

# PARTNERSHIP FOR PATIENT CARE

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## Proactive Risk Assessment

# Research Summary

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## FALLS PREVENTION



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## Risk Data and Trends

State and federal agencies and healthcare organizations have been collecting data related to patient falls in healthcare facilities. The falls data has historically been used for research and internal hospital quality improvement; public reporting of adverse events is a recent mandate in several states. The two distinctly different data collection methodologies that have evolved among these organizations are

- (1) collection of falls data from incident reports by nursing or quality staff, usually on a monthly basis, and
- (2) discharge abstract data mining, recently with added quality codes.

This section provides an overview of published risk data from these organizations and also provides a description of each organization's data collection and analysis efforts.

### ◆Agency for Healthcare Research and Quality (AHRQ)◆

#### *National Healthcare Quality Report*

The Agency for Healthcare Research and Quality (AHRQ) of the U.S. Department of Health and Human Services is charged with supporting the improvement of quality healthcare; reducing costs; improving patient safety and decreasing medical errors; and broadening access to healthcare services. AHRQ acknowledged in the patient safety chapter of its 2005 National Healthcare Quality Report that “much progress has been made in recent years in raising awareness, developing event reporting systems, and developing national standards for data collection.”<sup>1</sup>

AHRQ tracks 20 hospital-level patient safety indicators (PSIs), which can provide insight into the level of patient safety in the U.S. “Specifically, PSIs screen for problems that patients experience as a result of exposure to the healthcare system and that are likely amenable to prevention by changes at the system or provider level.”<sup>2</sup>

Postoperative hip fractures (PSI 8) are among those events tracked by AHRQ. This is one of the measures that AHRQ uses as a surrogate measure for trending hospital adverse events. AHRQ's stated rationale for the measure's use is as follows: “After surgery, some patients may be at risk of falling, which may result in broken bones. This risk can be reduced by raising bed rails, monitoring ambulation, and removing items from the room that could cause a patient to trip.”

According to AHRQ evidence-based research, “Hip fractures are the most feared complication of falls. Up to 20% of people sustaining a hip fracture become nonambulatory and only 14 to 21% recover their ability to carry out instrumental activities of daily living.”<sup>3</sup> AHRQ estimated 1991 Medicare expenditures for hip fractures at 2.9 billion per year, or between \$16,300 and \$18,000 per individual for the first year after the fracture.



AHRQ's analysis of the postoperative hip fracture measure is as follows:

- The empirical national value is 0.276 postoperative hip fractures per 1,000 population at risk (adults surgical inpatients age 18 years of age and older who were not susceptible to falling).
- The 2005 National Healthcare Quality Report showed that the rate of postoperative hip fracture did not change significantly between 1994 and 2002.
- The 2002 research study that was used to validate PSIs prior to submitting them for panel review showed a rate of 1.12 postoperative hip fractures per 1,000 in the population at risk.<sup>4</sup>

#### *State Inpatient Databases (SID)*

AHRQ sponsors the Healthcare Cost and Utilization Project (HCUP), which is comprised of several databases, one of which is the State Inpatient Databases (SID). In 2003, twenty-six states contributed data to these databases (excluding Pennsylvania). The SID all-payer database contains inpatient discharge abstracts translated into a uniform format to allow nationwide comparisons. AHRQ's quality indicators are currently used for internal hospital quality improvement, public reporting by hospitals, and for private and public national pay-for-performance initiatives. The data is accessible to researchers using statistical analysis software, and summary reports are available to the public.

For the hospital-level indicators, data is analyzed by hospital and is reported as the postoperative hip fracture rate per 1,000 discharges. The rate is based on the annual HCUP Nationwide Inpatient Sample from SID, which in 2003 was 38 million hospital discharges. The following summary data is available at AHRQ's HCUPnet Web site <http://hcup.ahrq.gov>:

- Hip fractures per 1,000 discharges (trended hospital level rate per 1,000 surgical discharges). The AHRQ reported rate shows an overall decline between 1994 and 2003; however, the decrease is not considered to be statistically significant.

<b>Year</b>	<b>Hip fractures per 1,000 discharges</b>
2003	0.283
2002	0.261
2001	0.289
2000	0.315
1997	0.340
1994	0.331



- Hip fractures per 1,000 discharges in conditions primarily affecting elderly (hospital level rate per 1,000 surgical discharges). The AHRQ reported rate shows that the elderly have significantly higher fall rates than the overall population and that the incidence of falls is greatest for those 85 years of age and older.

	<b>Conditions Primarily Affecting Elderly: Hip fractures per 1,000 discharges</b>	
	<b>65-69 years old</b>	<b>≥85 years old</b>
2003	0.37	1.19
2002	0.36	1.72
2001	0.13	5.91
2000	0.55	6.94

The measure PSI 8 is derived by screening all surgical discharges for hip fracture captured in any secondary diagnosis field. Surgical discharges are defined by specific DRGs (diagnosis-related groups) and an ICD-9-CM (International Classification of Diseases, Ninth Revision, Clinical Modifications) code for an operating room procedure. The measure excludes the following types of patients:

- Medical discharges
- Patients with musculoskeletal disease
- Patients admitted for seizures, syncope, stroke, coma, cardiac arrest, poisoning, trauma, delirium, psychoses, and anoxic brain injury
- Patients with metastatic cancer, lymphoid malignancy, bone malignancy, and self-inflicted injury
- Obstetric patients
- Children under the age of 18
- Patients admitted to surgically repair a hip fracture that occurred elsewhere

Rates are adjusted based upon the 2000 U.S. population distribution of age and gender to increase the validity of multiyear trends and further adjusted by comorbidities and DRG clusters. This indicator may be biased for hospitals that care for more patients age 85 and older. Further explanation is available at AHRQ's Web site [www.qualitymeasures.ahrq.gov](http://www.qualitymeasures.ahrq.gov).

### *PSNet and WebM&M Web Site*

AHRQ has developed a web-based resource, accessed at <http://psnet.ahrq.gov/>, featuring patient safety resources. The site offers weekly updates of patient safety literature and allows users to customize the site around their interests (My PSNet). The site is linked with AHRQ WebM&M, a monthly journal that features user-submitted cases of medical errors, expert commentaries, and perspectives on patient safety.



### ◆Pennsylvania Health Care Cost Containment Council (PHC4)◆

The Pennsylvania Health Care Cost Containment Council (PHC4) collects quarterly inpatient hospital discharge abstracts from Pennsylvania hospitals. This data includes treatment, charge, and other financial data. The state agency analyzes the information and makes reports about the cost and quality of healthcare in Pennsylvania available to the public. In their most recent report, the statewide length of stay for hip fractures was 6.0 days, and the mortality rate was 2.2% of 12,784 surgical repairs for the 12 months ending September 30, 2005.<sup>5</sup> Summary reports are available at <http://www.phc4.org>.

### ◆Pennsylvania Patient Safety Reporting System (PA-PSRS)◆

Statewide mandatory reporting of adverse medical events and near misses began for Pennsylvania hospitals in June 2004. The enabling state legislation, called The Medical Care Availability and Reduction of Error Act of 2002, is tied to reforms aimed at mitigating the professional liability insurance crisis that has resulted in a decline in healthcare access within the state. Reports are submitted through a Web-based system called the Pennsylvania Patient Safety Reporting System (PA-PSRS). Reports are analyzed and are used as the basis for advisory articles published in the quarterly PA-PSRS Patient Safety Advisory. The Advisory provides clinical guidance about patient safety process improvements that may help to reduce patient harm. For example, in 2005 an advisory was published about the dangers of sequential compression devices after over 40 falls reports were received for patients wearing the devices.<sup>6</sup>

During 2005, PA-PSRS received 33,654 reports of falls, representing 20% of submitted reports. Falls were the second most frequently reported hospital event, with only medication errors reported more often. Of the fall reports, 1,294 were identified as serious events, representing 4% of reported serious events. There were 16 reported fall-related patient deaths in hospitals, representing 3.5% of the statewide reported deaths from events.

The 2005 statewide reported rate was 3.3 falls per 1,000 patient days, with regional differences consistent with overall reporting rates. Patients over age 65 were especially vulnerable, representing 64% of all reported falls, while perinatal patients were not prone to falling, having few falls. PA-PSRS analyzed fall events dividing them into the following categories:

- Falls while lying in bed
- Falls while ambulating
- Falls in the hallways of the facility
- Other types of falls

Lack of patient compliance/adherence was the most frequently cited patient-related contributing factor that may have caused the fall.



Other states have also recently instituted mandatory reporting of adverse events. As of July 1, 2007, California hospitals will be required to report to the state's Department of Health Services the National Quality Forum list of "Never 28" events that include "patient deaths associated with a fall while being cared for in a facility."<sup>7</sup> The Department is required to investigate and substantiate each report; and to monitor the hospital until the event is resolved. By 2009, the outcomes of verified reports become public information.

### ◆The Joint Commission◆

#### *Hospital Accreditation Program*

Facilities accredited by The Joint Commission are required to monitor staffing effectiveness for at least two inpatient units. The rationale for this requirement is that using "data driven quality improvement principles" can help organizations identify and mitigate "potential adverse effects on quality and patient safety" related to "significant changes in nurse staffing levels and the skill mix of personnel."<sup>8</sup> Joint Commission has published a list of approved clinical and human resource screening indicators to use to monitor staffing effectiveness in its Comprehensive Accreditation Manual for Hospitals. The hospital is directed to select two of each type of indicator to collect data, benchmark, and investigate if goals are not met. "Falls Prevalence" and "Falls with Injury" are among the approved Joint Commission clinical screening indicators. The National Quality Forum is identified as the evidence base for these two indicators.

#### *Sentinel Event Review and Reporting*

Facilities accredited by The Joint Commission are also required to review as sentinel events "a patient fall that results in death or major permanent loss of function as a direct result of the injuries sustained in the fall." The organization is expected to prepare a root-cause analysis and action plan for each sentinel event and submit it to The Joint Commission (or provide for evaluation by The Joint Commission under an approved protocol).

### ◆Centers for Medicare and Medicaid Services (CMS)◆

#### *The Medicare Patient Safety Monitoring System*

The Medicare Patient Safety Monitoring System (MPSMS) is a national surveillance project aimed at identifying the rates of adverse events within the Medicare population. A random sample of hospital discharges is selected from the Medicare Hospital Payment Monitoring Program. The medical records of the chosen discharges are abstracted at the Medicare Clinical Data Abstraction Center, using clinical algorithms to determine if an adverse event occurred. An adverse event is defined as an "unintended harm, injury, or loss that is more likely associated with a patient's interaction with the health care delivery system than from an attendant disease process."<sup>9</sup>



Adverse event hospital quality measures developed for the MPSMS meet the following tests:

1. The event is documented in a characteristic fashion/location in the medical record;
2. The event is associated with a specific process of care;
3. The event is common;
4. The event is responsible for serious morbidity/mortality; and
5. The event is preventable or repairable; processes can be developed or prevent or decrease the morbidity/mortality associated with the event.

One of the 15 hospital quality measures collected about adverse events is in-hospital falls. One year of data (2005) will be available in 2007, the analysis of which will be published by AHRQ in its Annual Healthcare Quality Report. For more information about Medicare's hospital quality measures, refer to the Web site of the project administrator, Qualidigm (Connecticut's Quality Improvement Organization) <http://www.qualidigm.org>.

### *Physician Quality Reporting Initiative (PQRI)*

The enabling legislation for the Physician Quality Reporting Initiative (PQRI) is the Tax Relief and Health Care Act of 2006. The PQRI establishes a financial incentive for physicians and other specified practitioners to submit quality measures to CMS. Reporting begins for dates of services on or after July 1, 2007. The 1.5% bonus, which applies to all fee-for-service claims submitted under a single taxpayer identification number, is payable if at least three PQRI quality measures are reported for at least 80% of cases. The PQRI program adopts measures developed for the Physician Voluntary Reporting Program (PVRP), which it replaces. For RQRI program updates refer to <http://www.cms.hhs.gov/PQRI>. Below are PQRI measures that apply to falls prevention.

**Screening for Falls Risk** Percentage of patients aged 65 years and older who were screened for fall risk (2 or more falls in the past year or any fall with injury in the past year) at least once within 12 months. The measure is reported by using a G-code or a CPT category II code. (G-codes are clinical data used to measure quality placed in the procedure field of a claim.) The patient must have been seen at least twice during the year by the provider.

The evidence-base cited for this measure is the American Geriatric Society/British Geriatrics Society/American Academy of Orthopedic Surgeons (AGS/BGS/AAOS) Guideline for the prevention of falls in older persons, and the National Institute for Clinical Excellence (NICE), UK, Clinical practice guideline for the assessment and prevention of falls in older people (see Standards and Guidelines). This measure has been endorsed by the National Quality Forum.

**Osteoporosis: Counseling for Vitamin D and Calcium Intake and Exercise** Percentage of patients, regardless of age, with a diagnosis of osteoporosis who are



either receiving both calcium and vitamin D or have been counseled regarding both calcium and vitamin D intake and exercise at least once within 12 months. This measure is reported by using a G-code or the CPT category II code and the ICD9-CM code for osteoporosis. The patient must have been seen at least twice during the year by the provider. The evidence-base cited for this measure includes:

- The National Osteoporosis Foundation (NOF)(see Standards and Guidelines)
- The American Association of Clinical Endocrinologists (AACE)
- The American Gastroenterological Association (AGA)

This measure has been approved by the American College of Rheumatology, the American Academy of Orthopaedic Surgeons, and the American Association of Clinical Endocrinologists, and is National Quality Forum-endorsed.

All of the above-referenced guidelines (except for AGS/BGS/AAOS, which has recently been archived) are available from the National Guideline Clearinghouse at <http://www.guidelines.gov>.

### *Quality Measures Management Information System*

The Centers for Medicare & Medicaid Services (CMS) has developed an electronic database that will include a description and specifications of all of the healthcare quality measures used by CMS. It is called the Quality Measures Management Information System and can be accessed at [www.qualitynet.org](http://www.qualitynet.org).

## ◆Centers for Disease Control and Prevention◆

### *Preventing Falls Among Older Adults*

The Centers for Disease Control and Prevention (CDC), a division of the U.S. Department of Health and Human Services (DHHS) publishes reports about fatalities and injuries from falls among older adults. Data is obtained from a number of sources including death certificates used by Vital Statistics to publish mortality data; inpatient records from the National Hospital Discharge Survey; and emergency room records from the National Electronic Injury Surveillance System-All Injury Program. The CDC's analysis for the three years in which comparisons could be made from all three databases, 2001-2003, is as follows:<sup>10</sup>

Traumatic brain injuries and injuries to hips, legs, and feet were the most common fatal falls-related injuries. The rate of fatal falls is increasing for adults 65 years and older, with women more likely to fall and men more likely to die from injuries related to falls. The 2003 death rates were 31.1 and 46.2 per 100,000, for women and men, respectively. The CDC attributed the increase in fatal falls to two factors: the



increasing U.S. life expectancy, which was 77.6 in 2003, and the overall increase in injury-causing falls among older adults. The 2003 falls-related injury rates were 5.7 and 3.9 per 1,000 women and men, respectively.

Hip fractures are the most frequently broken bones from falls. The rate of hip fractures declined 14% between 1993 and 2003 for adults 65 years and older. The 2003 rates were 0.89 and 0.58 per 1,000 women and men, respectively. The CDC attributed the decrease in hip fractures to osteoporosis screening and effective treatment to build bone mass in women, who have a greater risk of hip fractures because they tend to have less bone mass. In 2000, direct medical costs for older adults totaled \$179 million for fatal falls and \$19 billion for nonfatal fall injuries. Medical costs for women, who make up 58% of older adults, were two to three times higher than for men.<sup>11</sup>

For more information about the incidence, costs, and outcomes of injuries from falls, refer to the National Center for Injury Prevention Web site: <http://www.cdc.gov/ncipc>.



## Evidence-based Practices

The current evidence base on falls prevention focuses falls risk assessment and multifactorial fall prevention interventions.

### ◆CDC's National Center for Injury Prevention and Control◆

#### *Reducing Falls and Resulting Hip Fractures Among Older Women*

In March 2000, The CDC's National Center for Injury Prevention and Control published a review and synthesis of the scientific evidence for reducing falls and resulting hip fractures among older women. The researchers made the following recommendations applicable to healthcare organizations:<sup>12</sup>

- Research demonstrates that effective fall prevention strategies require a multifaceted approach with both environmental and behavioral components. Important elements include knowledge and skill building to increase knowledge about fall risk factors, exercise to improve strength and balance, home modifications to reduce fall hazards, and medication assessment to minimize side effects.
- New primary fall prevention approaches are needed (e.g., characterizing footwear that promotes stability), as well as secondary prevention strategies (e.g., protective hip pads) that can prevent injuries when falls occur.
- Approaches that address specific risk factors can supplement fall prevention program efforts. Medical approaches might include maximizing control of chronic diseases and counseling older women against inappropriate weight loss.
- Strategies are needed to institutionalize fall prevention interventions, particularly in long term care facilities. One review showed that about one-third of risk reduction recommendations were discontinued within three months of implementation.
- Researchers do not know all the factors that contribute to falls and fall-related injuries or how personal and environmental factors interact to cause a fall. One common reason is that people cannot explain the causes or circumstances surrounding falls events. Evidence included a research study that showed about 30% of those interviewed did not recall a fall that occurred three years ago.

### ◆Agency for Healthcare Research and Quality (AHRQ)◆

#### *Technology Assessment on Patient Safety Practices: Prevention of Falls in Hospitalized and Institutionalized Older People*

AHRQ is the lead federal agency for research on healthcare quality, costs, outcomes, and patient safety. AHRQ funds research that addresses concerns of very high public priority and then supports Evidence-based Practice Centers that review and synthesize scientific evidence for conditions or technologies that are costly, common, or important to the



Medicare or Medicaid programs. (ECRI is one of 13 AHRQ-designated Evidence-based Practice Centers.)

AHRQ provides technology assessments for the Centers for Medicare and Medicaid Services to use in Medicare national coverage decisions and to inform Medicare carriers about new technology. Technology assessments may be done in-house by AHRQ staff, or they may be done in collaboration with an Evidence-based Practice Center. Technology assessments include a systematic review and analysis of the literature from multiple sources and an assessment of the clinical and financial value of medical interventions.

In July 2001, AHRQ published a technology assessment of patient safety practices that was prepared by the University of California San Francisco-Stanford University Evidence-based Practice Center. Chapter 26 of that study focused on prevention of falls in hospitalized and institutionalized older people.

AHRQ defines a fall as “unintentionally coming to rest on the ground, floor, or other lower level, but not as a result of syncope or overwhelming external force.” Falls are the leading cause of nonfatal injuries and trauma-related hospitalizations in the United States. Complications such as bone fractures, injury to the soft tissues, increased functional dependence, and fear of falling again increase the risk of future falls. Studies have identified age, gait or balance impairment, sensory or cognitive impairment, musculoskeletal diseases, environmental hazards, and many medications as falls risk factors. An acute illness may increase a patient’s falls risk due to immobility, deconditioning, or changes in medications. The hospital environment itself may either be supportive or may contribute to falls risk. The number of risk factors is positively related to a patient’s risk of falling. A research study found the risk of falling increased from 19% to 78% as the number of risk factors increased from one to four or more.

Based on the multifactorial etiology of falls, multicomponent interventions have been developed to address patient risk factors and prevent falls. AHRQ found that most studies have not been designed in a way to determine which of these components is most effective. However, AHRQ cited a 2000 literature review of hospital fall prevention programs that concluded that the interventions reduced falls by 25% over the historical baseline.

The AHRQ technology assessment made the following recommendations about falls prevention:

- There is currently insufficient information to recommend the use of colored bracelets to identify patients at high risk for falls. In theory, patient identification bracelets remind staff that the patient is at high risk for falls which triggers fall prevention interventions. Identification bracelets might also increase the patient’s



falls awareness, for example, serving as a reminder to call for assistance when getting out of bed.

- Immobility is a significant risk factor for several geriatric complications, including falls, pressure ulcers, and functional decline. AHRQ recommends minimization of bed rest as an intervention to prevent these hospital-acquired conditions.
- An overwhelming majority of the large, prospective, controlled studies have been carried out in the outpatient environment. Many of the interventions could be modified for a hospital or long-term care facility; however, research has not shown whether they are generalizable to diverse inpatient settings or transportable between institutions with variable resources for implementation.

### ◆Centers for Medicare and Medicaid Services (CMS)◆

#### *Healthy Aging Project: Falls Prevention Interventions in the Medicare Population*

With an increasing U.S. life expectancy, the number of Medicare and Medicaid beneficiaries who are expected to experience functional losses will increase. The CMS commissioned the Healthy Aging Project to identify interventions that will promote health and prevent functional decline in older populations. During the first phase of the project, the evidence was reviewed and reports were produced on six topics, including a 2002 report on falls prevention interventions. The Healthy Aging Project is administered by the Southern California Evidence-based Practice Center, a joint center of RAND health and AHRQ. For its review of falls prevention interventions, the project pooled data from 38 randomized controlled trials that met inclusion criteria. The data revealed the following:<sup>13</sup>

- Falls prevention programs reduced the monthly rate of falling by 23%.
- The most potent program types, those that included both multi-factorial risk assessment and management, reduced the monthly rate of falling by 40%.
- Exercise programs reduced the monthly rate of falling by 16%. Because most programs contain multiple types of exercise (e.g., balance, endurance, flexibility, strength), the preferred type of exercise could not be determined.
- Pairing teams of clinicians with different expertise to perform medical assessments, such as pharmacists with geriatricians, is beneficial because of the complexity of falls and the specialized knowledge required to assess falls risk.
- Screening for falls risk is rarely done in primary care, despite its being recommended in guidelines (see Standards and Guidelines).
- The rate of falls is high the first month after hospital discharge, and falls-related injuries account for 15% of re-admissions within 30 days. Providing a detailed assessment of falls risk at the time of discharge and making appropriate patient referrals is warranted.
- There is strong evidence to support a falls prevention benefit for Medicare beneficiaries who have fallen that would include a multifactorial risk assessment with a supervised exercise program.



During the second phase, currently under contract, the Health Aging Project will implement interventions to reduce behavioral risk factors in the senior population.

### ◆World Health Organization (WHO)◆

*Health Evidence Network: What are the main risk factors for falls amongst older people and what are the most effective interventions to prevent these falls?*

The World Health Organization (WHO) commissioned the Health Evidence Network (HEN) of its Regional Office for Europe to summarize the evidence and present policy options related to falls prevention. WHO undertook this study to answer the question: “What are the main risk factors for falls amongst older people and what are the most effective interventions to prevent these falls?” The report, the findings of which are summarized below, was subjected to international review.<sup>14</sup>

HEN found there are still some gaps in knowledge and questions about generalizability of interventions across cultures, countries, and settings. Strategies aiming to reduce overall population risk may be inexpensive, but targeting those at higher risk appears to be more effective.

HEN evaluated risk assessment tools cited in the literature and found that more research is needed to clarify the most appropriate tools for use in different settings, in terms of simplicity of use, applicability, sensitivity and specificity. Their findings are as follows:

- The STRATIFY risk assessment tool, validated in the UK for hospital inpatients, is simple to complete and allows for the identification of inpatients at highest risk of falling. The tool measures these risk factors: fall since hospital admission, agitation, visual impairment, frequent toileting, and poor transfer and mobility (score of 3 to 4 on the Barthel index).<sup>15</sup>
- The screening tool developed by PROFET (Prevention of Falls in the Elderly) project (a European multicenter randomized controlled trial) has been validated for identifying emergency department patients at high falls risk.<sup>16</sup>
- The Get Up and Go Test, recommended by the ABS/BGS/AAOS guidelines (see Standards and Guidelines), is a simple screening test for impaired strength or balance in people presenting with a first fall. In the case of a poor performance, a full assessment should be performed.<sup>17</sup>
- The Mobility Interaction Fall Chart has been shown to be predictive when combined with fall history or staff judgment in residential care facilities. This tool includes an observation of the ability to walk and simultaneously interact with another person or object, a vision test, and a concentration rating.<sup>18</sup>
- The Tinetti balance and gait scale, the Berg scale, and the Physiological Profile developed by Lord are good research tools that are not generally practical for clinical



screening due to their length and the need for formal training of administrators. They are also not comprehensive, focusing primarily on mobility.<sup>19</sup>

Although widely implemented, strategies for reducing falls among inpatients have not been assessed in randomized controlled trials. A summary of the evidence base applicable to inpatient facilities follows:

- There is no high level evidence to recommend for or against multifactorial fall prevention interventions in acute hospital settings.
- There is no evidence to support the use of physical or pharmaceutical restraints or bed sides in the prevention of falls and there is evidence of worse injuries as a result of falls when restraints are used.
- Alternative strategies to restraints (lower bed, mats on floor, safe-transfer and exercise training, alarm devices, etc.) have proved beneficial.
- There is weak evidence to support hospital discharge risk assessment and planning for older people; appropriate referral to continued health care in their own home or residential care facilities may be necessary.
- Bed alarms appear promising, but identification bracelets do not appear effective at reducing falls in the hospital environment.

HEN found the following gaps in the evidence base, applicable to hospitals:

- Randomized controlled trials are needed to show the fracture-reducing benefit of different falls prevention interventions.
- Research is needed on how to best to present to older adults information about falls risk factors and prevention interventions to increase compliance.
- Investigation is needed to determine how falls and fractures can best be prevented in patients with cognitive impairment and dementia.
- Research is required to understand the effect on falls risk of transient factors, such as orthostatic hypotension, dizziness, and syncope.
- Research is required to identify the effects of non-injurious falls and fear of falling on morbidity, including functional dependence and institutionalization.
- Evaluation is needed of the cost effectiveness of dedicated multidisciplinary fall prevention teams.



## Case Studies

### ◆MD Anderson Cancer Center◆

#### *Transforming Care at the Bedside: Falls Prevention*

MD Anderson Cancer Center, a 512-bed teaching facility in Houston, is one of the 13 sites in the Institute for Healthcare Improvement (IHI) break-through series Transforming Care at the Bedside. Staff in their gastrointestinal surgical unit, which provides postsurgical care for patients with cancers of the digestive and endocrine system, have focused their efforts on falls prevention.<sup>20</sup> The unit has reduced its falls rate from a baseline of 2.72 falls per month for the 8 months preceding the interventions, from January to August 2004, to 0.67 falls per month for the 10 month postintervention period, from September to July 2004. Staff analyzed falls incidents and found the majority occurred around patient elimination needs. They determined patients were at the greatest falls risk during the first 72 postoperative hours. The successful interventions included the following:

- A customized falls risk assessment tool, developed after testing the Morris and Hendricks tools
- Staff education that falls prevention is everyone's responsibility
- Mandatory use of bedside commode with staff present for the first 72 postoperative hours
- A safety checklist used by all caregivers who enter the room, that requires an assessment of toileting needs
- Improvements in environmental safety for all patients on the unit

### ◆Veterans' Affairs Fall Prevention Screening Clinic (FPSC)◆

#### *Fall Prevention Screening Clinic (FPSC)*

The Fall Prevention Screening Clinic (FPSC)<sup>21</sup> was part of a large multicenter clinical initiative of the Veterans Affairs (VA) National Patient Safety Center of Inquiry, funded by the VA that began in 1995 and has recently ended. The target population was ambulatory VA patients with a history of falls or those identified as high risk who were motivated to participate in an intervention program. During the FPSC project, over 300 patients were screened per year at each of four Southern California and Nevada VA outpatient sites. About six patients were screened per week per site in the half-day clinic. The FPSC was staffed by a multidisciplinary team, with each clinician following an established protocol. The pharmacist reviewed the patient's medication profile and assessed compliance and also performed mental status testing. The therapist conducted mobility tests and evaluated home environment, use of adaptive equipment, and footwear. The physician reviewed the patient history, identified medical contributors to falls, and assessed underlying disease management.



Interdisciplinary team meetings were held after each patient evaluation to identify the underlying etiology of falls risk and to design appropriate interventions. A team member then reviewed findings and recommendations with the patient and family. A follow-up visit was held about three months after the initial assessment to ensure that recommendations were implemented and any new risk factors were identified and addressed.

The efficacy of the program was evaluated using participant satisfaction surveys, medical records review, and falls incident rates. Results were as follows:

- At least 80% of all patients screened in the four VA clinics reported they were completely satisfied with their care at the FPSC.
- Over 70% of patients completed recommended interventions for physical therapy, medication review, and prosthetics.
- Over 80% of pharmacist's recommendations were followed by the patient's primary care provider.
- Over 60% the patients had a reduction in fall events, and 28% of the recurrent fallers reported no falls in the three month interval between assessment and follow-up.

Following the end of grant funding, the program was scaled back into the physical medicine and rehabilitation clinic where staff try to maintain the basic format and approach.

### ◆NorthEast Medical Center◆

#### *Failure Mode and Effects Analysis*

NorthEast Medical Center is a regional 457-bed, not-for-profit teaching facility located in Concord, North Carolina. NorthEast specializes in cardiac surgery and operates 26 regional facilities. In June 2000, the Medical Center initiated an interdisciplinary falls team to address their falls rate (6.1 falls/1,000 patient days) that had exceeded their internal benchmark (4.1 falls/1,000 patient days).<sup>22</sup> Their 10-bed locked geriatric psychiatric unit accounted for a majority (58%) of the falls.

The falls team first developed a falls risk-assessment tool that was used to categorize patients as either low or high risk. Interventions were chosen by the caregiver and became part of each patient's care plan. The falls team next conducted a root cause analysis for the 300 inpatient falls in their database. They found different trends among each of their three patient populations: Geriatric psychiatric patients had higher rates of previous falls and incontinence, medical patients tended to fall soon after their admission, and surgical patients fell later in their stay.

The falls team then conducted an FMEA (failure modes and effects analysis) on the fall process for the high risk geriatric psychiatric unit. From the FMEA, they developed and implemented a falls prevention action plan. By 2003, the falls rate on the geriatric psychiatric unit had decreased to 23.3 falls/1,000 patient days, and the hospital's overall falls



rate had decreased to 2.6 falls/1,000 patient days, well below their benchmark. Following are their action plan activities:

- Adult assistive walking devices
- Convex mirrors in hallways
- Bedside motion detectors
- Upgraded bed-exit alarms
- Population-specific staff education



## Patient Safety Initiatives

The 1999 publication of the Institute of Medicine's monograph, *To Err is Human: Building a Safer Health System*, brought concerns about patient safety to the forefront, prompting various initiatives aimed at improving healthcare systems. These initiatives have the following factors in common:

- Promoting public awareness
- Funding research and systems that collect and report data
- Setting time-limited measurable objectives for change
- Encouraging the implementation of evidence-based practices

### ◆National Quality Forum (NQF)◆

#### *Voluntary National Consensus Standards: Patient-centered Outcome Measures*

The National Quality Forum (NQF) is a voluntary consensus standards-setting organization that began in 2000 as a public-private collaborate. In 2003, this diverse group of healthcare stakeholders endorsed 39 national consensus standards (NCS) for hospital care and in 2004 NQF endorsed 15 NCS for nursing-sensitive care. The NQF has endorsed the following patient-centered outcome measures related to falls:

- NQF-NCS 3: Falls prevalence: Number of inpatient falls per inpatient days (nursing-sensitive and hospital)
- NQF-NCS 4: Falls with injury: Number of inpatient falls with injury per inpatient days (nursing-sensitive). Injuries levels of minor or greater are included, according to the below description:
  - None: patient had no injuries resulting from the fall
  - Minor: results in application of a dressing, ice, cleaning of a wound, limb elevation, or topical medication
  - Moderate: results in suturing, application of steri-strips/skin glue, or splinting
  - Major: results in surgery, casting, traction, or required consultation for neurological or internal injury
  - Death: results in death as a result of the fall

In 2005, The Joint Commission developed an implementation guide for each of the NQF nursing-sensitive measures, describing the above levels of injury.<sup>23</sup> The Joint Commission has adopted the NQF falls-related outcome measures for its hospital accreditation program (see Risk Data and Trends).

The NQF supports rapid implementation and widespread dissemination of its NCS consensus standards. To better understand the barriers and challenges of hospitals adopting



its nursing-sensitive NCS, NQF has obtained funding from Robert Wood Johnson Foundation to track implementation; through this project it will give feedback to measure developers.

### *Serious Reportable Events in Healthcare: “Never 28”*

In 2002, NQF sought to standardize adverse event reporting by publishing a list of 27 serious events that should never happen in a healthcare setting, but when they do should be publicly reported. In 2006, the list was updated and currently includes 28 serious reportable events. As of December 2006, 11 states have adopted legislation requiring public reporting of some or all these events and the Centers for Medicare and Medicaid Services (CMS) is exploring ways to stop paying for procedures that involve these events.<sup>24</sup> The falls-related serious reportable events are described by NQF as

Patient death or serious disability associated with a fall while being cared for in a healthcare facility. Additional specifications: Includes but is not limited to fractures, head injuries, and intracranial hemorrhage.

Descriptions of NQF voluntary consensus standards and serious reportable events in healthcare related to patient falls, and summaries of research projects are available at <http://www.qualityforum.org>.

### ◆The Joint Commission◆

#### *National Patient Safety Goal: Implement a Falls Reduction Program*

According to The Joint Commission, the purpose of goal number 9B of its 2007 National Patient Safety Goals (NPSG 9B) is for an organization to “evaluate its patients’ risk for falls and take action to reduce the risk of falling and to reduce the risk of injury, should a fall occur.” The components of this goal and Joint Commission’s accreditation compliance requirements are available at in their Comprehensive Accreditation Manual for Hospitals, available and are as follows:<sup>25</sup>

**9B Implement a fall reduction program** (including an evaluation of the effectiveness of the program).

The organization establishes a fall reduction program that includes:

1. An evaluation as appropriate to the patient population, settings, and services provided
2. Interventions to reduce the patient’s fall risk factors
3. Staff education
4. Patient and family education
5. An evaluation of the effectiveness of the program. Outcome indicators such as number of falls and severity of fall-related injuries are recommended to be used to evaluate program effectiveness.



The Joint Commission monitors hospital implementation of each of its National Patient Safety Goals and reports implementation status to the public on its Quality Check Internet website, [www.qualitycheck.org](http://www.qualitycheck.org). Overall compliance with NPSG 9B was 87.7% of 2,817 surveys in the first half of 2006, with the compliance rate of surveyed hospitals at 94.1%. Compliance should increase as facilities gain more experience with this new NSPG.

The Joint Commission published a Sentinel Event Alert in July 2000 about fatal falls, where it reported receiving 22 cases from 24-hour facilities during its first four years of tracking these events.<sup>26</sup> Seventeen of the 22 patients had an altered mental status at the time of the fall, and a disproportionate number of the cases occurred on nights, weekends and holidays. Sentinel event reporting has increased over the years. In 2005, the Joint Commission received 45 fall-related sentinel events reports. The top three contributing root causes of these recent events were as follows: 70% patient assessment, 62% communication, and 49% environmental safety/security (multiple causes can be attributed). Sentinel event statistics are available at <http://www.jointcommission.org/SentinelEvents/Statistics/>.

### ◆Institute for Healthcare Improvement (IHI)◆

#### *Transforming Care at the Bedside*

The Institute for Healthcare Improvement (IHI) in partnership with the Robert Wood Johnson Foundation launched a breakthrough series initiative, Transforming Care at the Bedside, to redesign medical/surgical care. This was based on the 2004 Institute of Medicine (IOM) report Keeping Patients Safe: Transforming the Work Environment for Nurses that documented the central role the registered nurse plays in maintaining vigilance against medical errors. IHI's initiative intends to "transform the elements that affect care on medical/surgical units: care delivery processes, nursing care models, physical environments, organizational cultures and norms, and care team collaboration and performance."<sup>27</sup> In June 2004, a multiyear, multiphase pilot phase was initiated at 13 hospital sites with varying geography and demographics. The teams at the pilot sites are monitoring 13 different performance measures that include "Patient Falls" as they try out various changes.

From initial findings of breakthrough series participants, IHI believes different processes are needed to integrate falls prevention into everyday activities within hospitals; that deeper issues exist in "latent system problems" and "complexity" issues. The MD Anderson Cancer Center is one of the 13 sites that has made falls prevention changes (see Case Studies). IHI is frequently updating its Web site, <http://www.ihl.org>, as the initiative progresses.

### ◆ANCC's Magnet Recognition Program◆

#### *The National Database of Nursing Quality Indicators (NDNQI)*

The Magnet Recognition Program of the American Nurses Credentialing Center (ANCC) recognizes nursing excellence and innovation within a hospital. The program is based on nursing administration standards published by the American Nurses Association.



Credentialed organizations must collect nursing-sensitive quality indicators at the unit level and benchmark that data at the highest/broadest level to support research and quality improvement initiatives. The data must be trended over time and analyzed for impact on patient outcomes.

Data may be submitted to the NDNQI of the American Nurses Association to satisfy reporting requirements for Magnet Recognition Program designation. Comparative reports are generated by NDNQI, benchmarking the hospital nationally by type of unit, and trending quarterly data over two years.

As of May 2006, 944 hospitals were contributing data to the NDNQI, and as of December 2006, 225 organizations had been granted magnet status. The indicators currently collected include the following fall prevention measures, endorsed by the National Quality Forum:

- Patient falls
- Patient falls with injury by injury level

For more information about NDNQI indicators currently collected and new indicators undergoing testing, refer to <http://www.nursingworld.org/quality/database.htm> . For more information about the Magnet Recognition Program, refer to <http://www.nursingworld.org/ancc/magnet/index.html> .

### ◆Falls Prevention Center of Excellence◆

The Falls Prevention Center of Excellence, headquartered at the University of Southern California Andrus Gerontology Center, is a consortium of geriatric service providers and policymakers funded by the Archstone Foundation to build a statewide network of stakeholders that will support falls prevention by information-sharing, practice improvement, and advocacy. For their invitational conference held in 2003, the Center published a white paper entitled Preventing Falls in Older Californians: State of the Art which is available at the Center's Web site: <http://www.stopfalls.org> .

The preconference research paper noted the key issue of concern with falls in older persons is the combination of a high incidence and a high susceptibility to injury due to age-related physical changes and a high prevalence of clinical diseases. The paper noted that the rate of serious injuries from falls is probably between 5% to 10% and may be similar in community-dwelling and institutionalized elderly. The estimated 1% of these elderly fallers who fracture their hip has a mortality rate as high as 25% within one year of the fracture. The themes that emerged from the conference were summarized in a paper entitled Creating a California Blueprint for Fall Prevention: Proceedings of a Statewide Conference, and are as follows:<sup>28</sup>



- California already has an infrastructure in place with services and programs that can address prevention of falls among seniors; advocates can build upon that infrastructure.
- There is sufficient knowledge to prevent falls. Falls risks and appropriate prevention activities have been well-documented and quality indicators have been established.
- Training of professionals in community-based practice is needed. In addition, professional training curricula for physicians and associated health professionals should be expanded to include falls prevention. Physicians are not widely practicing falls prevention and assessment strategies, despite published guidelines.
- Multi-agency strategies are needed to encourage the integration of agencies and disciplines beyond traditional workgroup boundaries.
- While some resources for falls prevention exist, funding is often unstable, fragmented and difficult to access.
- The general public lacks awareness that many injurious falls can be prevented.
- Prevention efforts should address the racial and cultural diversity of the California population, as well as urban-rural differences.
- A central clearinghouse or coordinating body is needed to share information, facilitate networking, and encourage training.
- A statewide coalition of experts and advocates can further the action steps needed.



## Standards and Guidelines

The guidelines presented below are those most frequently cited in the falls prevention literature. Several other guidelines are available from the National Guideline Clearinghouse at <http://www.guidelines.gov>.

### ◆American Geriatric Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons (AGS/BGS/AAOS)◆

#### *Guidelines for the Prevention of Falls in Older Persons*

Joint guidelines by the Panel on Fall Prevention of the American composed of representatives of the American Geriatric Society (AGS), the British Geriatrics Society (BGS) and American Academy of Orthopaedic Surgeons (AAOS) were published in 2001.<sup>29</sup>

- All older people under the care of a health professional should be asked about occurrence of falls at least once a year.
- All older people who report a single fall should be observed performing the "get up and go" test - any unsteadiness should lead to further fall risk assessment. (See, also the "timed up and go test" at <http://www.va.gov/ncps/SafetyTopics/fallstoolkit/>.)
- All older people who report recurrent falls should be referred for a fall risk assessment performed by a clinician with appropriate skills and experience, which may necessitate referral to a geriatrician or other specialist.
- A falls evaluation should include the following:
  - History of falls circumstances, medications, medical problems, and mobility levels;
  - Examination of vision, gait and balance, and lower extremity joint function;
  - Examination of basic neurological function, including mental status, muscle strength, lower extremity peripheral nerves, proprioception, reflexes, and tests of brain function; and
  - Assessment of basic cardiovascular status.

### ◆National Collaborating Centre for Nursing and Supportive Care, UK (NICE)◆

#### *Clinical Practice Guideline for the Assessment and Prevention of Falls in Older People*

In 2004, an update to the above AGS/BGS/AAOS guidelines was published by a collaborative group of health care professionals in London. A copy of this guideline is provided as an attachment to this report. Below are the National Collaborating Centre for Nursing and Supportive Care (NICE) recommended components of a falls risk assessment:<sup>30</sup>



- Identification of falls history
- Assessment of gait, balance and mobility, and muscle weakness
- Assessment of osteoporosis risk
- Assessment of the older person's perceived functional ability and fear relating to falling
- Assessment of visual impairment
- Assessment of cognitive impairment and neurological examination
- Assessment of urinary incontinence
- Assessment of home hazards
- Cardiovascular examination and medication review

### ◆National Osteoporosis Foundation (NOF)◆

*Physician's Guide to Prevention and Treatment of Osteoporosis and Health Professional's Guide to Rehabilitation of the Patient with Osteoporosis*

The National Osteoporosis Foundation (NOF) sponsored expert panels to review the evidence base and form a consensus for the prevention, treatment, and rehabilitation of patients with osteoporosis. These development committees authored two consistent guidelines that were adopted by the following organizations of those represented on the panels. The prevention and treatment guideline was developed in 1999 and updated in 2003 (a copy of which is appended to this report); the rehabilitation guideline was developed in 2003. Members of the two panels were as follows:

- American Academy of Orthopaedic Surgeons (both)
- American Academy of Pain Medicine (rehabilitation)
- American Academy of Physical Medicine and Rehabilitation (both)
- American Association of Clinical Endocrinologists
- American College of Obstetricians and Gynecologists (both)
- American College of Radiology (both)
- American Geriatrics Society (both)
- American Medical Association (both)
- International Society for Physical Medicine and Rehabilitation (both)
- National Osteoporosis Foundation (both)
- American College of Rheumatology (prevention and treatment)
- The Endocrine Society (prevention and treatment)

#### **Falls and Falls Prevention**

According to the NOF experts, falls appear to precede about 90% of hip fractures, 33% of vertebral fractures, and nearly all distal forearm fractures. In patients with a previous fall, detailed medical, occupational and home-risk assessments with appropriate interventions can



reduce the risk of falling by 60%. Hip-strengthening and Tai Chi exercises may lower the risk of falls by 40%.<sup>31</sup>

**Categories of Risk Factors for Falls** (from NOF Health Professional's Guide to Rehabilitation of the Patient with Osteoporosis)

- Environmental factors (e.g., low-level lighting)
- Medical risk factors (e.g., urge incontinence, malnutrition, diminished cognition)
- Neuromuscular (e.g., poor balance, weak muscles)
- Fear of falling

**Risk Factors for Osteoporotic Fractures** (from NOF Health Professional's Guide to Rehabilitation of the Patient with Osteoporosis)

- Personal history of low-impact fracture
- Current low bone-mass density
- History of fracture in a first-degree relative
- Caucasian race
- Advanced age
- Female sex
- Dementia
- Impaired eyesight despite correction
- Recurrent falls
- Poor health/frailty
- Current smoker
- Low body weight
- Estrogen deficiency
- Low lifetime calcium intake
- Excessive use of alcohol
- Inadequate physical activity

**Major Prevention and Treatment Recommendation to the Physician** (from Physician's Guide to Prevention and Treatment of Osteoporosis)

- Counsel all women on the risk of osteoporosis and related fractures.
- Advise all patients to consume adequate amounts of calcium and vitamin D.
- Recommend regular weight-bearing and muscle-strengthening exercise to reduce the risk of fall and fractures.
- Advise patients to avoid tobacco smoking and excessive alcohol intake.
- Recommend bone mineral density testing to:



- All women aged 65 and older;
  - Younger postmenopausal women who have additional risk factors other than being white and female); and
  - Postmenopausal women who have suffered fragility fracture.
- 
- Initiate therapy to reduce fracture risk in postmenopausal women with positive bone mineral density testing or with vertebral or hip fractures.
  - Current pharmacologic options for osteoporosis prevention and/or treatment are bisphosphonates, calcitonin, estrogens and/or hormone therapy, parathyroid hormone, and raloxifene.



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## Selected Resources

**ECRI Institute**, accessed at <http://www.ecri.org>, is a nonprofit health services research firm, an AHRQ Evidence-based Practice Center. ECRI Institute is the state's contractor for PA-PSRS, the Pennsylvania Patient Safety Reporting System, and has published Falls Prevention Strategies in Healthcare Settings, a falls prevention toolkit. ECRI Institute provides technical support for the Partnership for Patient Care.

**Agency for Healthcare Research and Quality (AHRQ)'s Patient Safety Network (PSNet)**, accessed at: <http://www.psnet.ahrq.gov/>, is AHRQ's Internet resource featuring news and essential resources on patient safety.

**Centers for Disease Control and Prevention's National Center for Injury Prevention and Control**, accessed at <http://www.cdc.gov/ncipc/pub-res/toolkit/toolkit.htm>, is CDC's Internet resource to prevent falls in older adults features facts that include charts and maps, a prevention toolkit that includes brochures and posters, summaries of sponsored research, and links to initiatives in different states.

**Food and Drug Administration (FDA)'s Hospital Bed Safety Workgroup**, accessed at <http://www.fda.gov/cdrh/beds/>, is the FDA's Internet resource that features publications of the Hospital Bed Safety Workgroup, a collaborative effort aimed at improving the safety of hospital beds for patients who are most vulnerable to the risk of entrapment. Publications include Clinical Guidance for the Assessment and Implementation of Bed Rails In Hospital, Long Term Care Facilities, and Home Care Settings and FDA Safety Alert: Entrapment Hazards with Hospital Bed Rails.

**Institute for Healthcare Improvement**, accessed at <http://www.ihl.org>, is a nonprofit organization driving the improvement of health by advancing patient safety initiatives.

**The Joint Commission**, accessed at <http://jointcommission.org>, is an independent, nonprofit organization that evaluates and accredits more than 15,000 health care organizations and programs in the United States.

**National Council on Aging**, accessed at <http://ncoa.org>, is an advocacy organization dedicated to improving the health and independence of older persons and to increasing their contributions to communities, society, and future generations. Publications include Falls Free: Promoting a National Falls Prevention Action Plan.

**National Quality Forum**, accessed at: <http://www.qualityforum.org>, is a private, nonprofit membership organization created to develop and implement a national strategy for healthcare quality measurement and reporting.



**National Osteoporosis Foundation**, accessed at [www.nof.org](http://www.nof.org), is a voluntary, nonprofit health organization and resource for information about the causes, prevention, and treatment of osteoporosis, a risk factor for fall-related fractures.

**Pennsylvania Patient Safety Authority**, accessed at <http://www.psa.state.pa.us>, is an independent Pennsylvania state agency charged with taking steps to reduce and eliminate medical errors. The Authority has implemented PA-PSRS, the Pennsylvania Patient Safety Reporting System.

**Pennsylvania Health Care Cost Containment Council (PHC4)**, accessed at <http://www.phc4.org>, is an independent Pennsylvania state agency responsible for addressing the problem of escalating health costs, ensuring the quality of healthcare, and increasing access for all citizens regardless of ability to pay.

**The Practicing Physician Education in Geriatrics Project**, accessed at <http://www.gericareonline.net/tools/eng/falls/index.html>, is a nonprofit organization that has taught over 4,000 primary care providers in the use of geriatric evaluation and management tools found on the Web site by using trained facilitators. The Project is funded by the John A. Hartford Foundation through the American Geriatrics Society.

**Veterans' Affairs (VA) National Center for Patient Safety (NCPS)**, accessed at <http://www.patientsafety.gov>, is a falls prevention resource with publications including: Ergonomic Guidebook, Falls Policy, and Fall Prevention Equipment and Technology Resource Guide.



## Endnotes

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## Appendix

1. **National Guideline Clearinghouse:** Clinical practice guideline for the assessment and prevention of falls in older people. (NICE)
2. **National Guideline Clearinghouse:** Physician's guide to prevention and treatment of osteoporosis. (NOF)
3. **Veterans' Health Administration:** Falls Policy

