

Using Root Cause Analysis to Reduce Falls in Rural Health Care Facilities

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Abstract

Prevention of patient falls is a significant patient safety concern in both acute and long-term health care settings. West Virginia's quality improvement organization, the West Virginia Medical Institute, worked collaboratively with the State's Patient Safety Improvement Corps, a national training program cosponsored by the Agency for Healthcare Research and Quality (AHRQ) and the Department of Veterans Affairs, on an AHRQ Information Technology Implementation Grant to assist health care institutions in reducing their rate of patient falls. We have done this by training 300 health care workers in root cause analysis (RCA) and by encouraging health care facilities to implement their own falls prevention programs, in which RCA is an essential tool to discover the cause of the initial fall and find ways to prevent recurrences.

Introduction

Fall prevention is important in both acute care and long-term care settings. Falls account for at least 40 percent of all accidents in hospitals and are the leading cause of injury and death among older adults.¹ Factors such as increased age, visual impairment, a history of falls, medications, incontinence, dizziness, delirium, and certain diagnoses are all potential risks for falls in this population.² Rural America is characterized as older, sicker, and poorer than its urban counterpart, suggesting that the risk for falls would be potentially greater here.³ In 1994, the total annual cost for fall injuries for adults age 65 or older was \$27.3 billion, and by 2020, it is estimated that the cost will reach \$43.8 billion.⁴

Previous studies have shown that fall-related injuries can be reduced by interventions that improve patient safety practices,⁵ and that such interventions are also important to hospital administrators and staff. In a study of patient safety priorities among rural hospital administrators and patient safety staff, falls were listed second, after adverse drug events, as a top priority.⁶

One method of reducing falls is to determine the underlying causes of falls through a process known as root cause analysis (RCA).⁷ RCA provides a structured and process-focused framework for approaching errors, and it lends organization to efforts to learn from previous mistakes.⁸

The Patient Safety Improvement Corps (PSIC) is a national training program, jointly sponsored by the Agency for Healthcare Research and Quality (AHRQ) and the United States Department

of Veterans Affairs (VA), to train health care staff in safety techniques. The primary goal of the PSIC is to improve patient safety by providing the knowledge and skills necessary to conduct effective investigations of reports of medical errors using RCA.

As part of the West Virginia Medical Institute's (WVMI) participation in an AHRQ grant ("Partnering to Improve Patient Safety in Rural West Virginia," UC1 HS01 4920-02), we formed a PSIC team and launched a collaborative project to reduce falls, using the RCA methods taught in the PSIC program. Members of the team included representatives from the West Virginia Office of Health Facility Licensure and Certification (OFLAC), two West Virginia rural hospitals, and WVMI, the Federally designated quality improvement organization (QIO) for West Virginia, Pennsylvania, and Delaware. The goals of our West Virginia PSIC team were to:

- Reduce the rate of falls in the inpatient setting by identifying and implementing a post-fall assessment tool. This tool was used to determine contributing factors that were either intrinsic to the patient (e.g., orthostatic hypotension, vision impairment, dementia) or extrinsic but in the patient's immediate environment (e.g., physical changes, lack of adaptive devices, noise level).
- Learn how to use the VA's RCA tool as a resource from which to draw interventions to prevent falls
- Initiate Statewide education of health care providers on the application of the RCA.

Background (Pilot Study)

Using the PSIC's RCA process, we first conducted a pilot project in two facilities: a small, rural acute care hospital and a rural critical access acute care hospital with a long-term care facility. The pilot ran from February 1, 2005 through September 30, 2005. Facilities in the pilot study were able to report their falls data by using an online incident reporting tool provided by Quantros, Inc. (Quantros, Inc. Occurrence reporting and management system; Milpitas, CA) through the AHRQ grant. The tool allowed them to gather specific data on the fall, including date of fall; cause of fall; restraint use; whether a fall assessment was completed; whether a fall protocol was in place at the time of the fall; and the main cause of the fall (Figure 1).

The hospitals' interdisciplinary team (IDT) conducted an RCA on each fall. Members of the IDT included representatives from all disciplines that were involved in the patient's care (e.g., nurses, physicians, therapists, and housekeeping). RCAs were used to identify causes specific to each fall and to help pinpoint areas for interventions to prevent future falls. Each of the facilities effected a change in the RCA process that they felt would increase their chances of successfully preventing a repeat fall. For example, one facility included families and patients in the RCA as part of the IDT; the other facility chose to perform the RCA during the shift in which the fall occurred.

Although the number of total fall events in the pilot study was small, the results were encouraging. The rural acute care hospital experienced an 84 percent decrease in initial falls (from 19 to three) and a 100 percent decrease in repeat falls (from 10 to zero). The critical access

Did hospital staff attempt to minimize the impact of the fall by ASSISTING the patient's descent to the floor? *	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Documented
Was the Fall/Accident ATTENDED by hospital staff? *	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Documented
Identify the MOST SIGNIFICANT injury as a result of the Fall/Accident: *	Please Select...
Specify Other Injury:	
Risk Related Details	
Was the patient assessed for being at risk? *	<input type="radio"/> Yes <input type="radio"/> No
Was the patient determined to be at RISK of falling according to the most recent risk assessment? *	<input checked="" type="radio"/> Yes <input type="radio"/> No
Was a Prevention/Precautionary PROTOCOL implemented prior to the Fall/Accident? *	<input type="radio"/> Yes <input checked="" type="radio"/> No
Attending/Consulting MD Orders prior to the Fall/Accident: *	Please Select...
Restraints Related Information	
Did the patient have restraint orders prior to fall? *	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Documented
Were restraints in use at the time of Fall/Accident?: *	<input type="radio"/> Yes <input type="radio"/> No
What type of restraint was in use?: *	Please Select...
Fall/Accident Cause Related Information	
Activity Engaged in by the patient Prior to Fall/Accident: *	Please Select...
Other Patient Activity:	
Fall/Accident Factors & Relationship Details	
Identify Environment of Care factors that could have contributed to the Fall/Accident: *	Please Select...
Specify Other Environmental Factor:	
What was the main patient factor associated with the Fall/Accident? *	Please Select...
Other Patient Factor:	
Medications administered prior to Fall/Accident	
Are there any Medications the patient is on that could have contributed to the Fall/Accident? *	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown
Were any of the following types of medications administered to the patient?	
Analgesics/Narcotics: <input type="checkbox"/>	Cardiac: <input type="checkbox"/>
Diuretics: <input type="checkbox"/>	Bowel Prep: <input type="checkbox"/>
Sedatives: <input type="checkbox"/>	Other Medication: <input type="checkbox"/>
Specify Other Medication Group:	
Were any of the medications indicated above administered within 12 hours of the Fall/Accident?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown

Figure 1. Fall-reporting section of the Quantros online incident reporting tool.

acute care hospital, with the long-term care facility, saw a 60 percent decrease in initial falls (from five to two) and a 100 percent decrease in repeat falls (from one to zero).

Through the use of RCAs, the staffs at these two facilities discovered that their own individual programs for identifying patients at high risk for falls and for implementing safety strategies for preventing initial falls were not working well. This finding led to further changes in falls implementation programs. Specifically, staff were not routinely completing falls risk assessments at admission, nor were they completing the post-fall assessment tools. In response to this finding, one risk manager added an annual training on falls prevention for all staff, rather than just for new staff.

Based on the positive results from this pilot study, we moved forward with plans to implement a statewide program for any West Virginia health care facility or home health care agency that wished to participate. Training sessions were held throughout the State for staff from interested facilities to learn how to perform RCAs and to learn from others their “best practices” for reducing falls. In addition, monthly conference calls were held with participating health care facilities to discuss best practices and issues relating to staff involvement in learning to perform RCAs.

Methods

In October and November 2006, WVMI hosted two separate learning sessions for over 300 health care workers in West Virginia. The learning sessions were led by speakers from the State PSIC, including the project manager for the AHRQ Health Information Technology (HIT) Implementation Grant, who was also a member of the PSIC.

The learning sessions taught the RCA process, emphasizing that the RCA approach could be used in any health care setting. The training focused on processes that avoided individual blame and spotlighted the cause of the fall. The VA RCA Tool Kit was used as the basic outline for the learning sessions.⁷

Health care providers participating in the training sessions were encouraged to join the State’s Falls Prevention Collaborative project. Participation in the Collaborative involved a commitment to conduct RCAs of falls occurring at their facilities, develop and implement intervention(s) to prevent repeat falls, and collect and report data on falls for the 6 months prior to and the 6 months after the intervention. Those that chose to join were asked to send WVMI retrospective baseline data on all falls occurring in their facilities between April 1, 2006 and September 30, 2006 (the 6 months preceding the statewide group learning session). In some facilities, hospital leaders provided additional training on RCAs for their staffs during October and November 2006.

When a patient experienced a fall, the facilities collected data using either the Web-based incident-reporting tool (Figure 1) (for facilities participating in the AHRQ grant), or they provided the same information using a paper fall-assessment tool (Table 1).

After a fall was reported, the IDT leader interviewed the patient, the staff, and any member of the patient’s family who might have witnessed the event. The IDT then conducted an RCA to

determine the intrinsic and extrinsic factors related to the fall and identified and implemented patient-specific interventions based on the results of the investigation.

We asked each participating facility to collect falls data prospectively for the period between December 1, 2006 and May 31, 2007 and send them to us. We used a single quality measure to monitor results of this project: fall rate, expressed as falls per 1,000 patient days.

Throughout the collaborative project we conducted monthly conference calls to discuss “best practices” and “lessons learned” with the health care facilities. Guest speakers from participating health care facilities talked about the project and discussed problems or concerns they had encountered while performing RCAs and how they overcame these problems. One long-term care facility stated that it conducted “mini-RCAs,” an abbreviated version of the formal RCA process, since there was not enough time for employees to do a full RCA on each fall.

Some of the “lessons learned” aided in the RCA discovery process. One hospital’s IDT discovered that patients or family members could sometimes be the best source of information regarding how and why a patient fell. Facilities employed a number of interventions based on what they learned through their RCA process, including having patients put on their call light when they went to the bathroom, using informative signs in the patient room, and training staff in proper lifting techniques and how to transfer patients.

Results

Thirteen facilities (11 hospitals and 2 long-term care facilities) participated in this project. The long-term care facilities were excluded from the final data analysis because they recorded “near miss” falls differently from the hospitals, specifically as actual falls, potentially skewing the results. Of the 11 facilities whose data were included in the results, eight were rural facilities participating in the AHRQ HIT grant, including six critical access hospitals (CAHs).

For data of this type, it is often difficult to establish meaningful denominators. In analyzing the falls data, we decided to use patient days as the denominator (since it is relatively consistent across facilities), and number of falls as the numerator. Rates are expressed as falls per 1,000 patient days.

The total falls per 1,000 patient days across all facilities decreased 45 percent, from 133.9 at baseline to 73.05 at remeasurement. The mean falls per facility per 1,000 patient days decreased from 12.17 at baseline to 6.64 at remeasurement. The median falls per facility per 1,000 patient days decreased from 4.94 to 3.02 between baseline and remeasurement (Figure 2).

Variation decreased significantly as well: the range from the 10th to 90th percentile decreased from 2.24 to 21.2 at baseline to 2.11 to 7.40 at remeasurement (Table 2). Nine of the 11 facilities experienced a decline in falls per 1,000 patient days from baseline to remeasurement (Figure 3). Falls data for each of the participating facilities are detailed in Table 2.

Table 1. West Virginia Falls Project Assessment Tool

Patient data (de-identify when sending to WVMI)	Date of fall (12/1/06 to 5/31/07)	Cause of fall (climbing, reaching, transferring, walking, unknown, other; please specify)	Restraints?		Fall assessment done?		Was patient determined to be at risk for a fall?		Was fall protocol in place?		What was the main factor associated with the fall?
			Yes ^a	No	Yes	No	Yes	No	Yes	No	(see list) ^b

a If Yes, please specify restraint type: e.g., 2-point, 4-point, handmits, vest, wrist, other.

b Examples of factors associated with falls: **Extrinsic** includes bed/side rails; call light not used; crowded room; foot wear; flooring; tub/shower; wet floors; noise level; poor lighting; other (please specify); and unknown. **Intrinsic** includes: bowel/bladder problems; changes in clinical condition; confused/disoriented; dizziness; hypotension; intentional act; loss of balance; seizure; medications; electrolyte imbalance; weakness/fainting; other (please specify); and unknown.

of discharges _____

of inpatient days _____

Table 2. Changes in falls per 1000 patient-days during 6-month periods before and after statewide RCA learning sessions

Facility	<u>Before RCA learning sessions</u> April 1, 2006 to September 30, 2006			<u>After RCA learning sessions</u> December 1, 2006 to May 31, 2007			Absolute change in falls per 1000 patient days
	Inpatient days	Number of falls	Falls per 1,000 patient days	Inpatient days	Number of falls	Falls per 1,000 patient days	
Hospital A	283	6	21	344	1	3	-18
Hospital B	1,417	7	5	1,523	5	3	-2
Hospital C	4,918	9	2	5,180	9	2	0
Hospital D	745	49	66	889	32	36	-30
Hospital E	7,146	16	2	7,619	23	3	1
Hospital F	3,552	19	5	4,443	27	6	1
Hospital G	3,690	11	3	3,718	10	3	0
Hospital H	1,826	30	16	3,917	29	7	-9
Hospital I	6,956	26	4	6,649	14	2	-2
Hospital J	11,699	65	6	10,880	57	5	0
Hospital K	14,768	57	4	15,043	39	3	-1
Total	57,000	295	134	60,205	246	73	-61
Mean	5,182	27	12	5,473	22	7	-6
Median	3,690	19	5	4,443	23	3	-1
10 th %-ile			2			2	
90 th %-ile			21			7	

Discussion

While this project resulted in a decrease in the number of falls overall, the participating facilities experienced barriers and challenges to performing an RCA after each fall. One barrier for some facilities was simply maintaining a sufficient number of trained staff to complete the RCAs in a timely manner; this problem was exacerbated by high staff turnover.

Staff training and motivation to follow through continue to be a challenge that facilities must overcome if RCAs are to become standard practice in the falls protocol.

Nonetheless, we have noted an overall increased interest and involvement in performing RCAs related to falls in West Virginia health care facilities as a result of this statewide falls prevention training effort. Anecdotally, the IDTs in several facilities have informed us that they have found it beneficial to meet more frequently than originally scheduled, including meeting as soon as possible after a fall occurs. They also have found that patients and their family members, as well as staff, have contributed useful information toward finding the cause of initial falls that can be used to prevent subsequent falls. For example, in one facility when the IDT asked a patient's family member the cause of a fall, the family member informed them that "He [the patient] likes his sweater close to him, and he fell trying to reach for it."

An important outcome of the staff involvement in collaborative efforts with other facilities is their heightened awareness of the need for early identification of potential causal factors of inpatient falls and the role this plays in an overall improvement in patient safety.

However, periodic re-education of the staff is vital to make sure all components of the falls prevention program are in

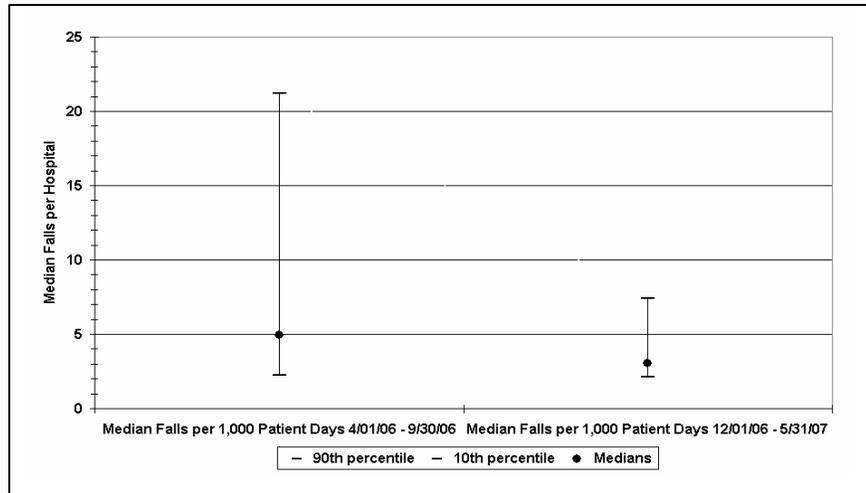


Figure 2. Median falls per hospital per 1,000 patient days from baseline to remeasurement: 10th and 90th percentiles.

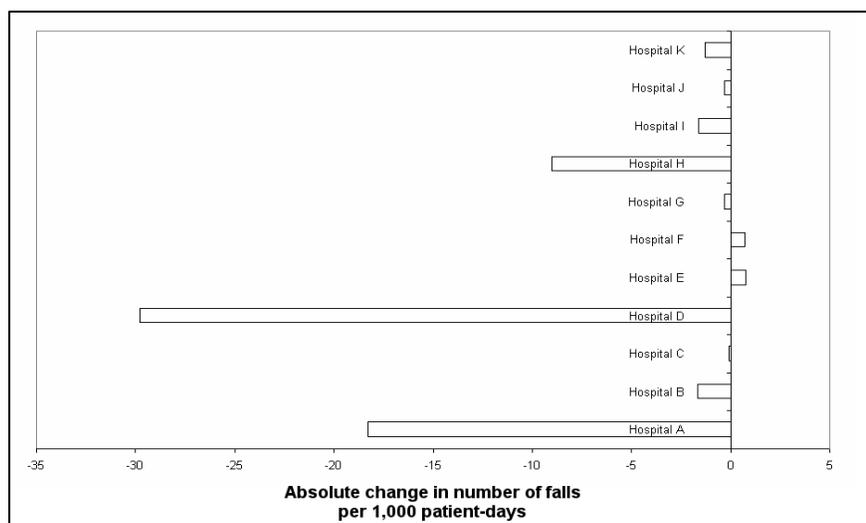


Figure 3. Absolute change in number of falls per 1,000 patient days from baseline to remeasurement for each participating hospital.

place—a lesson learned in the pilot phase of this study. These components include the completion of the initial fall risk assessments and implementation of fall prevention measures. This is particularly true for small rural providers that are likely to see fewer events by virtue of their low census.

Conclusions

RCA can be an effective tool for reducing the rate of falls in acute care facilities, even for the smallest of rural health care providers, and it can be easily taught in group settings. Statewide learning sessions are an efficient method of conducting such instruction. Group learning sessions also provide an opportunity for similar facilities to discuss best practices and lessons learned, in addition to any problems or concerns encountered during the RCA process.

By leveraging the training received from the AHRQ PSIC and the funding and analytic expertise from the AHRQ HIT Implementation grant, West Virginia was able to realize a statewide collaborative falls prevention effort that trained over 300 health care providers in performing RCAs. Furthermore, the overall project promoted a statewide learning community through collaborative efforts, such as the generation of peer group patient safety benchmarks.

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