how to mitigate the risks of pediatric falls when nurses are not present. Additional knowledge is needed to determine factors that promote a patient culture of safety and influence nurses to report falls. Accurate reporting is needed to evaluate the true incidence pediatric falls and to design quality improvement initiatives that will address risks for fall prevention.

Limitations

This hospital's journey of implementation of an evidence-based fall prevention program did not exist as the only topic of focus in the organization's efforts to promote a culture of safety. Multiple efforts

Fig. 7. Five tips to prevent pediatric falls.

were being made simultaneously across the organization, which could be viewed as a limitation due to competing demands for attention. However, the Falls HAC Team recognized this factor and made efforts to collaborate with other groups and stakeholders to disseminate information strategically as to not overwhelm the recipients or dilute the messages being delivered.

Conclusion

In conclusion, achieving a culture of patient safety reduces harm to patients through rigorous evaluation and mitigation of potential risks. Pediatric patient falls include unique risk factors for consideration that include normal childhood behavior and development. In addition, best practices have evolved with improved availability of national benchmark data for pediatrics. Through collaboration among children's hospitals, evidence-based practices were adopted and implemented by a nurse led team resulting in a reduction in pediatric falls. Secondary gains included advances in safe sleep practices for both hospitalized and at discharge infants and children, standardization of safe crib selection for small infants, and integration of technology to identify fall risks. The engagement and empowerment of clinical nurses in the quality improvement process design and implementation yielded improved patient outcomes and patient safety while reducing harm. As part of the journey towards Magnet Recognition®, integration of national benchmark pediatric data and joining a patient safety collaborative with other children's hospitals resulted in a reduction in pediatric patient falls with injury.

Author Statement

Stephanie Benning: Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization, Supervision, Project Administration

Tammy Webb: Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Resources, Writing – Original Draft, Writing – Review & Editing, Visualization, Supervision, Project Administration, Funding Acquisition

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