



## Falls in Radiology: Establishing a Unit-Specific Prevention Program

### ABSTRACT

*As healthcare facilities continually look to strengthen their falls prevention programs and respond to the high-risk problem of persistent patient falls, evaluation of falls events outside direct patient care, such as in radiology, may provide additional opportunities to address this organizationwide challenge. Analysis of reports to the Pennsylvania Patient Safety Authority in 2009 revealed 602 falls events in radiology departments. Falls experienced by both inpatients and outpatients throughout the department were commonly associated with syncope; slips, trips, and loss of balance; and medication-related effects. Falls were from stretchers, procedure tables, or stools, including during transfers. Many of the patients had affirmed to a radiologic technologist their ability to transfer either independently or with some assistance from a wheelchair or stretcher to an examination table, or to stand for the duration of an upright examination. In these instances, technologists usually relied on verbal and nonverbal patient cues to assess the patient's ability to meet the physical demands of an impending diagnostic study. However, most of the reports described situations in which patient risks were not apparent, and radiology staff did not anticipate a fall. The adoption of standardized strategies to reduce falls risk—including ongoing education about safe patient handling practices, nurse to radiologic technologist handoff communications, and use of an assessment tool or checklist—helps to identify patient risk factors and could mitigate injurious patient falls in radiology departments. (Pa Patient Saf Advis 2011 Mar;8[1]:12-7.)*

### INTRODUCTION

From 2005 through 2009, the number of Serious Events involving falls (i.e., falls resulting in patient injuries and requiring subsequent treatment) reported to the Pennsylvania Patient Safety Authority averaged about 1,300 a year.<sup>1</sup> Patients in a care unit where a falls risk assessment has been performed and a high risk for falls identified are protected by standard falls prevention strategies prescribed by nursing, such as low beds, bed exit alarms, call bells, and floor mats. Patients transported to the radiology suite are not protected. In 2009, falls accounted for 10% of all Serious Events reported to the Authority and made up 8% of all events reported in radiology departments statewide. The data suggests that although radiology staff may take precautions with patients who obviously need assistance, radiologic technologists were less likely to evaluate a patient's ability to withstand radiologic positioning modes when a falls risk is less apparent.

Evidence-based reviews have established that patients with a history of recent falls and with impaired mobility are predisposed to and at increased risk for falling.<sup>2</sup> Patients with impaired mobility include those who require assistive ambulation devices, those who take psychoactive medications including sedatives, and those of advanced age with its associated frailties. Falls can also result from loss of consciousness due to syncope from various factors.<sup>3</sup> The physical design of the radiology department may create hazards that can cause patients to slip and trip.<sup>4</sup> A unit-specific analysis of falls is an opportunity to reduce the number and severity of injuries sustained within radiology departments, and implementation of risk reduction strategies could reduce the number of falls overall and injury-related falls organizationwide.

### RADIOLOGY FALLS REPORTED TO THE AUTHORITY

In 2009, 602 falls events were reported to the Authority from radiologic service areas, including breast health services, computed tomography (CT), diagnostic and interventional radiology, magnetic resonance imaging (MRI), nuclear medicine, and ultrasound. Just over half the reported falls events were associated with the following issues:

- Syncope
- Slips, trips, and loss of balance
- Falls from stretchers, procedure tables, or stools, including transfer mishaps
- Medication-related effects

In 2009, 5% of all reported falls in radiology departments were reported as Serious Events, compared to 4% of reported Serious Events involving falls from all departments. The demographics of the patients who fell in radiology were consistent with the population served by hospital radiology departments, including ambulatory services with breast health services for women. Fifty-four percent of falls in radiology involved patients age 65 or younger, compared to 44% of all reported falls; female patients represented 54% of radiology falls, compared to 50% of all reported falls.

About half of reported Serious Events involving falls occurred in combined services, about a quarter in the angiography and special procedures service areas, and 10% in ultrasound areas; events were relatively evenly distributed throughout the other service areas. (See Figure.) Of the reported patient injuries sustained, 39% included fractures, 42% of which were of the hip; 52% included lacerations, 69% of which were of the head; and 6% included serious head traumas, such as subdural and subarachnoid hemorrhages and frontal and parietal hemorrhages.

## Syncope

Patients in radiology service areas may be predisposed to syncopal or near-syncopal episodes due to factors such as fasting, blood donation, chemotherapy, and lying supine. In 2009, 17% of radiology falls reports described syncopal events. About half of the patients fainted or nearly fainted when standing for an upright study (e.g., chest radiograph, mammogram), such as the following report describes:

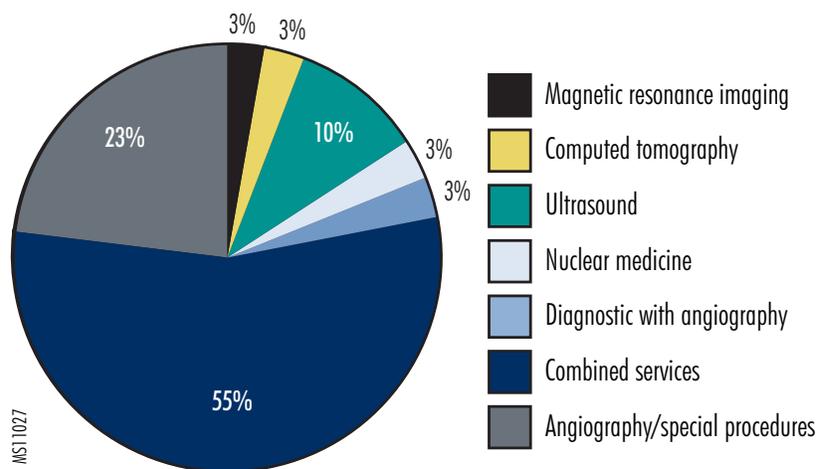
*Prior to a chest x-ray, an elderly patient appeared “wobbly” but stated she could stand for the study. When the patient stood, she passed out and was lowered to the floor by the technologist. The patient was taken to the ED [emergency department] for evaluation. Apparently the patient had just donated a unit of autologous blood in advance of a planned operation and she had an orthostatic episode.*

Syncope-related falls also occurred after insertion of an intravenous line and during or immediately after a breast biopsy. Although in most instances radiology staff helped patients safely to the floor, staff was not always close enough or able to support falling patients. In such situations, injuries commonly occurred when patients hit their head on the floor or against other objects, as in the following case:

*A patient was standing in front of an x-ray table and waved to get the technologist’s attention and fainted. The patient fell to her side and hit her head on the floor. She had been standing for approximately 10 minutes for an upper gastrointestinal test and had been fasting. The patient became immediately coherent and was alert and oriented; however, she sustained a laceration to the forehead.*

(For more information, see “Preventing Syncope-Related Falls: A Clinical Study.”)

Figure. Radiology Service Areas Reporting Serious Events to the Pennsylvania Patient Safety Authority, 2009



## Slips, Trips, and Loss of Balance Falls

Fifteen percent of radiology falls reports described patient slips, trips, or loss of balance events. In these situations, patients who were able to bear weight, either independently or with an assistive device, lost their footing and fell, even with staff assistance. Slip and trip falls occurred throughout the radiology department and were not limited to examination rooms. The use of walking aids (e.g., canes, walkers) contributed to several patient falls. The failure to use such aids also contributed to patient falls. In one event, a patient fell and hit the back of her head on the floor after attempting to walk to the bathroom without using her cane, sustaining a head laceration.

Slips, trips, or loss of balance incidents occurred in all radiologic service areas. For instance, in mammography, patients tended to fall backward on release of the compression device as they loosened their grip on the mammography unit’s support handles, as exemplified in the following report:

*After mammography compression was released, the radiologic technologist told the elderly patient she could step away from mammogram machine. The*

*patient stepped backwards, lost her balance, and fell back, hitting her head on the chair before falling to the ground.*

Bathrooms, dressing rooms, and waiting rooms also were common locations for falls with serious consequences. Patients with a history of falling or at probable risk for falling were left alone in these areas and subsequently experienced fractures, lacerations, and extensive bruises. The following report is one example:

*An elderly patient presented to a hospital-based radiology center for x-rays of the abdomen and chest. The patient was offered assistance with undressing and dressing but stated he did not need help. Following the x-ray, the patient was in the dressing room and yelled out. He was found on the floor and stated he hurt his left arm. X-rays were obtained [and revealed] a fracture.*

Loss of balance also occurred when a patient’s clothing or shoelaces became entangled in transport vehicles (e.g., wheelchairs, carriers), medical equipment (e.g., scales), or waiting room furnishings and carpet. Three patients slipped on wet floors, two as a result of incontinence and one who slipped on a small quantity of

**PREVENTING SYNCOPE-RELATED FALLS: A CLINICAL STUDY**

Peterson and Berns conducted a retrospective review of falls incidents within the clinic system of the University of Wisconsin Medical Foundation and found that fainting was the single largest cause of falls. A review of incident reports revealed that the propensity for falls due to fainting had increased from 21% in 2002 to 36% in 2003. A clinical task force established a two-step plan to significantly reduce the annual number of fainting-related falls. The plan included safe care guidelines for patients with a history of syncope and mandatory education on the management of syncopal events for all staff in areas where patients are at high risk for fainting. Staff was trained to ask patients about previous fainting, and patients were encouraged to report difficulties with procedures. Positive patient histories were then communicated throughout the clinic, including the laboratory and the radiology department. Staff monitored patients for signs of syncope and informed patients not to fast for more than 12 hours before laboratory testing and to drink water while fasting. Practice changes included drawing blood with at-risk patients in a supine position and offering juice and crackers afterward. Implementation of the fainting prevention plan resulted in a decrease in falls rates from 36% in 2003 to 12% in 2004-2005.

**Source:** Peterson R, Berns S. Prevention and education to decrease patient falls due to syncope. *J Nurs Care Qual* 2006 Oct-Dec;21(4):331-4.

hand sanitizer. Footwear, including socks, also contributed to these types of falls. Several patients in stocking feet sustained fractures during transfer between a wheelchair and a procedure table or stretcher, as in the following report:

*A patient was finishing a radiology exam when he slipped getting off the x-ray table. The radiologic technologist had instructed the patient to wait while she got his wheelchair closer to the table. The patient was sitting at the edge of the table when he attempted to get off himself. [The patient's] slip resistant slipper was noted to be twisted to the side, not affording the slipper to provide maximum grip. The technologist had the wheelchair between her and the patient and could not reach patient in time [before he fell].*

**Stretcher and Examination Table Falls**

Another significant cause of injury was patient falls from transport vehicles and procedure tables or chairs. Twelve percent of the reports described falls from a

transport stretcher, wheelchair, radiologic procedure table, or stool. Of these events, 12% resulted in serious injury, equally divided between hip fractures and head injuries. Most of the head injuries were lacerations; however, one patient suffered a cerebral hemorrhage. Injuries occurred largely when patients tried to get off a stretcher or table for toileting, repositioning, or transferring or when patients inadvertently rolled off the table. Many patients fell while attempting to get up by moving to the foot of the stretcher, tipping it over. The following example pertains to a fall from a procedure table:

*A patient was placed on a procedure table in the supine position. Her right arm was placed out to the side in preparation for peripheral insertion of a central catheter line. The nurse and radiologic technologist were at the patient's right side. Her right arm was lifted for placement of a sterile towel as per protocol. The patient was slowly rolled onto her left side and [fell] off the table [sustaining an] approximate three-foot fall [to the floor].*

Preventing falls from procedure tables can be a challenge. For example, MRI examination tables have no bedrails, although it may be possible to use straps to secure and stabilize patients. In the absence of stabilization, patients could incur significant injuries (e.g., traumatic brain injuries) in longer falls from elevated tables.<sup>5</sup> Caregivers also can be injured when straining to prevent patient falls. While a table is still in the lowered position, the technologist can verify that the patient is well situated and ready for the table to begin moving. The patient not only must be carefully observed, immobilized, or secured before the table is moved, but he or she also must know what to expect before movement starts.<sup>6</sup>

On several occasions, a patient on a stretcher who was positioned for a procedure (e.g., lateral decubitus position) against the image receptor fell between the receptor and the stretcher. Either the stretcher was unlocked or, in one event, a locked stretcher moved away from the image receptor as a patient forcefully pushed against it in repositioning. Similar falls occurred when patients were transferred from a stretcher to a procedure table or vice versa. Although staff may have been in place, gaps between procedure tables and stretchers allowed for patient falls.

*A radiology staff was preparing to transfer an elderly patient to a gurney. The patient turned on his right side with two technologists present on each side of him. There was a space between the x-ray table and lead shield. Despite a technologist standing close to the patient, there was a gap and the patient slid to the floor. The patient's head hit a foot pedal.*

Falls during repositioning also occurred as patients were seated upright on stools. An example of this is the following:

*A patient walked into an x-ray room for a hand x-ray. The technologist asked the patient to sit on a stool. The patient sat on the stool while the*

technologist turned to get film. The patient tried to readjust his body on the stool and slipped off, striking his head on the floor.

### Medication-Related Effects

Sedatives and medications for anxiety and depression can affect cognitive and physical function, such as blood pressure, balance, and awareness. Four percent of the reported radiology falls events identified medication as a contributing factor. Almost 75% of these events were related to the use of opiates for pain control, and the remaining 25% were related to the effects of benzodiazepines used for the treatment of anxiety or claustrophobia. Most patients experienced dizziness or syncope during an upright examination or fell from a procedure table. Although most patients were not injured, two needed follow-up CT scans for further evaluation of the head and cervical spine, and one sustained a leg fracture.

Reported events that exemplify medication-related falls include the following:

*A patient was asked if she had been out of bed since surgery. She replied, "Yes, this morning." Her stretcher was parked next to the xray Bucky. The patient stood and shuffled her feet. She was asked, "Are you able to walk?" She said "that's why I had the surgery; my feet are numb." The patient was standing with her back to the Bucky while the radiologic technologist was talking to her. She became unresponsive and started to slide down the Bucky. The technologist could not fully support her, and lowered her to the floor and called for help. Staff responded and assisted in lifting a now coherent patient onto the table. The patient said that it probably happened because she hit the button on her morphine pump, just before being brought into the room.*

*A patient presented for an outpatient bone scan. Following the test, the*

*patient became nauseated and was given a glass of water and was asked to sit with her daughter while her films were reviewed by the radiologist. She asked to go to the bathroom. When she was coming out of the bathroom, she looked weak, so the technologist and the daughter went to assist her. Before they reached her, she went down to her knees on the floor not losing consciousness. She said she was not hurt, but was weak because she did not eat. The patient did not want to be seen in the ED. She was very nervous about the results of her test and she took approximately two Valium® before the test.*

### PRIORITIZING FALLS PREVENTION IN RADIOLOGY

Despite efforts by healthcare facilities to revamp and strengthen their falls prevention programs, many nonfatal injuries sustained in radiology departments are caused by patient falls. The lack of medical literature specific to falls in radiology care areas suggests that little is known about or has been done to address such occurrences in these care areas. Falls may result from factors such as a patient's cognitive state, prescribed medications, the physical environment, and infrequent staff education about recognizing patient falls risks. Careful review of a patient's physical condition and associated environmental factors can help radiology departments set priorities for prevention by adopting strategies that can reduce the risk of patient harm from falls.

In addition to injury prevention, there are financial incentives for implementing and monitoring strategies to reduce patient falls in radiology. As of October 2008, Medicare and some other payers may no longer reimburse hospitals for the cost to treat injuries from falls if the injury occurred during the patient's hospital stay or an outpatient visit.<sup>7</sup> In approximately 5% of the total reported radiology falls events, a postfall CT scan was needed to evaluate the patient and rule out fractures

or internal bleeding. Although in 75% of these events there were minor or no subsequent injuries, facilities may not be reimbursed for these studies; in addition, there may be long-term risks to the involved patients from the additional radiation exposure.<sup>8</sup>

### Implement Unit-Specific Falls Prevention Strategies

Radiologic technologists have not been immune to liability lawsuits. In a survey of 415 radiology-related lawsuits, technologists were most often called to court in cases of patient falls. As in the reports submitted to the Authority, technologists were found to be negligent in leaving patients unattended without properly securing them or in performing a study with a patient in an upright position when the patient should have been in a horizontal or seated position.<sup>9</sup>

To minimize the chances of injuring a patient, radiologic technologists, as well as all radiology staff, can take the proper precautions when entrusted with a patient's care. Knowledge of falls prevention strategies before performing a procedure is paramount to ensuring the safety of patients in this service area. Consider the following risk-reduction strategies in the implementation of a unit-specific falls program.

**Offer falls prevention training.** Staff education is an important component of falls prevention. All radiology staff who interact with patients, from a clerical to a clinical capacity, can participate in training to meet the department's falls prevention goals. Ongoing education will keep technologists apprised of methods for assessing patients and identifying conditions in which a modified approach to examination may be needed to avoid patient injury. Departmental in-service sessions can offer practical training on body mechanics and basic patient movement techniques that promote safe patient transfer between transport vehicles and procedure tables. In addition, transport



staff can be trained to lower stretchers before leaving a patient unattended.

**Assess falls risk.** Although radiology departments receive inpatients that have been assessed by nursing for falls risk, assessment protocols of ED-referred patients and outpatients for whom radiologic studies are ordered may not be as standardized. Similar to prevention programs initiated in other patient care settings, the development and use of a unit-specific falls risk assessment can help radiology staff predict and prepare for a fall possibility that otherwise may have been overlooked. Consider the following elements in the assessment process and in the development of an assessment tool (also see the “Radiology Falls Risk Assessment Tool,” available online at <http://patientsafetyauthority.org/EducationalTools/PatientSafetyTools/Pages/home.aspx>):

- Assess patient mobility and determine if the patient will need to be accompanied to the department, the type of transport the patient will need, and if the patient may encounter fall or transfer problems. If a patient is identified as at risk for falls, enlist patient care aids familiar with the patient’s needs to accompany the patient and to take an active role in providing transfer and positioning assistance before, during, and after the procedure.
- Note any visual clues that might indicate a patient is at risk (e.g., color-coded identifier, ambulatory assistive devices, socks without grips, untied shoelaces).
- Assess a patient’s pain level and consider his or her physical ability to withstand positioning and to follow directions. Determine whether an alternative approach would be safer (e.g., sitting versus standing).
- Review medications and incorporate a list of high-risk medications in the assessment tool.

- Inquire about toileting needs and assistance, especially of those patients with impaired gait and mobility due to functional deficits and those who may experience drug side effects (e.g., Valium taken for claustrophobia).
- Assess the patient’s position or need for repositioning on a transport vehicle, examination table, or stool before leaving the patient’s side.
- Question the patient or family about patient fall tendencies or behaviors.
- Be an active participant in patient handoff discussions. (See the section “Communicate Patient Risks.”)

**Involve patients and families.** Patients and their families play a significant role as collaborators in the care process; however, they may not always understand their personal risk and may refuse assistance. Allowing patients and their families to candidly speak with the radiology team about falls risk and tendencies allows the department to take appropriate actions to ensure their safety. Displaying a poster (e.g., “Are you at risk for falling?”) in patient waiting areas and in examination rooms is one way to alert patients to the most common falls risks and may encourage them to speak up about their own risk factors.

**Share event analysis results.** Communication of actual and near-miss falls events and the factors that contributed to these events can be shared with radiology staff as part of the falls prevention program. Investigate the causes of unit-specific falls and develop corrective interventions to prevent future falls.

### Communicate Patient Risks

Patients have fallen because of the lack of interdepartmental communication. Visual identifiers, including armbands, stickers, and colored socks, can be used to communicate falls risk; however, if the radiology department is not aware of this component of the falls program, patients transported to this area will be at risk. The Joint Commission requires that hospitals have a process in place to receive or share information when a patient is referred

to other internal care providers. The hospital’s process for handoff communication must allow for discussion of patient information.<sup>10</sup> A pretransport tool, such as SBAR (Situation, Background, Assessment, Recommendation),<sup>11</sup> can be used by nursing and radiology to ensure that patients who cannot be left unattended, who may be a difficult transfer, or who have experienced a fall will be safe while off the patient care unit. The transport form would address any falls risk issues, such as language barriers and medication use that affects alertness, and any implemented falls prevention measures, including proper footwear, recent toileting, use of a personal alarm, and patient and family safety education. Handoff and receiving personnel could jointly review the form.<sup>12</sup> In addition, transport procedures can list the steps for receipt in radiology of a patient at high risk for falls and the steps for return of the patient, including required checkpoints of staff interaction.

### Assess Environmental Safety

Facilities can provide and encourage patients to wear footwear with slip-resistant soles. Footwear is a safety factor that will require ongoing inspection; footwear that has twisted on the patient’s foot or that displays worn treads can no longer protect a patient and may not prevent a fall.

Facility policies should include a spill-control program. Wet floors are more slippery than dry floors; the test of good flooring is how slip resistant it remains while wet. The slip resistance of flooring products on a wet floor can be evaluated during the selection process. Environmental hazards in radiology may include changes in floor surfaces, bold carpet patterns that obscure objects, and abrupt changes in lighting from bright to dim.<sup>4</sup> Keeping patient and staff traffic patterns free of equipment can also be a challenge in radiology. Frequent patient safety environmental rounds can be an effective way to monitor safety and assess compliance with the falls prevention program. Regular leadership rounds that include engaged radiology staff are an

important strategy for maintaining visibility of falls prevention initiatives.<sup>13</sup>

## Evaluate and Document Falls Injuries

Because patients may not remember having fallen, information provided from radiologic technologists or other witnesses to the event can provide valuable diagnostic information to the ED, especially for mild traumatic head injuries and syncopal episodes. The American College of Emergency Physicians has published evidence-based recommendations for these two conditions that depend on an accurate patient history. Documentation by radiology staff of the following observations in the medical record can be very helpful:<sup>5,14</sup>

- Distance a patient falls from a fully raised stretcher or procedure table
- Loss of consciousness
- Loss of memory about the event
- Position when syncope occurred (e.g., standing, sitting, reclining)

- Complaints of headache or vomiting after a possible head injury
- Obvious signs of trauma (e.g., fracture, deformity, laceration, bruising, redness, swelling, point tenderness)

Evaluation and treatment of a potentially injured patient may be limited when a fall occurs in offsite or independent radiology centers instead of in hospital-affiliated departments. The patient may require further clinical workup after assessment by the center's radiologist or other medical professional. Depending on the circumstances and severity of the patient's injuries, options include contacting the referring or primary care provider to consult on the patient's medical history and the need for additional radiologic studies; activating the emergency medical system; sending the patient to an ED, and having the patient follow up with his or her physician. Hospital-based radiology departments are to follow hospital policies; most facilities reported calling the hospital's rapid response team for assistance or transporting patients to the ED for further evaluation. Regardless of

where a fall occurs, radiology facilities are to implement and follow postfall processes that include appropriate medical evaluation, documentation, and disclosure.

## CONCLUSION

Although most injurious falls occur in direct patient care areas, patients can sustain falls injuries in any location of the facility that provides patient care services. Radiology departments must set clear unit-specific priorities for falls prevention and implement interventions that reduce the likelihood of patient harm. Prevention ideally begins before a patient leaves the patient care area, through nursing to radiology communication of a patient's risk for falls. In the emergency or ambulatory setting, radiology staff can identify patient-specific risk factors by using an assessment tool or checklist and by engaging the patient and his or her family. Ongoing monitoring of a falls prevention program is essential to identifying successes and problems and will help radiology professionals continue to prevent falls.

## NOTES

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# PENNSYLVANIA PATIENT SAFETY ADVISORY

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The Pennsylvania Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (“Mcare”) Act. Consistent with Act 13, ECRI Institute, as contractor for the Authority, is issuing this publication to advise medical facilities of immediate changes that can be instituted to reduce Serious Events and Incidents. For more information about the Pennsylvania Patient Safety Authority, see the Authority’s website at <http://www.patientsafetyauthority.org>.



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