

An Analysis of Patient Falls and Fall Prevention Programs Across Academic Medical Centers

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UHC conducted an analysis of more than 25 000 patient fall reports entered into the UHC Patient Safety Net incident reporting tool. Gaps were found in the completion of fall risk assessments, the ability of tools to accurately assess risk, and prevention strategies in particular inpatient units and emergency department. Common factors in falls resulting in major harm or death included age more than 80 years, altered mental status, ambulation (often without assistance), toileting, and diuretics and anticoagulants. **Key words:** *fall prevention, fall rate, fall risk assessment, harmful falls*

FALLS, which can result in significant injury, extended hospital stays, increased health care costs, loss of independence, and even death, are one of the most frequently reported incident types in hospitalized patients.^{1–3} Depending on the patient population, setting, and diagnosis, the rate of reported inpatient falls varies from 0.64 to 9 per 1000 patient days, with lower rates in pediatric populations and higher rates in geriatric, rehabilitation, and neurology care areas.^{2,4–8}

A *fall* is defined by the National Database of Nursing Quality Indicators (NDNQI) as “an

unplanned descent to the floor or extension of the floor, with or without injury to the patient.”^{9(p50)} The causes of inpatient falls are multifactorial, including both intrinsic and extrinsic factors, so preventing fall-related injuries is challenging. Falls can be caused by accidental or environmental factors, by physiological factors that can be anticipated or unanticipated, by behavioral factors, and in children by developmental factors.³ Risk factors associated with inpatient falls include a history of a recent fall, advanced age, certain medications, altered mental status/impaired cognition, specific diagnoses, multiple comorbidities, mobility impairment, muscle weakness, postural hypotension, behavioral disturbance, agitation, and urinary incontinence or frequency.^{2,4,7,8}

Because national initiatives are aimed at preventing patient harm from falls,^{10,11} prevention programs require additional focus on patient risk factors associated with injury from a fall, such as age more than 85 years; use of an anticoagulant or presence of a coagulation defect; osteoporosis, metastatic bone disease, vitamin D deficiency, or malnutrition; and lower limb amputation or major abdominal or thoracic surgery.^{2,12–14} Using these

Author Affiliation: UHC, Chicago, Illinois.

Authors have no conflicts of interest and no funding sources to disclose.

Supplemental digital content is available for this article. Direct URL citation appears in the printed text and is provided in the HTML and PDF versions of this article on the journal's Web site (www.jncjournal.com).

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Accepted for publication: June 17, 2013

Published ahead of print: July 9, 2013

DOI: 10.1097/NCQ.0b013e3182a0cd19

factors, fall risk assessments can identify patients at greater risk of injury so that targeted prevention strategies can be implemented.^{1,12-14}

Because the causes of inpatient falls are multifactorial and include both patient-specific and environmental factors, a fall prevention program should include a wide range of actions to promote safety across the organization and at the patient level.^{1,3,15,16} Fall prevention programs have been shown to reduce falls and fall-related injuries by 30% to 64%.^{2,7,17-19}

OBJECTIVE

University HealthSystem Consortium (UHC) analyzed data from the UHC Patient Safety Net (PSN), a Web-based incident reporting tool used by academic medical centers and their affiliated hospitals. The objective of this study was to increase our understanding of falls by identifying factors associated with falls, with and without harm, and by exploring the effectiveness of fall risk assessment tools and prevention programs.

METHOD

Trends for 154 618 inpatient falls reported from 2004 through 2010 were analyzed, and rates of reported falls were calculated for inpatient and emergency department (ED) locations. Rates of reported falls per 1000 inpatient days were calculated for 40 UHC organizations that participate in both the PSN and the UHC Operational Data Base or the UHC Clinical Data Base/Resource Manager, from which data on inpatient days could be obtained. In addition, fall rates were obtained from the UHC Nursing Quality Data Base (NQDB), which collects UHC member data from NDNQI.

UHC conducted a retrospective review of 25 510 falls among inpatients and ED patients that were reported in the PSN by 76 organizations in 2010. Quantitative analysis was completed on aggregated data from fall reports. Aggregated data were analyzed by

age, gender, location, time of the fall, level of injury, contributory factors, risk status, medications ordered, activity, and prevention strategies at the time of the fall. Text entered information for "other contributing factors" was reviewed. In addition, organizations that participate in the PSN were asked to complete a survey on the components of their fall prevention programs and assessment tools.

FINDINGS

Trends in reported falls from 2004 to 2010

The analysis of 154 618 inpatient falls entered into the PSN database from 2004 through 2010 showed a decrease in the rate of reported falls beginning in 2005, when The Joint Commission introduced National Patient Safety Goals aimed at reducing falls and associated harm.¹⁰ Between 2005 and 2010, there was a 20% reduction (from 95.6 to 76.8) in the rate of reported falls per 1000 staffed beds, a 27% reduction (from 15.3 to 11.2) in harmful falls, and a 34% reduction (from 0.29 to 0.19) in falls requiring life-sustaining intervention or resulting in permanent harm or death.

Rates of patient falls in 2010

In 2010, the average inpatient fall rate for 40 hospitals that use the PSN was 3.16 per 1000 patient days (range, 2.90-3.31), and the average rate of falls with injury was 0.53 per 1000 patient days (range, 0.40-0.69). In addition, fall rates for all reported falls and falls with injury were calculated per 1000 patient days for specific location types in the PSN. These rates were compared with rates obtained from the UHC NQDB.

Both data sets showed higher rates of falls per 1000 patient days in adult rehabilitation (PSN/NQDB rates were 9.26/6.88, respectively), adult medical/surgical (6.26/3.67), psychiatric (PSN rate 5.60), adult medical (4.82/4.10), and bone marrow transplant (2.98/3.98) units. These locations also had higher rates of falls with injury with the highest rate in adult rehabilitation (1.65/1.0).

Lower fall rates were found in pediatric (PSN rate 0.59), women's (PSN rate 0.90), adult critical care (1.66/1.69), intermediate care (1.27/3.30), and adult surgical (2.68/2.95) units. Fall rates derived from each database were similar for adult medical, adult surgical, and critical care units, but differences were noted in adult rehabilitation, combined medical/surgical, and intermediate units (Supplemental Digital Content, Table 1, available at <http://links.lww.com/JNCQ/A27>). Although the reasons for these differences are not entirely clear, they may be related to differences in the categorization of units, rate calculation formulas, and reporting practices. In addition, the PSN data include "near miss" events, but the NQDB data do not.

Findings in 2010 fall data

Location

Almost 75% of 25 510 reported falls in 2010 occurred in one of 11 locations: medical-surgical units (15%), medical units (11%), adult psychiatric units (11%), rehabilitation units (10%), ED (6%), surgical units (5%), telemetry units (3%), neurology units (3%), orthopedic units (3%), medical oncology units (3%), and cardiac units (3%). The remaining falls occurred in many other location types. To further analyze fall data for variations by location, individual locations were categorized into a more manageable list of 7 location groups (n = 22 741):

- *Medical-surgical* (n = 8131, 36%)
- *Specialty acute care*: rehabilitation, cardiac, oncology, neurology, orthopedic, renal, trauma, urology, and diabetic units (n = 5804, 25%)
- *Special care areas*: intensive care, intermediate, burn, bone marrow transplant, and telemetry units (n = 4026, 18%)
- *Psychiatric*: psychiatric and chemical dependency units (n = 2441, 11%)
- *ED* (n = 1425, 6%)
- *Pediatric*: pediatric intensive care, intermediate, medical-surgical, and oncology units (n = 519, 2%)

- *Women's acute care*: gynecology, obstetric, and labor and delivery units (n = 395, 2%)

Level of injury, age, gender, and location

Fall reports were analyzed using the NDNQI injury scale, which has 5 levels of injury—none, minor, moderate, major, or death⁹; 500 reported falls were not included in the analysis because a level of injury was not assigned. Of the 25 010 inpatient falls, 18 967 (76%) resulted in no injury, 5369 (21%) resulted in minor injury (requiring application of a dressing or ice, cleaning of a wound, limb elevation, or application of topical medication); 502 (2%) resulted in moderate injury (requiring suturing, application of Steri-strips/skin glue, or splinting); and 172 "high-harm" falls (<1%) resulted in major injury (requiring surgery, casting, traction, or consultation for neurological or internal injury) or death.

In a review of falls by age group, the greatest number of falls was reported in 51- to 60-year olds, followed by those 61 to 70 years old. Although male patients had a higher percentage of falls than female patients (53% and 47%, respectively), female patients were more likely to experience a fall that resulted in major injury or death (Table 1), most notably female patients older than 80 years. In the pediatric population, male patients were more likely to experience high harm. In a comparison of adult, non-gender-specific locations, variances in fall data for age and gender were noted in psychiatric units, where young adults fell more often than older adults, and female patients across all adult age groups fell more often than male patients.

Pediatric patients (≤ 17 years old) and patients older than 80 years sustained minor injury more often (34% and 32%, respectively) than other age groups (22%-24%). However, patients were more likely to experience moderate injury and major injury/death with advancing age. Adults older than 80 years sustained major injury or death 2 to 6 times more often than younger age groups (Table 1).

Falls in pediatric and psychiatric units and EDs resulted in injury (minor-major)

Table 1. Falls by Level of Injury for Each Age Group and Location Group

Characteristics	No. of Events ^a	No Injury, % (n = 18967)	Minor Injury, % (n = 5369)	Moderate Injury, % (n = 502)	Major Injury/Death, % (n = 172)
Gender					
Male	13 311	75.2	21.9	2.3	0.6
Female	11 694	77.5	20.1	1.6	0.8
Age group, y					
≤ 17	904	65.9	32.3	1.2	0.6
18-30	2057	78.2	19.9	1.5	0.4
31-40	2004	77.6	20.3	1.6	0.5
41-50	3896	77.3	20.0	2.1	0.6
51-60	5561	77.0	20.5	2.0	0.5
61-70	4699	76.2	21.0	2.1	0.7
71-80	3330	75.9	21.5	1.9	0.7
81-90	2186	71.6	24.2	2.8	1.4
>90	368	64.7	29.1	3.5	2.7
Location group					
Medical-surgical	8005	78.1	19.7	1.7	0.5
Specialty acute care	5683	77.0	20.7	1.6	0.7
Special care area	3972	74.1	22.8	2.0	1.1
Psychiatric	2381	69.3	27.8	2.2	0.7
ED	1388	70.0	23.5	6.1	0.4
Pediatric	516	70.5	27.7	1.2	0.6
Women's acute care	383	85.6	12.8	1.3	0.3

Abbreviation: ED, emergency department.

^aThe total number of events may vary depending on whether there were missing data for gender, age, and injury level.

or death more often than those in other locations, but pediatric and psychiatric units had more minor injuries. Falls in EDs resulted in moderate harm more often (6%) than those in other locations (1%-2%). Patients in special care areas were more likely to experience major injury or death from a fall (1.1%) than those in other care area groups (0.3% to 0.7%) (Table 1). Although falls were less frequently reported in some of the following individual care areas, patients were more likely to sustain major injury or death from a fall in the operating room (14%), transplant intensive care unit (3%), pediatric oncology (3%), medical/cardiac intensive care unit (2%), surgical oncology (2%), geriatric psychiatry (2%), and telemetry units (2%). Of the 172 high-harm falls, medical units (10%), medical/surgical units (10%), and telemetry units

(8%) reported the greatest number of major harm or death events. In addition, 5% of falls resulting in major injury involved hospitalized patients who fell in treatment or public areas.

Activity/contributing factors

The most common patient activities at the time of a fall were toileting (23%) and ambulating (22%). The most common patient factors contributing to falls were altered mental status/cognitive impairment (34%), inability to rise without assistance (19%), and altered elimination (16%). These 3 factors were more common in patients on medical/surgical, special care areas, and specialty acute care units, and with advancing age. Dizziness/vertigo was a factor in 10% of all falls; it was the most common factor contributing to falls on women's units and the second most common

in psychiatric and pediatric units and the ED. Dizziness was a more common factor in young adults than in other age groups.

For the 172 high-harm events, patients were most frequently described as ambulating (38%), often without assistance, or trying to get to the toilet or toileting (35%), and/or had altered mental status/impaired cognition (35%). Nine percent of high-harm falls involved the use of a commode. Depression was a contributing factor in 4% of all falls, and in 7% of falls resulting in major injury or death.

Medications

Pain medications/opiates (29%), cardiac drugs/antihypertensives (25%), sedatives/hypnotics (20%), and antipsychotics/antidepressants (15%) were the most common medications being taken by patients at the time of a fall. Seventeen percent of the patients who fell were taking 3 or more of these medication types at the time of the fall.

Patients taking cardiac/antihypertensive medications, anticoagulants, and diuretics appeared to be at higher risk for major injury or death when they fell. Drugs in these 3 categories were being taken more often by patients who suffered major injuries or death (34%, 19%, and 16%, respectively) when compared with all falls (32%, 15%, and 9%, respectively). Fallers sustaining major injury or death were almost twice as likely to be taking diuretics compared with all fallers.

Repeat falls

Patients who fell more than once accounted for 8.5% of all those who fell. Repeat falls were more common in male patients (56%). Of patients who fell more than once, 43% were reported to have altered mental status or cognitive impairment, 6% had depression, and 21% were taking antidepressants. These characteristics were noted to be more common in repeat falls when compared with single falls (31%, 3%, and 13%, respectively). Twenty percent of falls resulting in major injury or death involved a patient who had had at least 1 other fall.

Repeat falls were most common on psychiatric units; 33% of falls involved a patient who had already fallen at least once. Forty-six percent of repeat fallers on psychiatric units had altered mental status/cognitive impairment identified as a factor contributing to their fall. These fallers were also taking sedative/hypnotics (60%) and antipsychotics/antidepressants (59%) 3 to 5 times more often than single fallers.

Time of day

The number of falls peaked 1 to 2 hours after mealtimes (10 AM, 2 PM, and 6 PM), possibly due to the need for toileting. In the ED, many falls occurred between 5 PM and 10 PM (typically ED peak volume time). In psychiatric units, falls peaked at 10 PM.

Risk assessment

To help define tool improvement opportunities, fall reports were reviewed for factors associated with patients who fell but had not been assessed as at risk of falling. Of all patients who fell, 88% had been assessed for fall risk. Of these, 80% were assessed as at risk of falling and 17% as not at risk; risk status was unknown for 3%. Of the patients who were assessed as at risk of falling, 76% had been assessed for risk within 12 hours before falling, and 9% had been assessed 12 to 24 hours before falling.

An analysis of patients' fall risk status by age showed that as age decreased, patients were less likely to be assessed. Patients older than 80 years were assessed for fall risk about 96% of the time; the percentage of patients assessed decreased progressively in each age group below that to a low of 69% for patients in the youngest group (≤ 17 years old). Patients in younger cohorts (< 50 years old) who were assessed were more likely to have been assessed as not at risk than those older than 50 years (Table 2). Female patients 11 to 40 years old were the most likely to be assessed as not at risk.

Most fallers had been assessed for fall risk on specialty acute care, special care, medical/surgical, and psychiatric units. Fall risk

Table 2. Risk Assessments by Age and Location

Characteristics	No. of Events ^a	Risk Assessment Completed, N (%)	Fallers Assessed as Not at Risk, N (%)
Age group, y			
≤ 17	888	616 (69)	191 (33)
18-30	2040	1719 (84)	501 (30)
31-40	1995	1760 (88)	410 (24)
41-50	3852	3451 (90)	635 (19)
51-60	5527	5062 (92)	798 (16)
61-70	4647	4315 (93)	579 (14)
71-80	3275	3092 (94)	408 (14)
81-90	2167	2078 (96)	172 (9)
> 90	362	347 (96)	15 (5)
Location group			
Medical-surgical	7974	7594 (95)	1072 (14)
Specialty acute care	5647	5433 (96)	753 (14)
Special care area	3937	3733 (95)	610 (16)
Psychiatric	2362	2127 (90)	553 (26)
ED	1369	689 (50)	233 (34)
Pediatric	510	416 (82)	103 (25)
Women's acute care	381	301 (79)	137 (46)

Abbreviation: ED, emergency department.

^aNumber of events may vary depending on whether there were missing data for age and risk assessment completion.

assessments had not been completed for 50% of patients who fell in the ED. Of patients who fell in women's acute care and pediatric units, 21% and 18%, respectively, had not been assessed for fall risk. In women's acute care units, nearly half of assessed patients had been classified as not at risk. Similar issues were seen in the ED, psychiatric units, and pediatric units, where 34%, 26%, and 25% of assessed patients who fell, respectively, had been assessed as not at risk (Table 2).

In patients assessed as not at risk of falling, 16% of patients fell because of dizziness/vertigo, which was twice more common than patients who were assessed as at risk of falling. Dizziness/vertigo was also a more common factor in falls that occurred in women's units (22%), psychiatric units (15%), pediatric units (11%), and the ED (11%), where patients were more likely to be assessed as not at risk. Patients who were assessed as not at risk fell more often while ambulating, toileting (including trying to reach the toilet

or during or after toileting), and in the hallway than did those at risk. For those fallers identified as not at risk on women's acute care units, a common and unique factor described as "other contributing factors" was diminished sensation or weakness postepidural administration.

A slightly higher percentage of patients (2%) who were assessed as not at risk experienced minor injury than did those at risk; no other differences between the 2 risk groups were seen. In the 172 falls resulting in major injury or death, 88% had been assessed for risk of falling; of these, 16% were classified as not at risk.

Prevention strategies

The fall prevention strategies that were in place at the time of the fall were bed in low position (68%), patient education (60%), fall alerts in place (47%), toileting schedule (33%), bed exit alarm (18%), medication modified (5%), and chair exit alarm (3%). These

prevention strategies were most commonly used and with similar frequency on medical/surgical, special care, and specialty acute care units. Gaps in prevention strategies were noted in the ED, pediatric, and women's units where interventions such as patient education, high-risk alerts, toileting interventions, bed exit alarms, and modification of medications were implemented less frequently than in other locations.

Findings on components of fall prevention programs and risk assessment tools

UHC conducted a survey of its members on their use of evidence-based fall prevention practices. Thirty-four of 100 surveys distributed were returned. The most common practices among survey respondents were the use of standardized risk assessments and environmental alerts. Hospitals also were asked to identify up to 5 practices that had the greatest effect in preventing falls and related injury. The most frequently selected practices and rate of selection included rounds every 1 to 2 hours to assess patient's needs (68%), risk assessments (56%), environmental alerts (44%), a team/committee that provides oversight of the fall prevention program (41%), and personal or pressure sensor alarms for patients at risk (38%) (Table 3).

In addition to the practices listed in Table 3, respondents reported successful use of these fall prevention activities:

- A postfall algorithm and physician order set
- Simulation training for nurses and residents on fall risk assessment and postfall evaluation
- Fall champions and safety coaches
- Ensuring that a staff member is within arm's reach during all toileting activities
- A fall risk dashboard in the electronic medical record.

Engagement and support of senior leadership are critical to the success of any fall prevention program. Senior leadership should identify and support an interdisciplinary falls

prevention team and establish mechanisms to monitor and evaluate the program.^{2,3,18}

Organizations were asked about their use of both organization-wide and population-specific fall risk assessment tools. The most commonly used organization-wide fall risk assessment tools were the Morse (44%) and Hendrich II (21%) tools, as well as tools created in-house or by combining commonly used scales (29%). Other fall risk assessment tools identified included the Schmid and Conley tools, The Johns Hopkins Hospital Fall Risk Assessment, and the Hester Davis Scale. The majority of organizations (68%) that provide pediatric inpatient services used the Humpty Dumpty Fall Risk Assessment for that population.

The Johns Hopkins Hospital Fall Risk Assessment and Hester Davis Scale, more recently developed tools, address risk factors not found in some of the older tools. Developed and refined over the past 10 years, The Johns Hopkins Fall Risk Assessment screens risk in 7 key areas: age, fall history, mobility, elimination, cognition, medications, and equipment, and includes an assessment of fall-injury risk. Standardized interventions are determined on the basis of the patient's level of fall risk and injury risk. The Johns Hopkins Tool is currently undergoing validation.^{26,27}

The Hester Davis Scale, developed at the University of Arkansas Medical Sciences Medical Center, is a validated 9-section scale that assesses additional areas of patient risk such as dizziness, medication factors, volume and electrolyte imbalances, sensory issues, and behavioral issues. The scale stratifies the patient's fall risk as low, moderate, or high and highlights the patient's individual risk factors, facilitating the creation of a plan of care that includes both standardized and individualized interventions.²⁸

DISCUSSION

This falls analysis represents a large sample of inpatient falls reported at 76 organizations across the country; therefore, the findings

Table 3. Components of 34 Organizations' Inpatient Fall Prevention Programs

Program Component	Fully/Almost Fully Implemented	Partially Implemented
^a Standardized risk assessments completed on all patients (admission, change of shift, transfer, and change in patient's status) ^{1,17,18,20}	100%	0%
Risk assessment includes identification of patients at risk for fall ^{1,17,20}	100%	0%
^a Environmental alerts on patient's fall/injury risk and level of assistance/interventions needed ^{1,13,16,18}	94%	6%
Regular review of falls and communication on fall statistics ^{1,3,16-18,20}	91%	9%
^a Personal or pressure sensor alarms ^{1,3,16,20}	85%	6%
Formalized, mandatory staff education on fall prevention including fall risks and prevention, environmental safety, and safe transfer ^{1,3,16-18}	82%	18%
^a Rounding every 1 to 2 hours to assess and assist in patient needs for toileting, pain relief, repositioning, and environmental safety ^{16,18,20}	76%	21%
Increased intensity and frequency of observation (one-to-one, line of sight) for patients at highest risk of serious fall-related injury ^{16,20}	76%	21%
^a Oversight/guidance of the falls prevention program by a multidisciplinary committee ^{2,3,18}	74%	21%
Standardized, multifaceted interventions based on patient's individual risk factors/needs ^{1,3,15-17,20}	74%	24%
Physical and occupational therapy referrals ^{1,3,20-22}	71%	12%
Standardized hand-off communication (at shift change, transfer) that includes patients at risk of falling and sustaining a fall-related injury ^{1,16,20}	56%	44%
Medication reviews by primary provider, treatment team, and/or pharmacist ^{1,3,18,20,23,24}	56%	21%
Risk assessment includes identifying patients at risk of a fall injury ^{2,12-14}	50%	15%
Postfall assessment/huddle ^{1,2,12,14,20}	50%	32%
Patient education on fall prevention using teach-back method ^{1,2,12,14,16,18,20}	50%	47%
Quarterly walk-through with multidisciplinary team to identify environmental hazards and equipment and renovation needs ^{5,16,17,20}	47%	18%
Identification of patients most at risk of moderate to serious injury from a fall early in each shift (shift safety huddles) ¹²	44%	41%
Gait belts for ambulating patients ²	44%	41%
Family education on fall prevention using teach-back method ^{1,2,12,20}	35%	59%
High-impact floor mats ^{14,20,25}	21%	12%
Hip protectors and helmets ^{10,14-16}	3%	15%

^aIndicates 1 of 5 most effective components of fall prevention programs as identified by survey respondents.

have good generalizability. Trended data from fall reports entered between 2004 and 2010 showed that national efforts have been successful in reducing inpatient falls and harm from falls. Although voluntary incident reporting is subject to variability among organizations and underreporting, this study provides fall rates for various inpatient units and the ED for organizational comparison.

While some of the findings in this data validate what we know about falls, other findings provide new information that can help guide organizations in their improvement efforts. This analysis supports findings in the literature on risk factors associated with serious fall injuries such as age greater than 80 years,^{12,14} toileting and the use of a commode,⁵ altered mental status,²⁹ and use of anticoagulants.¹²⁻¹⁴ Seriously injured fallers were commonly described as ambulating, often without assistance, and were almost twice as likely to be taking diuretics compared with other falls. The use of diuretics is likely related to the need to toilet, which is associated with fall injuries.⁵

A standardized fall risk assessment tool is an essential component of a fall prevention program and should be completed at regular intervals during hospitalization.^{1,17,20} Fall risk assessments are useful in identifying patient-specific risk factors and level of risk; they also increase staff awareness of issues relating to falls and guide the selection of prevention strategies. Some tools apply standardized interventions based on a general risk score without linking individual risk factors to specific interventions, whereas others provide interventions in specific areas of risk. Specific risk factors associated with various inpatient populations should be addressed in screening tools, and they should be validated in the specific inpatient population they are being used.^{2,7,17} It is important that organizations understand these differences when choosing an assessment tool.

While fall risk assessment tools that have been validated in different settings and patient populations are available (eg,

Morse and STRATIFY), even validated tools do not perform consistently well in predicting fallers and nonfallers across a variety of settings,^{2,7,13,17,30,31} which is demonstrated in this analysis. Challenged to reduce falls and injuries in the inpatient setting, organizations are modifying or developing their own organization-wide and population-specific fall risk assessment tools (30% surveyed created an in-house tool) in an attempt to improve their predictive value, but many of these have not been validated.

One of the aims of this analysis was to understand the effectiveness of fall risk assessments, and there were important findings in this regard. There was variation across locations, age groups, and in gender in the rate of completion of fall risk assessments and the ability of these tools to accurately assess fall risk. The greatest opportunities for improvement were identified in patients younger than 50 years, particularly female patients, and patients in women's acute care units and the ED where there were the lowest rates of completion of risk assessments and the highest rates of failure to identify fallers as at risk.

Continued efforts focusing on the improving inpatient fall risk assessment tools and prevention strategies to meet population-specific risks are warranted. For example, the data on risk assessments suggest the need for tools that screen for dizziness and identify prevention strategies, but not all tools screen for dizziness. On inpatient units, dizziness was a common factor in falls and in fallers assessed as not at risk. Because studies are limited, there is currently no empiric evidence supporting recognition or management of dizziness or postural hypotension.⁷ In women's acute care units, falls were most commonly a result of dizziness, and a cause commonly described was numbness/weakness after epidural anesthesia.

Unique differences were also found in the characteristics of fallers on psychiatric units, which can help direct screening, interventions, and education; young adults and female

patients across all age groups fell more often and repeat falls were common in this population. Central nervous system agents can increase the likelihood of a fall, and studies have shown that that central nervous system agents³² and sedatives/hypnotics³³ are significantly associated with falls. Commonly used psychotropic medications cause sedation, dizziness, hypotension, and confusion in patients on psychiatric units who are often ambulating rather than in bed.⁷ One third of all falls on psychiatric units were repeat falls, and these fallers were 3 to 5 times more likely to be taking sedatives/hypnotics, antipsychotics, and antidepressants than single fallers. Other risk factors common in the psychiatric population include behavioral factors such as agitation and aggression and seizure risk from detoxification.

Survey respondents most commonly identified 1- to 2-hour rounds to address toileting needs, a standardized risk assessment, environmental alerts, committee oversight of the fall program, and sensor alarms as the most effective interventions in their programs. Most of these interventions have been supported in the literature as important components of a multifactorial fall prevention program, but research-based evidence is limited and variable.^{7,18,30,34,35}

LIMITATIONS

This analysis was limited by the voluntary nature of incident reporting, accuracy and completeness of the documentation in the event reports, and inability to categorize and separate fall data by the type of fall (anticipated/unanticipated physiological and environmental). Because cases were extracted from a voluntary reporting system, the data are not likely representative of all falls at these organizations but provide an excellent sample. Data on the type of fall were not collected in the incident report, and individual review of the descriptions of these events was not possible due to the large sample size.

CONCLUSIONS

This large analysis of patient falls provides useful information on fall risks and gaps in fall risk assessments and prevention practices. Further studies are warranted that focus on risk factors in specific patient populations and settings such as the ED and women's acute care, psychiatric, and pediatric units, so that assessments and/or prevention strategies can be developed to target the specific needs of these at-risk patients.

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