

PENNSYLVANIA PATIENT SAFETY ADVISORY



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Falls Rates Improved in Southeastern Pennsylvania: The Impact of a Regional Initiative to Standardize Falls Reporting

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ABSTRACT

The Pennsylvania Patient Safety Authority and the Health Care Improvement Foundation (HCIF) partnered in 2008 to establish a falls reporting initiative to assist hospitals in their falls prevention efforts. Following the development of standardized definitions for falls and falls with harm, the initiative provided participating hospitals with two full years of deidentified comparison reports to measure and benchmark progress with falls prevention. Most significantly, the reports revealed five uninterrupted quarters of steady decline in rates of falls with harm. The Authority and HCIF hypothesized that this decline was the result of effective interventions and approached those hospitals that showed steady improvement to learn more about their falls prevention programs. The assessment revealed that several regional hospitals had implemented effective and innovative strategies as a result of the benchmarking data to boost their existing falls prevention measures. To continue the improvement realized through this initiative, the Authority is moving forward with a statewide reporting initiative that includes a modification to the Authority's reporting system to track falls and to provide facility- and unit-level falls data from both the inpatient and outpatient settings. The Authority has also partnered with the Hospital and Healthsystem Association of Pennsylvania in the Hospital Engagement Network of the Centers for Medicare and Medicaid Services as part of the Partnership for Patients initiative and will attempt to reproduce the success that the data collection and reporting initiative achieved in the southeastern region of Pennsylvania. (Pa Patient Saf Advis 2012 Jun;9[2]:37-42.)

INTRODUCTION

Falls are the leading cause of injury-related deaths and nonfatal injuries among older adults in the United States.¹ They result in traumatic brain injuries and most of the fractures suffered by older adults. In 2010, there were nearly 36,000 patient falls reported to the Pennsylvania Patient Safety Authority.² Likewise in 2010, patient falls accounted for 16% of all reported events and 15% of all Serious Events, including 16 patient deaths statewide.² Because falls with injury represent the most frequently reported hospital-acquired condition and are one of the most frequently reported adverse patient events in Pennsylvania, they continue to represent a significant patient safety challenge for many hospitals.

In 2008, the Health Care Improvement Foundation (HCIF) and the Authority partnered to provide 29 southeastern Pennsylvania hospitals—representing teaching and community-based acute care hospitals, behavioral health hospitals, and rehabilitation hospitals—with comparison reports that measured and benchmarked rates for falls and falls with harm. The main goal of the reporting initiative was to confront the problem of falls by providing reliable data. To do that, the Authority and HCIF prospectively worked with the participating hospitals to develop standardized definitions that would enable consistency in the data set. The data from participating hospitals was gathered using event reports submitted through the Pennsylvania Patient Safety Reporting System (PA-PSRS), and patient-days data was gathered from submissions to the Delaware Valley Healthcare Council (DVHC) of the Hospital and Healthsystem Association of Pennsylvania (HAP). Eight quarters of data were collected from October 2008 through September 2010, and rates of falls and falls with harm were calculated and distributed to each of the participating hospitals.

THE REPORTING INITIATIVE

Definitions

Beginning October 1, 2008, the 29 hospitals committed to reporting falls and falls with harm using standardized definitions to reduce variability in falls reporting (adverse or near-miss events) in the southeastern Pennsylvania region. These definitions were developed by a falls prevention task force under the leadership of the Partnership for Patient Care* and were developed to be consistent with the definitions used by the American Nurses Association's National Database of Nursing Quality Indicators in order to eliminate duplicate data collection and to enable comparisons against national benchmark data on falls. The standardized definitions were as follows:

- A *fall* was defined as “any unplanned descent to the floor (or any other horizontal surface such as a chair or table) with or without injury to the patient.” The definition included “assisted falls,” in which a caregiver saw a patient about to fall and intervened, lowering them to a bed or floor, and “therapeutic falls,” in which a patient fell during a physical therapy session with a caregiver present specifically to catch the patient in case of a fall. The definition excluded “failures to rise,” in which a patient attempted but failed to rise from a sitting or reclining position.

* The Partnership for Patient Care is a collaboration among HCIF, the hospitals in southeastern Pennsylvania, Independence Blue Cross, and ECRI Institute to accelerate the effective adoption of evidence-based clinical practices by pooling the resources, knowledge, and efforts of hospitals and other key stakeholders.



- A *fall with harm* was defined as “any fall that required more than first aid care.” This definition included falls that resulted in a laceration requiring Steri-Strips, skin glue, sutures, or splinting; a more serious injury; or death. The definition excluded falls that required no intervention or only first aid care, such as limb elevation, cold compresses, or bandages.

Comparison Reports

Deidentified quarterly comparison reports were developed and distributed to the 29 participating hospitals from the fourth quarter of 2008 through the third quarter of 2010. Of the 29 hospitals, 25 were included in the distributed data and received quarterly comparison reports of both falls and falls with harm. Three of the hospitals subsequently did not agree to the definition of falls with harm, and one hospital did not report any falls events. Although not included in the data, the three hospitals that did not agree to the definition of falls with harm were provided with falls data along with calculated hospital-specific falls rates to allow for comparison with the 25 hospitals included in the data and with the overall mean rate. The one hospital that did not report any events throughout the reporting initiative did not receive any reports.

Falls Survey

For a better understanding of the falls prevention programs implemented by the hospitals engaged in the reporting initiative, a survey was distributed in February 2011. The survey was completed by 13 patient safety officers or leaders of falls task forces. Responses to the survey suggested that the most common causes of falls within the hospitals included the following:

- Patients fail to call for assistance
- Bed alarm not set
- High-risk medications
- Poor communication between staff

- Inadequate patient and family involvement or education
- Inadequate staffing
- Inadequate patient assessment
- Call bell out of reach
- Delayed response to call bell
- Inadequate footwear

Results

For those hospitals that fully participated in the reporting initiative, falls rates were used to track and monitor progress. Falls rates were calculated using falls events reported through PA-PSRS that met the definition of falls (i.e., those without harm) or falls with harm and the number of patient-days as reported by DVHC. Rates for falls were reported per 1,000 patient-days, and rates for falls with harm were reported per 100,000 patient-days. (See “Method of Calculation for Rates of Falls and Falls with Harm.”)

Checks for data validity were performed and included searching event report narratives for references to fractures, sutures, or Steri-Strips to ensure that the events were appropriately categorized as falls with harm using the criteria outlined by the standardized definitions. In most quarters, at least one reported event originally designated as a fall met the definition for a fall with harm and the data was adjusted accordingly.

Event report narratives were an important component in determining the severity of patient falls. Narratives that described circumstances of the events, such as patient location and activity at the time of the fall or patient risk factors (e.g., medications),

provided insight into the possible causes of patient harm. However, incomplete narratives, such as “patient found on floor,” “patient threw himself out of bed because he was mad,” and “patient found on floor having rolled out of bed; hip pain,” provided less opportunity for complete event analysis.

During the total reporting period, the participating hospitals reported 14,571 falls events to the Authority. By the aforementioned definitions, falls comprised 14,192 (97.4%) of these events—including near misses—and falls with harm comprised 379 (2.6%) of these events. The most common injuries were lacerations, fractures, and head traumas. Four events resulted in patient death; however, one death was not directly related to the fall. In the remaining three events, the patients died as a result of the fall. One patient, status post hip fracture, died as a result of a fall, another sustained an intracranial bleed, and the third developed a pulmonary embolism secondary to a complex fracture from a fall.

Mean rates of falls and falls with harm were calculated and distributed quarterly to allow participating hospitals the ability to compare their rates and progress with that of the other participating hospitals over the eight-quarter reporting period. Figures 1 (rates of falls) and 2 (rates of falls with harm) illustrate the falls rates for the 25 participating hospitals during the total reporting period. Figure 1 shows that there was a gradual increase in the falls rates after the third quarter of 2009, which may be indicative of the commitment to reporting falls events to

METHOD OF CALCULATION FOR RATES OF FALLS AND FALLS WITH HARM

Rate of Falls	=	$\frac{\text{Number of patient falls} \times 1,000}{\text{Number of patient days}}$
Rate of Falls with Harm	=	$\frac{\text{Number of patient falls} \times 100,000}{\text{Number of patient days}}$

the Authority. Of note in Figure 2, there were five uninterrupted quarters of steady decline in rates of falls with harm from the first quarter of 2009 (12 per 100,000 patient-days) through the first quarter of 2010 (8 per 100,000 patient-days).

However, event reporting patterns for five hospitals were inconsistent during the reporting initiative. Figure 3 shows the mean rates for falls and falls with harm for the 20 hospitals that consistently reported falls and falls-with-harm events. In these hospitals, falls rates remained rather consistent, with an overall mean rate of 4.06 falls per 1,000 patient-days; the data for falls with harm shows that there were three uninterrupted quarters of decline from the third quarter of 2009 (14 per 1,000 patient-days) through the first quarter of 2010 (6 per 100,000 patient-days).

Further analysis of the collected data identified probable risk factors contributing to falls events and patient harm, including the following:

Harm from falls occurred in older patient age groups. The Authority's findings were consistent with those reported by the Centers for Disease Control and Prevention affirming that falls are the leading cause of injury-related death and nonfatal injuries among older adults,¹ as well as consistent with the expectation that harm from falls more commonly occurs in older patient age groups. The findings also emphasized the age ranges at which patients were most vulnerable to harm. See Figure 4, available exclusively with this article online at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun;9\(2\)/Pages/home.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun;9(2)/Pages/home.aspx).

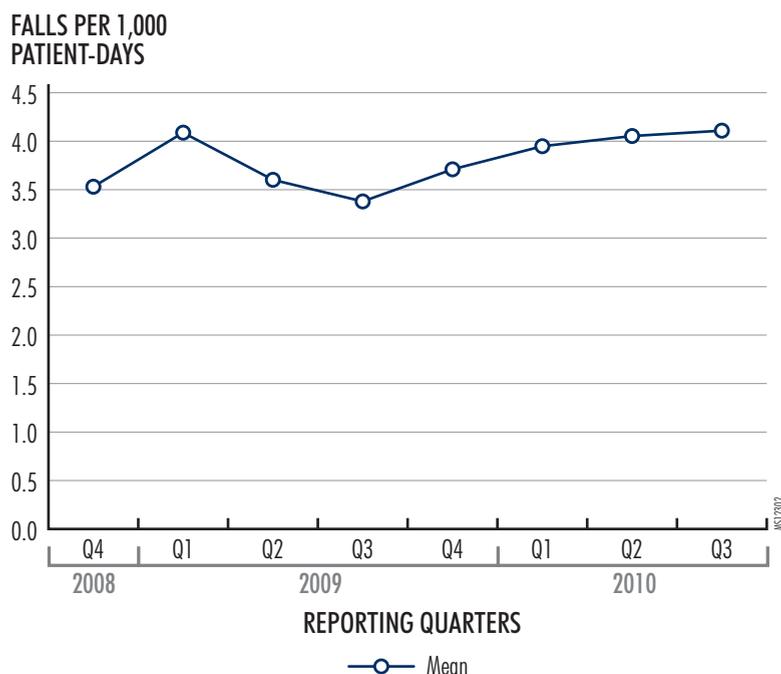
When combining age groups 0 to 24 and 25 to 44, 1% (n = 24) of the reports described a harmful event as compared with nonharmful events; however, there was a two-fold increase by percentage to 2% (n = 100) in the falls associated with harm for ages 45 to 65 and almost another two-fold percentage increase to 4% (n = 255) in patient harm for ages 66 or older.

Falls were common in certain patient care areas. Although patient falls occurred throughout various areas of each hospital, fall events (with and without harm) were mainly reported from the following units: medical/surgical (31%), intermediate (e.g., medical/surgical, cardiac, telemetry) (20%), critical care (including the emergency department) (11%), behavioral health (10%), and rehabilitation (9%). Injuries sustained from falls at the unit level were reported as follows: behavioral health units (3.5%), intermediate units (2.8%), general medical/surgical units (2.6%), and specialty units (e.g., orthopedics, oncology) (2.6%).

Patient harm was linked to several event types. Of the patients who sustained injuries from falls, 37% were found on the floor, 20% were ambulating, 16% were toileting, and 9% were sitting. In the remaining 18% of events, patients fell from lying in bed, transferring, being assisted, or falling from a stretcher or examination table, usually in the radiology department. (For additional information on falls in radiology, see the March 2011 *Advisory* article "Falls in Radiology: Establishing a Unit-Specific Prevention Program" at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/mar8\(1\)/Pages/12.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/mar8(1)/Pages/12.aspx).)

Risk assessments and falls precautions influence patient harm events. The falls survey distributed to the participating hospitals revealed that the most commonly used assessment tools were the Hendrich Fall Risk Model, Morse Fall Scale, and facility-developed tools. During the

Figure 1. Mean Falls Rates of 25 Participating Southeastern Pennsylvania Hospitals from the Fourth Quarter of 2008 through the Third Quarter of 2010





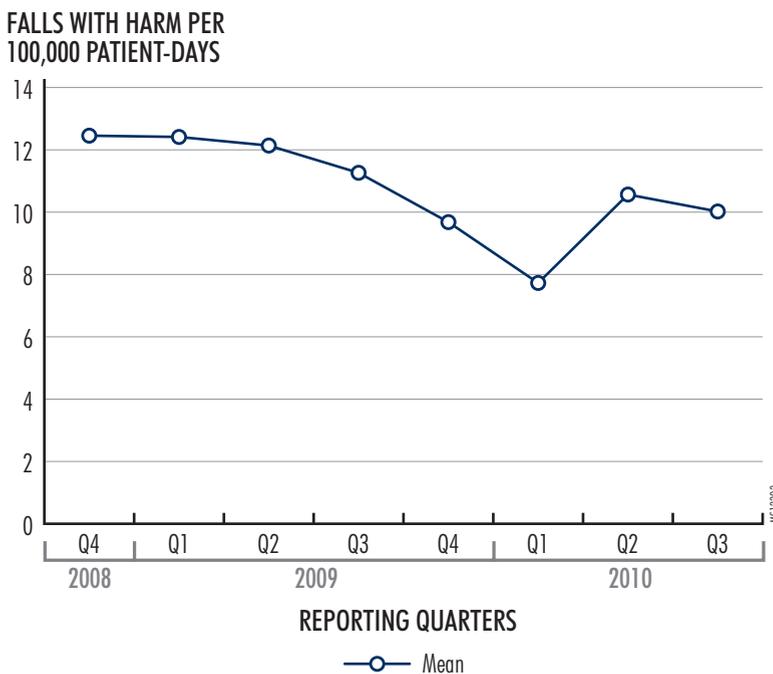
reporting period, about 81% of patients who fell (with or without harm) had a falls risk assessment performed. However, 4% of patients who were injured from a fall were not assessed for potential risk factors, and the falls risk assessment was unknown or not given for 15% of these patients.

The data also suggests that falls precautions were implemented before about three-fourths of all falls events. Twelve percent of patients who were injured did not have precautions in place, and implementation of falls precautions were unknown or not given for 13% of the patients who were injured. The Table illustrates, by quarter, the relationship between the performance of a falls risk assessment and the implementation of falls precautions. Most patients who did not have an injury (71%) had both a risk assessment and implemented precautions in place, and of the patients who had an injury, 14% had neither an assessment performed nor precautions implemented.

Risk assessments were performed in older age groups. Although age should not be a determining factor as to whether a falls risk assessment is performed, the data demonstrated that risk assessments were performed more commonly on elderly patients than on younger patients. In the 0-to-24 age group, 67% of those who fell with no injury had been assessed and only about 40% of patients who sustained an injury had an assessment performed. These results may indicate that risk assessment protocols may be needed to identify children and young adults who are at risk for harmful falls. See Figure 5, available exclusively with this article online at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun;9\(2\)/Pages/home.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun;9(2)/Pages/home.aspx).

Medications contributed to patient falls. Medication-induced falls accounted for 3% of the reported falls. The most common medications to contribute to patient falls included benzodiazepines, opiates, antipsychotics, and cardiac medications.

Figure 2. Mean Falls-with-Harm Rates of 25 Participating Southeastern Pennsylvania Hospitals from the Fourth Quarter of 2008 through the Third Quarter of 2010



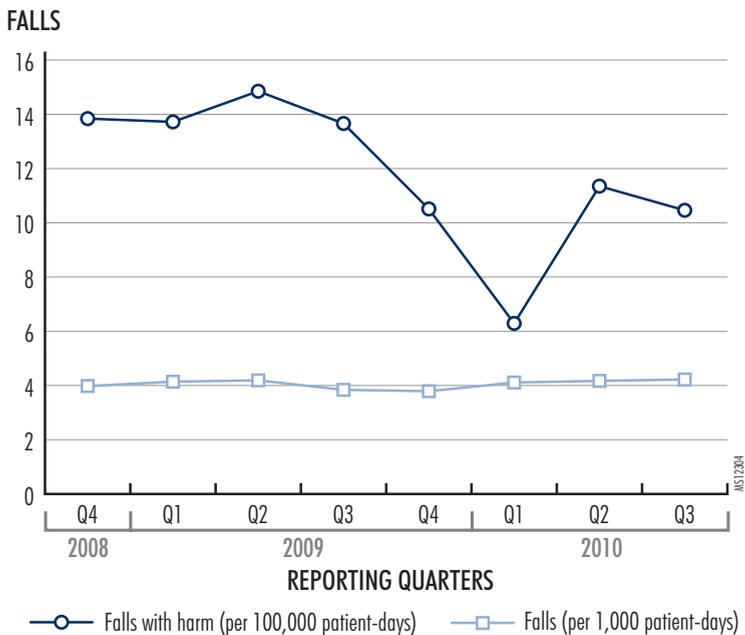
About 2% of patients sustained an injury as a result of a medication-induced fall within each of these medication categories. Eighty-one percent of patients who fell without an injury had been assessed for a potential medication-induced fall, and 10% had not been assessed. Similarly, 81% of those who fell and sustained an injury had been assessed for a potential medication-induced fall, and 5% had not been assessed. This data suggests that there is opportunity for better compliance with assessing falls risk, particularly when the aforementioned medications are administered. (For additional information on the role of medications in fall prevention, see the March 2008 *Advisory* article “Medication Assessment: One Determinant of Falls Risk” at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2008/Mar5\(1\)/Pages/16.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2008/Mar5(1)/Pages/16.aspx).)

THE SEARCH FOR INNOVATIVE SOLUTIONS

Despite hospitals’ ongoing efforts, falls continue to occur and pose a difficult challenge. With the accumulation of evidence on both the frequency and severity of falls, the recognized risk to patient safety, and the impending financial impact to hospitals for certain hospital-acquired conditions, there is an urgency to reduce the occurrence of this patient event.^{3,4}

Following data review, it became clear that some hospitals were seeing significant improvements in reported rates of falls with harm. Although the overall mean rate of falls continued to rise in the latter four quarters of the 25-hospital data set and was rather consistent in the 20-hospital data set, there was a substantial reduction in the rates of falls with harm in both scenarios presented. To explore the

Figure 3. Mean Falls and Falls-with-Harm Rates of Participating Southeastern Pennsylvania Hospitals that Consistently Reported Events from the Fourth Quarter of 2008 through the Third Quarter of 2010



validity of this finding, visits were made by a designated patient safety liaison from the Authority to assess falls reporting and falls prevention programs in each of the hospitals where data suggested an improvement in the rate of injurious falls.

During the on-site hospital visits, it was evident that there were core elements common to nearly all of the assessed falls prevention programs. These “bundled” elements typically included the following:

- Establishment of a multidisciplinary team focused on falls
- Review and analysis of falls data
- Performance of falls risk assessment on admission and reassessment at prescribed intervals
- Use of visual cues to communicate falls risk
- Use of bed-exit alarms
- Implementation of one-to-one observation or sitters

- Enforcement of patient rounding
- Promotion of patient education

From the on-site assessments, it also became apparent that hospitals with better-than-average performances were incorporating additional strategies and innovations that allowed for sustainment of their overall programs. In an effort to spread the ideas and improvements found in the better-performing hospitals, the Authority and HCIF sponsored a full-day conference in June 2011. Although this capstone conference concluded the reporting initiative, its goal was to accelerate improvement across the entire southeastern Pennsylvania region by sharing the ideas and improvements that led to fewer falls with harm in some hospitals.

The Authority enlisted six hospitals whose innovative strategies reflected new ideas and creative approaches to the longstanding problem of falls. These hospitals responded to the data distributed on

falls and falls with harm and initiated interventions that went beyond the core set of interventions typically employed. The conference proved to be a forum for collaborative learning where ideas were exchanged freely and lessons shared and taken away. The Institute for Safe Medication Practices also participated and provided insight about the role of medications in falls risk. Some of the innovations shared with patient safety and risk management leaders from across the region included the following:

- Use a falls risk assessment tool with factors specific to patient population.
- Conduct postfall huddles and investigate causes.
- Incorporate medications into the risk assessment tool.
- Include “fall risk” in the handoff communication tool.
- Conduct daily hospitalwide safety calls to raise awareness of recent fall activity.
- Implement “purposeful” rounding to proactively reduce risk-prone patient behavior.
- Use low-rise beds.
- Employ supervision status tags that communicate patient fall risks.
- Develop staff awareness campaigns.
- Audit and monitor implemented interventions.
- Establish a patient safety assistant role in place of one-to-one observation to reduce costs.

CONCLUSION

Falls prevention in southeastern Pennsylvania, and nationwide, continues to be a work in progress. Undoubtedly, tremendous efforts have been made to reduce patient fall risks. The overriding observation from each hospital assessment during the reporting initiative was that hospitals demonstrated an extraordinary level of commitment, passion, energy, and creativity in addressing patient falls. Based on



Table. Occurrence of Patient Falls Compared with Performed Falls Assessments and Implemented Falls Precautions, by Quarter (2008Q4 to 2010Q3)

QUARTER (Q)	HARM LEVEL	MEAN RATE*	FALL ASSESSMENT COMPLETED?					FALL PRECAUTIONS IN PLACE?				
			Yes	No	Unknown	Null	Total	Yes	No	Unknown	Null	Total
2008Q4	Incident	3.53	80%	11%	4%	5%	100%	79%	12%	3%	7%	100%
	Serious	12.45	78%	6%	10%	6%	100%	68%	14%	8%	10%	100%
2009Q1	Incident	4.09	81%	10%	4%	6%	100%	78%	12%	3%	7%	100%
	Serious	12.41	82%	7%	7%	4%	100%	75%	13%	5%	7%	100%
2009Q2	Incident	3.6	79%	10%	4%	7%	100%	76%	12%	4%	9%	100%
	Serious	12.14	82%	5%	5%	7%	100%	79%	5%	5%	11%	100%
2009Q3	Incident	3.38	81%	10%	4%	5%	100%	78%	12%	4%	6%	100%
	Serious	11.26	77%	8%	4%	10%	100%	69%	17%	4%	10%	100%
2009Q4	Incident	3.7	82%	8%	4%	6%	100%	78%	10%	3%	8%	100%
	Serious	9.68	86%	0%	7%	7%	100%	81%	7%	2%	9%	100%
2010Q1	Incident	3.9	80%	9%	4%	7%	100%	76%	12%	3%	9%	100%
	Serious	7.73	77%	0%	6%	17%	100%	77%	6%	9%	9%	100%
2010Q2	Incident	4.05	81%	9%	4%	5%	100%	77%	13%	4%	6%	100%
	Serious	10.57	87%	2%	2%	9%	100%	74%	17%	4%	4%	100%
2010Q3	Incident	4.11	81%	9%	4%	6%	100%	76%	13%	4%	7%	100%
	Serious	10.02	80%	4%	4%	11%	100%	70%	13%	4%	13%	100%
Total	Incident	3.85	81%	10%	4%	6%	100%	77%	12%	3%	7%	100%
	Serious	10.89	81%	4%	6%	8%	100%	74%	12%	5%	9%	100%

* Mean rate of falls = (number of patient falls x 1,000)/(number of patient days); mean rate of falls with harm = (number of patient falls x 100,000)/(number of patient days)

the success of the reporting initiative, there is evidence to suggest that focused and creative approaches in response to comparative data can have a significant impact on falls prevention, although questions remain as to the long-term sustainability of the improvements brought about from those innovations.

Because of this success, the Authority has moved forward with a statewide reporting initiative—and a modification to PA-PSRS—to standardize definitions for falls reporting in order to track data and to provide facility-level and unit-level falls data from both the inpatient and outpatient settings. The Authority has

also partnered with HAP in a Hospital Engagement Network to leverage collaborative learning and sharing to reproduce the success that the data collection and reporting initiative achieved in the south-eastern region.

NOTES

- Centers for Disease Control and Prevention. Falls among older adults: an overview [online]. [cited 2011 Sep 21]. Available from Internet: <http://www.cdc.gov/HomeandRecreationalSafety/Falls/adultfalls.html>.
- Pennsylvania Patient Safety Authority. Annual report 2010 [online]. 2011 Apr 28 [cited 2011 Sep 23]. Available from Internet: http://patientsafetyauthority.org/PatientSafetyAuthority/Documents/2010_Annual_Report.pdf.
- Centers for Medicare and Medicaid Services. Proposed inpatient prospective payment system rule. *Fed Regist* 2010 May 4;75(85):23880-98. Also available: <http://www.gpo.gov/fdsys/pkg/FR-2010-05-04/html/2010-9163.htm>.
- Centers for Medicare and Medicaid Services. Medicaid program; payment adjustment for provider-preventable conditions including health care-acquired conditions. *Fed Regist* 2011 Feb 17;76(33):9283-95. Also available: <http://www.gpo.gov/fdsys/pkg/FR-2011-02-17/pdf/2011-3548.pdf>.



Standardizing Reporting of Patient Falls: A Survey of Pennsylvania Hospitals

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ABSTRACT

The Pennsylvania Patient Safety Authority set out to evaluate the interest of Pennsylvania hospitals to expand a regional initiative to standardize falls reporting to a statewide level. A survey was distributed to Pennsylvania hospitals to determine the level of interest in this initiative. The results showed a general consensus among 81 respondent hospitals on the standardized falls definitions and willingness to participate. Hospitals indicated support for separate reporting of comparison data of falls rates for general acute care and specialty hospitals and for inpatient and outpatient settings. Potential barriers include financial, resource, and data collection burdens (e.g., collecting unit-level utilization data). (Pa Patient Saf Advis 2012 Jun;9[2]:43-6.)

INTRODUCTION

Beginning in the fourth quarter of 2008, the Pennsylvania Patient Safety Authority partnered with the Health Care Improvement Foundation (HCIF) and 29 hospitals in the southeast region of Pennsylvania to standardize reporting of patient falls. At the end of the fourth quarter of 2010, this initiative culminated in a patient falls conference for participating hospitals to share their experiences. Given the positive response to the regional initiative, the Authority and the Hospital and Healthsystem Association of Pennsylvania explored the opportunity to expand this initiative statewide. Input from various hospitals led to the development of a survey to ascertain the potential to expand this project. The purpose of this article is to summarize the results of this statewide survey.

METHODS

In August 2011, the Authority surveyed Pennsylvania hospitals to evaluate statewide expansion of the initiative to standardize reporting of patient falls. The survey was sent to 167 general acute care hospitals, specialty hospitals, children's hospitals, and rehabilitation hospitals or centers. Invitations to 13 facilities were undeliverable, which reduced the sample size to 154 facilities. The survey included 25 questions: 18 general questions, 5 follow-up questions, and 2 open-ended questions. When analyzing the results, the analysts interpreted nonresponses in two ways. For questions of preference, the analysts interpreted nonresponses as indications of no preference and included them in the analysis. For all of the other questions, the analysts removed nonresponses from the analysis and calculated percentages based on specific responses. The unit of analysis is the hospital.

RESULTS

Demographics

The survey response rate was 52.5% (n = 81 of 154). Among respondents, two questions had a 100% response rate (n = 81 of 81), the remaining response rates ranged from 69% to 94%. General acute care hospitals made up the majority of respondents (80%). The Figure shows a breakdown of the respondents.

Hospital Comparison Data

Questions about falls comparison data focused on current involvement of hospital comparison of falls rates with external data sources, participation in a Pennsylvania statewide standardized reporting of falls rates initiative using comparison data, and which outpatient services and departments to include in the reporting of comparison data.

External data sources. Seventy-nine percent (n = 64 of 81) of responding hospitals compared their falls rates with an external data source; 21% (n = 17 of 81) did not. Eleven different types of external source comparison data were identified and used by this sample of Pennsylvania hospitals. Some hospitals identified multiple external data sources; however, the National Database of Nursing Quality Indicators (NDNQI) was the biggest external source (59.4%). Table 1 provides a breakdown of the external data sources.

Statewide comparison data. The majority of hospitals, 85.2% (n = 69 of 81), were interested in participating in a Pennsylvania statewide standardized reporting initiative that would compare falls rates and improve processes, while 8.6% (n = 7 of 81) were not interested and the remaining 6.2% (n = 5 of 81) indicated no preference. A similar

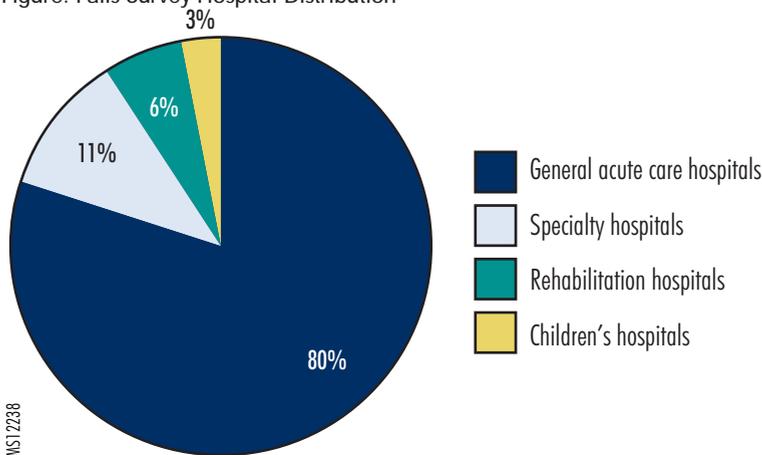
level of support was indicated for the ways hospitals prefer to have comparison data presented. There was strong support for separate reporting of comparison data of falls rates for general acute care and

specialty hospitals and for separate reporting of comparison data of falls rates for inpatient and outpatient settings. See Table 2.

Outpatient comparison data. Hospitals were asked which outpatient settings/

departments for falls rates comparison data would be desired. They identified nine different areas, with five settings/departments receiving 97% of the total responses. See Table 3.

Figure. Falls Survey Hospital Distribution



Falls Definition

The Authority/HCIF southeastern regional falls reporting initiative defined a fall as “any unplanned descent to the floor (or other horizontal surface such as a chair or table), with or without injury to the patient.”

This definition of falls includes assisted falls, in which a caregiver sees a patient about to fall and intervenes, lowering him or her to a bed or floor, and therapeutic falls, in which a patient falls during a physical therapy session with a caregiver present specifically to catch the patient in case of a fall. The definition excludes failures to rise, in which a patient attempts

Table 1. Data Sources Used by Hospitals for Comparison of Falls Rates

DATA SOURCE	NUMBER OF HOSPITALS USING DATA SOURCE*†	PERCENTAGE
National Database for Nursing Quality Indicators‡	38	59.4%
Estimates in peer-reviewed literature	15	23.4
Veterans Health Administration§	7	10.9
Corporate and other company hospitals	7	10.9
Pennsylvania Patient Safety Authority and Health Care Improvement Foundation southeast region falls initiative**	4	6.3
Pennsylvania Mountains Healthcare Alliance falls benchmarking and development of falls-related injury program††	4	6.3
Massachusetts performance measures‡‡	3	4.7
Shared data among local hospitals	2	3.1
Maryland Quality Indicator Project§§	1	1.6
Agency for Healthcare Research and Quality	1	1.6
University HealthSystem Consortium	1	1.6

* Out of 64 Responding Hospitals. Some hospitals identified multiple external data sources.

† Websites provided when data sources were not accessible.

‡ Available from: <https://www.nursingquality.org>.

§ Available from: <http://www.patientsafety.gov>.

** Available from: <http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/Pages/Home.aspx>.

†† Available from: <http://www.pmhalliance.org/extra/AboutUs/Initiatives/tabid/63/Default.aspx>.

‡‡ Available from: <http://www.patientcarelink.org/hospital-data/performance-measures.aspx>.

§§ Available from: <http://www.wha.org/marylandQIP.aspx>.

Table 2. Preferences for Separate Standardized Reporting of Comparison Data

TYPES OF SEPARATE STANDARDIZED REPORTING OF COMPARISON DATA	PREFER SEPARATE STANDARDIZED REPORTING OF COMPARISON DATA OF FALLS RATES	DO NOT PREFER SEPARATE STANDARDIZED REPORTING OF COMPARISON DATA OF FALLS RATES	NO PREFERENCE FOR STANDARDIZED REPORTING OF COMPARISON DATA OF FALLS RATES*
Acute care general hospitals versus specialty hospitals	68 (84%)	0 (0%)	13 (16%)
Inpatient versus outpatient settings	62 (76.5%)	5 (6.2%)	14 (17.3%)

* No preference reflects nonresponses to these specific survey questions

but fails to rise from a sitting or reclining position.

The majority of responding hospitals, 80.5% (n = 58 of 72), used the falls definition identified by the initiative, and 19.4% (n = 14 of 72) of responding hospitals did not. When asked if changes in the definition should be made, 70.8% (n = 51 of 72) of responding hospitals said no. The remaining 29.2% (n = 21 of 72) of responding hospitals provided comments or recommended changes to the definition. Two respondents recommending changes indicated that they would change their facilities' falls definition to the falls definition identified by the initiative. The recommended changes were grouped according to 10 similar themes and are presented in Table 4.

Hospitals were asked whether they use the defined falls event subcategories (e.g., toileting, ambulating) in the Pennsylvania Patient Safety Reporting System (PA-PSRS)

or whether they use the write-in description subcategory labeled "Other" when reporting falls data. A majority of hospitals, 74.6% (n = 53 of 71), responded that they use the PA-PSRS falls event subcategories; however, 25.4% (n = 18 of 71) of hospitals responded that they report falls using the write-in falls subcategory "Other." One-half (n = 9 of 18) of the hospitals that use the write-in subcategory "Other" to report falls events did not provide a reason for using this subcategory. Twenty-seven percent (n = 5 of 18) of these hospitals identified patient conditions (e.g., seizures, syncope) as a falls event subcategory, and the remaining 22% (n = 4 of 18) of these hospitals identified other circumstances of the fall (e.g., found on floor, intentional falls).

When hospitals were asked about the falls with harm definition requiring the inclusion of any fall where more than first aid care is needed, 94% (n = 66 of 70) of respondents agreed with the definition.

Three percent (n = 2 of 70) of hospitals recommended the removal of first aid and minor sutures from the current falls with harm definition, and another 3% (n = 2 of 70) of hospitals inquired about how to classify rib fractures that do not require surgical intervention.

Collection and Measurement Issues

General data collection concerns. Data collection questions assessed potential reasons for nonparticipation and current data submission practices. More than half, 59.2% (n = 45 of 76), of the responding hospitals would participate in the standardized patient falls reporting initiative even if additional data collection were required. The remaining hospitals, 40.8% (n = 31 of 76), were uncertain or would find additional data collection prohibitive. The most common reasons for lack of participation included resource limitations (financial, time, and personnel) and data collection burden, especially being required to collect new types of data in addition to current data.

Measurement issues. Responding hospitals almost unanimously (94.3% [n = 66 of 70]) acknowledged that they collect and monitor falls at the unit level, yet only 77.9% (n = 53 of 68) of hospitals were willing to report patient-days separately for every unit. Potential methods or resources to consider should the initiative require unit-level data include the following:

- Use of NDNQI data methods and definitions

Table 3. Outpatient Settings/Departments for Which Falls Rates Comparison Data Is Desired

OUTPATIENT SETTINGS/DEPARTMENTS	TOTAL RESPONSES*	PERCENTAGE
Emergency room	52	77.6%
Physical/occupational therapy	51	76.1
Radiology	50	74.6
Laboratory	39	58.2
Outpatient/hospital-based clinics	38	56.7
Cardiology	3	4.5
Ambulatory surgical procedural units	3	4.5
Postanesthesia care unit	1	1.5
Nonclinical buildings and grounds	1	1.5

* Out of 67 responding hospitals. Facilities provided more than one response.

Table 4. Recommended Changes to or Comments on the Initiative's Falls Definition

RECOMMENDED CHANGES OR COMMENTS	NUMBER OF RESPONDENTS*	PERCENTAGE OF RESPONDENTS
Therapeutic and developmental falls are not falls.	6	28.5%
Assisted falls are not true falls.	4	19.0
Definition is not appropriate for behavioral health and rehabilitation facilities.	3	14.3
No recommended changes.	3	14.3
Hospitals would change their definition to the falls definition in the survey.	2	9.5
Failure to rise is ambiguous and inconsistent to measure.	2	9.5
The use of Steri-Strips or glue should be considered first aid.	1	4.7
Add falls risk assessment, patient population, and presence of staff to definition.	1	4.7
Provide distinction for anticipated versus unanticipated falls.	1	4.7
There are discrepancies between the initiative's definition and the National Database of Nursing Quality Indicators' definition, which includes the use of high or low beds.	1	4.7

* From 21 responding hospitals. Some respondents provided more than one comment.

- Use of PA-PSRS, specifically the patient-days reporting component of the infection control system
- Use of 1,000 patient-days as the standard denominator for reporting falls
- Use of a web source to report data or excel spreadsheet to collect data for reporting

LIMITATIONS

There are several limitations to this survey. It was sent to a sample of Pennsylvania hospitals with a response bias toward acute care general hospitals and possibly hospitals actively involved in reporting performance measures and adverse event data. Distributing the survey in late August for a period of two and a half weeks may have influenced the number of responses. Survey responses may be

influenced by respondents' involvement in the recent Authority falls reporting initiative or other negative or positive reporting experiences.

CONCLUSION

This sample of Pennsylvania hospitals indicates a willingness to participate in a statewide initiative to standardize reporting of falls rates as well as a general agreement on the falls definition. Overall, the consensus indicates that Pennsylvania hospitals actively compare falls rates to a variety of external data sources and want more facility-level, unit-level, and inpatient- and outpatient-specific information. There are several common themes to the issues of data collection and measurement, namely the standardization of definitions and data collection requirements and a

desire to use established systems (e.g., PA-PSRS, NDNQI, Centers for Medicare and Medicaid Services or Institute for Healthcare Improvement reporting systems) to facilitate reporting of falls rates. Incorporating the survey information into a statewide standardized falls reporting initiative would expand and enhance hospital monitoring and may improve understanding of patient falls.

ACKNOWLEDGEMENTS

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Falls, a Healthcare-Acquired Condition: The Pennsylvania Patient Safety Authority's Enhanced Reporting Program

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The Centers for Medicare and Medicaid Services (CMS) is addressing healthcare-acquired conditions (HACs) through the Partnership for Patients and the Affordable Care Act.^{1,2} There are 10 different categories of HACs that were chosen because of their high occurrence and/or the high cost associated with treating them.³ Of the 10, the most frequently occurring class of HACs is falls and trauma, with a national rate of 0.564 per 1,000 patient discharges.^{4,*} The Pennsylvania rate for falls and trauma, using CMS administrative data, is 0.581 per 1,000 patient discharges (95% CI: 0.531 to 0.632). Falls and trauma rates consist of falls that result in fractures, dislocations, and intracranial injuries and also traumas from other hospital causes, specifically harm from crushing injuries, burns, and electric shocks.⁵

Pennsylvania Patient Safety Authority analysts compared the CMS Pennsylvania falls and trauma rate with the Authority's falls rate (other trauma events were excluded due to their low number of events).⁶ The Authority's falls rate was calculated using falls events that resulted in fractures, dislocations, surgical interventions, intracranial injuries, and deaths that were reported through the Pennsylvania Patient Safety Reporting System (PA-PSRS) along with discharge data reported through CMS for the same time period. The Pennsylvania rate based on PA-PSRS event reports for falls with harm was 0.332 per 1,000 patient discharges (95% CI: 0.294 to 0.370).

The average additional cost of a fall with serious injury (e.g., fracture, subdural hematoma, any injury resulting in surgical intervention, death) was \$13,316.⁷ The average additional length of stay was 6.3 days longer than for patients who did not fall.⁷ Combining these averages with the number of falls with serious injury reported to the Authority in 2010 (215 falls with serious injury), Pennsylvania hospitals experienced an estimated additional average cost of \$2.9 million and 1,355 additional days from fall injuries.[†] The Authority has developed a new falls-with-harm savings calculator for hospitals to calculate the average additional cost of falls with serious injury, additional days, and cost savings associated with 10%, 25%, 50%, 75%, and 90% reductions in falls with serious injury. This savings calculator is available on the Authority's website (see [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun:9\(2\)/Pages/home.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/Jun:9(2)/Pages/home.aspx)).

ENHANCED FALLS REPORTING PROGRAM

In March 2012, the Authority launched a statewide initiative for reporting patient falls to provide real-time falls rate reports with benchmarking data for Pennsylvania hospitals. This new initiative is an expansion of a two-year Pennsylvania southeast region patient falls initiative that ended in 2010.⁸ The new statewide falls reporting initiative has two ways to participate. In one, hospitals can participate in the CMS Hospital Engagement Network (HEN) collaboration project among the Hospital and Healthsystem Association of Pennsylvania, the Authority, and hospitals statewide in Pennsylvania. The second is through the non-HEN statewide falls reporting program. Both programs require hospitals to use standardized definitions of falls and falls with harm to provide similar comparisons of falls rates and receive meaningful falls reports with comparative data. To accomplish this task, PA-PSRS has been enhanced to

* For the purposes of this article, falls rates were calculated using discharge data for comparison with CMS, whereas other articles in this issue included falls rates calculated using patient days, which aligns with the new PA-PSRS enhancements.

† The average additional cost of a fall with serious injury and additional days were based on the study by Wong et al.

provide unit-level and facility-level reports on falls rates, detailed falls reports, and prevention strategies for participating hospitals.

Before March 2012, PA-PSRS did not have the capacity to provide users with falls rates and comparative data. Achieving this new level of functionality (i.e., providing falls rate reports with comparative data at the facility and unit levels) required enhancements in the form of utilization data entry (i.e., entering data for patient-days and patient encounters). To calculate unit-level falls rates—since falls rates will be based on the location of the falls—the Authority standardized the locations or units within a hospital. These units are referred to as care areas and are identified and grouped by type of services provided. For example,

general medical/surgical units are composed of medical units, surgical units, and medical/surgical units in a hospital. Intermediary units include “intensive care unit step-down units” and telemetry-type units. Specialty units are identified by medical conditions (e.g., orthopedic unit, cardiac unit, gynecology unit). PA-PSRS has 20 care areas that are used to identify the location of a fall, including a category titled “Other,” which includes chemical dependency units, ancillary departments, diagnostic labs, administration, and unspecified care areas. When the unit location of a fall is unknown or unspecified, the choice “Other” can be selected. However, falls reported in the “Other” category do not appear in a unit-level falls rate report, which reduces the validity of these reports.

Not all care areas will be measured in the statewide falls reporting program. Care areas for the falls reporting program were chosen based on where the largest number of falls and falls with harm occurred in Pennsylvania hospitals. To determine this information, the Authority conducted a search, by care areas, of falls event reports submitted to PA-PSRS from January 1, 2008, through December 31, 2010. The Table shows the location of patient falls by care areas within Pennsylvania hospitals.

DISCUSSION

Nearly half (46.5%, n= 62,992 of 135,221) of all falls reported by Pennsylvania hospitals from 2008 through 2010 occurred in medical/surgical units or intermediate units (e.g., telemetry unit,

Table. Patient Falls by Care Area (Based on Reports Submitted to the Pennsylvania Patient Safety Reporting System by Hospitals Only, 2008 to 2010)

CARE AREA	INCIDENTS	PERCENTAGE AS INCIDENTS	SERIOUS EVENTS	PERCENTAGE AS SERIOUS EVENTS (SHADED CELLS ARE ABOVE CATEGORY MEAN)	TOTAL	PERCENTAGE OF TOTAL FALLS
General medical/surgical units	42,928	96.7%	1,472	3.3%	44,400	32.8%
Intermediate unit [†]	17,941	96.5	651	3.5	18,592	13.7
Inpatient psychiatric	14,360	95.8	622	4.2	14,982	11.1
Inpatient rehabilitation	13,901	97.3	392	2.7	14,293	10.6
Specialty units [†]	11,874	96.5	427	3.5	12,301	9.1
Critical care	6,037	96.6	211	3.4	6,248	4.6
Emergency department	5,408	95.3	265	4.7	5,673	4.2
Rehabilitation services	3,037	97.7	71	2.3	3,108	2.3
Pediatric care	2,682	96.6	94	3.4	2,776	2.1
Radiology services	2,023	94.8	111	5.2	2,134	1.6
Outpatient clinics	1,775	97.3	49	2.7	1,824	1.3
Extended care	1,207	97.7	28	2.3	1,235	0.9
Obstetrical care	1,038	98.2	19	1.8	1,057	0.8
Surgical services	769	96.2	30	3.8	799	0.6
Other [‡]	5,559	95.9	240	4.1	5,799	4.3
Total	130,539	96.5[§]	4,682	3.5[§]	135,221	100.0

* Includes telemetry and step-down units

† Includes units designated as single specialty units, such as oncology units and orthopedic units

‡ Includes chemical dependency, ancillary departments, diagnostic labs, administration, and unspecified care areas. Each care area in this category, except for unspecified care areas, accounted for less than 1% of the total percent of falls. Unspecified care areas accounted for 2% of total falls.

§ Average percentage

step-down unit). The majority (85.7%, n = 115,884 of 135,221) of all falls occurred in inpatient care areas (e.g., medical/surgical units, critical care units, inpatient psychiatric units), 10.0% (n = 13,538 of 135,221) occurred in care areas that provide services to outpatients and inpatients (e.g., emergency department, radiology), and 4.3% (n = 5,799 of 135,221) were assigned to the care area titled "Other." Half of the falls identified in the "Other" care area category

(2%, n = 2,900 of 5,799) were falls where the location of the fall was unknown or unspecified. A detailed review of the reports submitted indicates that many of the falls in this category occurred on a hospital unit or in a diagnostic setting; however, the exact location was not identified. For hospitals participating in the falls reporting program at the unit level, providing the exact location of a fall is necessary to provide accurate unit-level falls rate reports.

CONCLUSIONS

Standardized reporting of falls requires more than a standardized definition and measure specifications. Accuracy of data and fall characteristics (e.g., location of a fall) is equally important to understanding trends and reducing incidents of falls. The care areas defined by the Authority provide insight about the location and type of fall that will allow for meaningful comparisons of falls rates and identification of trends across units.

NOTES

1. Centers for Medicare and Medicaid Services. The Affordable Care Act: helping providers help patients. A menu of options for improving care [online]. [cited 2012 Mar 14]. Available from Internet: <https://www.cms.gov/ACO/Downloads/ACO-Menu-Of-Options.pdf>.
2. Centers for Medicare and Medicaid Services. Strengthening Medicare: better health, better care, lower costs. Efforts will save nearly \$120 billion for Medicare over five years [online]. [cited 2012 Mar 14]. Available from Internet: <http://www.cms.gov/apps/files/medicare-savings-report.pdf>.
3. Centers for Medicare and Medicaid Services. Hospital-acquired conditions [online]. [cited 2012 Mar 14]. Available from Internet: https://www.cms.gov/hospitalacqcond/06_hospital-acquired_conditions.asp.
4. Centers for Medicare and Medicaid Services. Hospital Compare [website]. [cited 2011 Dec 22]. Washington (DC): U.S. Department of Health and Human Services. Available from Internet: <http://hospitalcompare.hhs.gov>.
5. Centers for Medicare and Medicaid Services. Hospital-acquired conditions (HAC) in acute inpatient prospective payment system (IPPS) hospitals [fact sheet online]. ICN 901045. 2011 Oct [cited 2012 Apr 3]. Available from Internet: <https://www.cms.gov/HospitalAcqCond/downloads/HACFactsheet.pdf>.
6. Research Triangle Institute. CMS reports: 2010 detailed analysis of selected HACs [online]. 2011 Aug 3 [cited 2012 Apr 3]. Available from Internet: http://www.rti.org/reports/cms/FY2010-Data/2010-Detailed-Analysis-Selected-HACs_080311.zip.
7. Wong CA, Recktenwald AJ, Jones ML, et al. The cost of serious fall-related injuries at three Midwestern hospitals. *Jt Comm J Qual Patient Saf* 2011 Feb;37(2):81-7.
8. Arnold TV, Barger DM. Falls rates improved in southeastern Pennsylvania: the impact of a regional initiative to standardize falls reporting. *Pa Patient Saf Advis* [online] 2012 Jun [cited 2012 Jun 6]. Available from Internet: <http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/Pages/Home.aspx>.



Patients Taking Their Own Medications While in the Hospital

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ABSTRACT

Pennsylvania facilities submitted 879 medication error reports from July 1, 2004, through January 31, 2011, to the Pennsylvania Patient Safety Authority involving patients taking their own medications while in a hospital. Categorization of the reports by harm score shows that 77.7% of the events reached the patient and 2.1% of the events resulted in patient harm. Almost 300 different medications were mentioned in the reports, and 18.7% of the reports revealed that patients took multiple medications. One or more controlled substances were involved in 40.3% of the events, and more than 25% of the reports mentioned a medication considered to be a high-alert medication. Employing strategies to prevent harm from patients taking their own medications can be prioritized by proactively assessing the risk associated with patients bringing in their own medications, developing a screening process for patients admitted to the facility who have a previous history of bringing in their own medications, and providing patient and family education upon admission to the facility about the facility's policies in regard to patients' use of their own medications. (Pa Patient Saf Advis 2012 Jun;9[2]:50-7.)

INTRODUCTION

The medications prescribed for and administered to patients while they are hospitalized are typically provided by the hospital's pharmacy department. However, there are times when it may be necessary for a patient to bring his or her own medications into the hospital. For example, patients are often asked to bring their medications with them so that an accurate medication list can be generated for medication reconciliation. If the drug the patient needs is not on the hospital's formulary and the hospital has no alternative therapy, the patients' personal medications may be used to avoid an interruption in therapy.¹ Some patients also may bring their medications from home to the hospital in hopes of saving money. Many patients desire to self-medicate with their own medicines while in the hospital to ease anxiety over the loss of self-control of their care.²

Hospitals of all sizes face challenges in managing patients' personal medications. Larger institutions and government hospitals generally maintain larger inventories of medications and have closed formularies. Smaller community and rural hospitals may not have the space or funds to maintain a large inventory of medications and, therefore, may be more likely to allow patients to use their own medications. A survey of directors of pharmacy at small hospitals (300 beds or less) found that a majority (90.9%) of the hospitals allowed patients to use their own medications while in the hospital. Of the hospitals not allowing the use of personal medications, 42.9% sent the medications home with the patient's family member or friend, 28.6% stored them on the nursing unit until the patient was discharged, and another 14.3% stored them in the pharmacy until the patient was discharged.¹

The Joint Commission addresses the issues involving patients' medications in standard MM.03.01.05, which states, "The hospital safely controls medications brought into the hospital by patients, their families, or licensed independent practitioners." This standard includes the following elements of performance:³

- The hospital defines when medications brought into the hospital by patients, their families, or licensed independent practitioners can be administered.
- Before use or administration of a medication brought into the hospital by a patient, his or her family, or a licensed independent practitioner, the hospital identifies the medication and visually evaluates the medication's integrity.
- The hospital informs the prescriber and patient if the medication brought into the hospital by patients, their families, or licensed independent practitioners is not permitted.

Pennsylvania facilities have submitted a number of reports to the Pennsylvania Patient Safety Authority mentioning errors with the use of patients' own medications, many indicating staff have found medications in a patient's room that were brought from home *without* the hospital staff's knowledge. There is scarce literature that addresses situations in which patients bring in their own medications, and a comprehensive search found no literature that discussed patients taking their own medications unbeknownst to the healthcare staff. Analysis of events reported to the Authority in which patients used their own medications has determined the most common types of events, patient populations involved, medications involved, and reasons why patients bring their medications to the hospital, as reported in Pennsylvania.

AGGREGATE ANALYSIS OF PATIENTS BRINGING THEIR OWN MEDICATIONS INTO THE HOSPITAL

While reviewing reports submitted to the Authority, analysts have the opportunity to further classify reports, using a “monitor code,” for future querying opportunities. Analysts queried the Authority’s database for reports assigned the monitor code “PE1,” representing reports identified as errors involving patients using their own medications. In addition, the event descriptions were queried for phrases such as “own meds” to identify reports that may involve patients taking their own medications that were not assigned the “PE1” monitor code. The query yielded 879 medication error reports that had been submitted to the Authority from July 1, 2004, through January 31, 2011. Categorization of the reports by harm score, which is adapted from the National Coordinating Council for Medication Error Reporting and Prevention harm index,⁴ shows that 77.7% (n = 683) of the events reached the patient (harm index = C to I) and 2% (n = 18) of the events resulted in patient harm (harm index = E to I).

More than 60.8% of the reports (n = 534) involved the adult population, while 36.6% (n = 322) involved the elderly. Only 2.6% (n = 23) of reports involved the pediatric population.

The predominant medication error event types reported by facilities (see Table 1) included unauthorized drug (48%, n = 422), other (23.1%, n = 203), extra dose (8%, n = 70), and wrong dose/overdosage (2.3%, n = 20).

Events took place in 68 different care areas, as selected by facilities. The most common care areas cited in these events included medical/surgical units (29.5%, n = 259), telemetry units (12.3%, n = 108), and medical units (5%, n = 44).

Table 1. Predominant Medication Error Event Types Associated with Patients Taking Their Own Medications (n = 746, 84.9% of total reports), July 1, 2004, to January 31, 2011

EVENT TYPE	NUMBER OF REPORTS	PERCENTAGE OF TOTAL REPORTS (N = 879)
Unauthorized drug	422	48.0%
Extra dose	70	8.0
Wrong dose/overdosage	20	2.3
Monitoring error/other	16	1.8
Wrong drug	15	1.7
Other	203	23.1

Medications Brought in by Patients

Nearly 300 different medications were listed in the 879 reports submitted to the Authority, and in 164 reports (18.7%), patients took multiple medications, for a total of nearly 1,300 medications mentioned in all reports. This does *not* include reports where no medications were mentioned (n = 114, 13%).

Patient found unresponsive. Emergently intubated and appropriate intervention for symptoms provided. During treatment, two prescription bottles, both empty, were found in patient’s bed. Both bottles had refill dates that occurred during inpatient hospitalization. Family will be questioned in regard to who provided the medications to the patient.

One or more controlled substances were involved in 40.3% (n = 354) of events reported to the Authority, and 15 of the top 25 mentioned drugs involved controlled substances. (A controlled [scheduled] drug is one for which use and distribution is tightly controlled because of its abuse potential or risk.⁵) The problem with controlled substance abuse, including opioids (e.g., Percocet®, Vicodin®) and benzodiazepines (e.g., Valium®, Ativan®) in the United States is well documented. In 2010, two million people reported using prescription painkillers for nonmedical purposes for the first time within the last year—this equates

to nearly 5,500 people per day.⁶ The unprecedented rise in overdose deaths in the United States parallels a 300% increase since 1999 in the sale of opioid painkillers. These drugs were involved in 14,800 overdose deaths in 2008, more than cocaine and heroin combined.⁷ The misuse and abuse of prescription painkillers was responsible for more than 475,000 emergency department visits in 2009, a number that nearly doubled in just five years.⁸ Authority analysts found, through review of event descriptions reported to the Authority and in response to the patients taking their own medications, that nearly 8% (n = 70) of the reported events resulted in a transfer of the patient to a higher level of care, with 67% (n = 47) of these cases involving patients taking their own controlled substances.

Patient did not disclose presence of home medications, including Soma® and Valium, upon admission when asked by admitting nurse. Patient took the Soma and Valium by crushing the medications and self-administering via her gastrointestinal tube. The medications were discovered in the patient’s personal belongings along with a syringe and pill crusher. The patient was found to be lethargic, with minimal response to verbal stimuli. Patient was transferred to the intensive care unit for monitoring.



A patient confused and with slurred speech was found standing in urine on the floor. Two pills, Benadryl® and Ambien®, were found on the floor. In addition, empty bottles for [containing] Zanaflex®, Vicodin, and Darvocet® were found in the patient’s drawer. The pills were brought in by the patient’s wife, but the patient denies taking the medications.

Patients also brought in over-the-counter medications, as mentioned in 108 reports (12.3%), including Tylenol®, Zantac®, aspirin, Pepcid®, and diphenhydrAMINE.

A patient with a fever refused the hospital-supplied Tylenol. The patient’s parent brought in the patient’s home supply, and the nurse said the child could take that because the fever needed to be treated. The nurse went out to get an oral syringe, and when he came back to the room, the mother said she gave the child what “seemed like a lot of Tylenol.” The nurse asked how much, and the parent said 20 mL, which would be 640 mg. The doctor was notified and labs were obtained, which showed an acetaminophen level of 30 and liver functions tests [serum glutamic oxaloacetic transaminase and serum glutamate pyruvate transaminase] increased significantly.

More than 25% (n = 220) of the reports mentioned a medication that would be considered to be a high-alert medication in either the acute or ambulatory care settings.^{9,10} Of the 25 most commonly mentioned medications (see Table 2), 10 (40%) were high-alert medications. Most of these high-alert medications were opioids, but two medications, insulin and warfarin, were not. Forty percent (n = 28) of the 70 events involving high-alert medications resulted in patients being transferred to a higher level of care.

Table 2. Top 25 Medications Involved in Medication Errors in Events in which Patients Took Their Own Medications (n = 526, 59.8% of total reports)

MEDICATION	NUMBER OF REPORTS	PERCENTAGE OF TOTAL REPORTS (N = 879)
OxyCODONE ^{*,†}	77	8.8%
Clonazepam [†]	44	5.0
ALPRAZolam [†]	43	4.9
HYDROcodone ^{*,†}	41	4.7
LORazepam [†]	36	4.1
Insulin [†]	34	3.9
Metoprolol	25	2.8
Methadone ^{*,†}	21	2.4
Zolpidem [†]	19	2.2
Diazepam [†]	19	2.2
Acetaminophen	19	2.2
Propoxyphene with acetaminophen ^{*,†}	16	1.8
Aspirin	14	1.6
Warfarin [†]	13	1.5
MetFORMIN [†]	11	1.3
Morphine ^{*,†}	11	1.3
Carisoprodol [†]	11	1.3
DiphenhydrAMINE	10	1.1
FentaNYL ^{*,†}	10	1.1
Temazepam [†]	10	1.1
Nitroglycerin	9	1.0
Sertraline	9	1.0
Fioricet® [†] (i.e., acetaminophen, butalbital, and caffeine)	8	0.9
HYDROmorphine ^{*,†}	8	0.9
Lisinopril	8	0.9

* Controlled substance (categories II through V)

† High-alert medication

Reasons Patients Bring Their Own Medications

Analysts also reviewed event descriptions to determine if reporting facilities mentioned the reasons why patients felt the need to bring in and self-administer their own medications. Most of the reports submitted to the Authority involved situations in which the patients brought in their medications without informing facility staff and self-administered them. However, at least 45 reports (5.1%) described errors that occurred in which

organizations were intentionally using patients’ own medications.

A nurse gave an extra dose of fenofibrate [which was the patient’s own medication] instead of the thalidomide that was scheduled. The patient’s thalidomide [also her home medication] was later found in another patient’s drawer. The next dose of fenofibrate was held and thalidomide was administered.

Vytorin® [a combination tablet of ezetimibe 10 mg and simvastatin

20 mg] was ordered for the patient. The pharmacy substituted Zetia® [ezetimibe] 10 mg and Zocor® [simvastatin] 20 mg to use for Vytorin, and that was printed on medication administration record. The nurse was unfamiliar with that drug. The patient brought in Vytorin, and all three medications were taken by the patient.

The physician wrote an order for Robinul® for a three-year old child to “use home med as ordered.” The bottle was sent to the pharmacy and identified, the order entered into the pharmacy system, and the bottle returned to floor. The nurse misinterpreted directions on the bottle [to dilute two tablets of Robinul in 20 mL of water and administer 4 mL orally every six hours] and administered two tablets [2 mg] versus 0.4 mg [4 mL] for two doses.

A large portion of the reports (44.5%, n = 391) did not specifically state the reasoning as to why the patient took their own medications, while almost 10% (9.8%, n = 86) of the reports indicated some level of miscommunication between the patient and staff, for example:

- Patients were unaware of which medications were prescribed or given to them.
- Patients were unaware that their medications were temporarily stopped (i.e., hold order).
- Patients were unaware that the directions for a particular medication were different in the hospital compared with at home.
- Patients were simply unaware that they should not take their own medications while in the hospital.

The patient used the call bell and asked to speak to the med nurse. Upon entering the room, the patient stated, “I took one of my Klonopin® [clonazepam].” The patient held up their bottle of pills, which actually

contained clonidine 0.2 mg. The patient said, “I thought it was nerve medicine.” Physician was informed, and orders [were] received to continue Klonopin for [the patient’s] anxiety.

The patient told the physician that he took his own Coumadin® because he thought we forgot to order it. The medication was actually on hold.

A nurse found the patient’s husband administering home medications via a peg tube. The medications administered included Zanaflex® 8 mg, Coumadin 5 mg, and docusate sodium 100 mg. The patient’s husband had been instructed not to administer any medications. The physician had ordered Coumadin to be held; no negative outcome was reported due to unauthorized dose.

When preparing the morning medications for the patient, she stated that she already took her medication that morning. She stated that her husband brought them in and that she took “everything, Dilantin®, phenobarbital, Colace®, all of them.” The doctor was notified and order was given to hold the medications.

The lab alerted the staff that the patient had open bottles of medication on her bed with some of them spilled on the floor. When the patient was asked what she was doing, she stated she didn’t get enough medicine so she was taking her own. When asked what she took, she stated that she took baby aspirin, heart pills, and Synthroid®. All of the medications were removed from the patient’s room and sent to the pharmacy.

Over 12.6% (n = 111) of the reports indicated that patients self-administered their own medications because they were not completely satisfied with the care they were receiving. For example, patients stated that their pain was poorly controlled, that they

were “tired of waiting” for their medication, or that their disease was not being adequately treated while in the hospital.

The nurse discovered that the patient had medicated himself with insulin, indicating that he was concerned that staff did not medicate him in a timely manner. The patient had Humalog® insulin along with insulin syringes in his room, apparently from home. The medication and syringes were removed from the patient’s room.

A five-year-old patient was seizing for about six to seven minutes, with the doctor in the room. The patient was apneic, and two nurses were bagging the patient. The mother took the medication Diastat® [diazepam] out of a bag and gave [the patient] the medication, saying there was no time for a third party to retrieve [the medication].

The patient’s father was upset with the delay of medications reaching the nursing unit for his daughter. He proceeded to administer her Imuran® [azathioprine] brought in from her home. This medication was not approved by pharmacy.

A patient was agitated about their elevated glucose readings for the past two checks. Adjustments were made to NovoLog® scale during the day shift; however, following the last elevated glucose reading, the patient expressed concerns about inadequate treatment. Calls were made to the resident to explain the situation; patient was assured that a sliding scale order would be entered for the elevated reading, but no order was received. Upon explanation of this to the patient, she stated, “I already took my own insulin.” She stated, “I took Humalog 10 units.” Review of glucose level was 95 and, when rechecked again, the glucose was 65.



RISK REDUCTION STRATEGIES

Many institutions are confronted with managing the patient's own medications that are brought in from home, and organizations can have procedures in place for the control and administration of these medications. Consider the strategies described in this section, which are based on a review of events submitted to the Authority and observations at the Institute for Safe Medication Practices:

Proactively assess the risk associated with the use of patients' own medications. For example, consider performing a failure mode and effects analysis to assess the risk associated with the various scenarios in which the facility may need to use a patient's own medications.

Develop a screening method for patients admitted to the facility who have a previous history of bringing in their own medications, and take proactive steps to deter this process.

Provide patient and family education upon admission to the facility about the facility's policies in regard to patients' use of their own medications.

- If patients are asked to bring in medications only for reconciliation purposes, explain to the family why the medications were needed and encourage them to take the medications home.
- If the facility does not need to use a patient's medications, explain to the patient and family the policy on bringing in prescription, over-the-counter, and herbal or homeopathic medications into the facility.

Review medication administration records (MARs) to determine how the directions for patients' own medications are expressed. For example, some organizations simply state "use home meds" on the MAR, which does not reflect the actual dosage or frequency of administration for those medications.

Review current organization policies and procedures to ensure the following items are addressed:

- Identify the types of personal medications that are allowed and not allowed for use and in which, if any, circumstances they are allowed to be used while the patient is in the hospital. Examples of circumstances allowing for personal medication use could include the following:
 - The medication is not available on the hospital's formulary, including those medications that are part of a restricted distribution system, compounded by an outside specialty pharmacy, investigational medications, and controlled substances.
 - There are no therapeutic alternatives on the formulary.
 - The patient is on a continuous parenteral infusion of such medications as Flolan[®], Remodulin[®], or an insulin pump.¹
- Develop an alternative plan to provide the medication to the patient if the pharmacy is unable to supply it before the next dose is due.
- Determine if the patient should be allowed to self-administer his or her own medications. For example, stating that if a patient's home medication must be used, it should be administered by a nurse.
- Address the pharmacy's role in this process, including the following:
 - If the medications are not to be allowed for use, return them to the patient's family or caregivers. If this is not possible, securely store the medications in a safe location (e.g., the pharmacy). Ensure a process is in place to return the medications to the patient or family on discharge from the facility.
 - Ensure proper verification procedures of patients' own medications. Specify that the pharmacist is the health professional who will identify the medications, and include guidelines for another health professional to identify these medications if the pharmacist is unavailable. In one published account of a hospital's assessment of medications that patients brought to the hospital, pharmacists were able to identify 95% of the medications, with 1 in 15 containers of these medications being mislabeled or unlabeled.¹¹
- Develop a process to ensure the proper labeling of any patient's personal medications that are allowed for use in accordance with state regulations, making sure that the medications are identifiable, in good condition, and not expired. Specific challenges to be addressed include the following:
 - a. Changes in the frequency of administration. For example, if a patient was taking their medication from home once daily but the directions have changed in the hospital to two times a day.
 - b. The use of bar codes. If the organization uses bar coding at the point of care, the pharmacy will need to apply a bar code to each medication brought in by the patient for use within the facility.
- Before medications are sent to the nursing unit, place stickers or some other means of notification on containers for the medications that have been reviewed by a pharmacist.
- Use a documented tracking mechanism to communicate the use of patients' personal

medications, especially when patients bring in controlled substances or investigational medications.

- If controlled substances are allowed, dispense them in unit-dose form.
- Develop a standardized approach in regard to the storage of patients' own medications in the patient care area.
- In accordance with hospital policy, report any adverse events associated

with the use of patients' personal medications.

- Ensure procedures are in place to return patients' personal medications before discharge, and note the final disposition of the medications in the pharmacy records.

CONCLUSION

In Pennsylvania, almost 900 medication errors have been reported from July 1, 2004, through January 31, 2011, involving patients taking their own medications while in healthcare facilities, many times

unbeknownst to healthcare practitioners. One or more controlled substances were involved in over 40% of these events reported to the Authority, and more than 25% of these reports mentioned high-alert medications. Employing proactive strategies to address situations in which patients may bring in their own medications and implementing a screening method for patients admitted to the facility with a previous history of bringing in their own medications can be steps that are prioritized to prevent potential harm to patients.

NOTES

1. Norstrom PE, Brown CM. Use of patients' own medications in small hospitals. *Am J Health Syst Pharm* 2002 Feb 15;59(4):349-54.
2. Jones L, Arthurs GJ, Sturman E, et al. Self-medication in acute surgical wards. *J Clin Nurs* 1996 Jul;5(4):229-32.
3. Joint Commission. Standard MM.03.01.05. In: *Comprehensive accreditation manual for hospital: the official handbook, update 2* (CAMH). Oakbrook Terrace (IL): Joint Commission Resources; 2011 Sep.
4. National Coordinating Council for Medication Error Reporting and Prevention. NCC MERP index for categorizing medication errors [online]. 2001 [cited 2012 April 2]. Available from Internet: <http://www.nccmerp.org/medErrorCatIndex.html>.
5. Texas State Board of Pharmacy. Controlled drugs: what is a controlled (scheduled) drug? [online]. [cited 2012 April 20]. Available from Internet: <http://www.tsbp.state.tx.us/consumer/broch2.htm>.
6. Substance Abuse and Mental Health Services Administration. Results from the 2010 national survey on drug use and health: summary of national findings [online]. NSDUH Series H-41, HHS Publication No. (SMA) 11-4658. 2011 [cited 2012 April 2]. Available from Internet: <http://oas.samhsa.gov/NSDUH/2k10NSDUH/2k10Results.htm#2.16>.
7. Centers for Disease Control and Prevention. Vital signs: overdoses of prescription opioid pain relievers—United States, 1999-2008. *MMWR Morb Mortal Wkly Rep* 2011 Nov 4;60(43):1487-92.
8. Substance Abuse and Mental Health Services Administration. Drug Abuse Warning Network: selected tables of national estimates of drug-related emergency department visits. Rockville (MD): Center for Behavioral Health Statistics and Quality, SAMHSA; 2010.
9. Institute for Safe Medication Practices. Results of ISMP survey on high-alert medications: differences between nursing, pharmacy, and risk/quality/safety perspectives. *ISMP Med Saf Alert* 2012 Feb 9;17(3):1-4.
10. Institute for Safe Medication Practices. ISMP list of high-alert medications in community/ambulatory healthcare [online]. 2011 [cited 2012 April 15]. Available from Internet: <http://www.ismp.org/communityRx/tools/ambulatoryhighalert.asp>.
11. Kostick J, Chidlow J, Plihal T. A program for controlling medications brought to the hospital by patients. *Am J Hosp Pharm* 1973 Sep;30(9):814-6.

(See Self-Assessment Questions on next page.)



LEARNING OBJECTIVES

- Recognize the types of medication errors that occur when patients bring their own medications into the hospital.
- Recall the most common types of drugs involved in medication errors when patients use their own medications.
- Identify reasons frequently mentioned in case reports indicating why patients bring their medications into the hospital.
- Select risk reduction strategies for healthcare organizations to proactively address the safe use of patients' own medications.

SELF-ASSESSMENT QUESTIONS

The following questions about this article may be useful for internal education and assessment. You may use the following examples or come up with your own questions.

1. Examples of miscommunication between patients and staff that may lead to patients taking their own medications while in the hospital include all of the following EXCEPT:
 - a. Patients are unaware of which medications are prescribed or given to them.
 - b. Patients are informed that their medications are temporarily stopped (i.e., hold order).
 - c. Patients do not realize that the directions for a particular medication are different in the hospital compared with at home.
 - d. Patients are not told that they should not take their own medications while in the hospital.
 - e. Patients are not completely satisfied with the care they are receiving.
2. Which of the following statements reflect standards from the Joint Commission?
 - a. The hospital defines when medications brought into the hospital by patients or their families cannot be administered.
 - b. After the use or administration of a medication brought into the hospital by a patient, the hospital identifies the medication and visually evaluates the medication's integrity.
 - c. The hospital informs the prescriber and patient if the medication brought into the hospital by patients is permitted.
 - d. The hospital safely controls medications brought into the hospital by patients, their families, or licensed independent practitioners.
3. Reasons why a patient may feel the need to bring their medications into the hospital include all of the following EXCEPT:
 - a. To obtain an accurate medication list for medication reconciliation.
 - b. To provide a drug that is on the hospital's formulary.
 - c. To avoid an interruption in therapy.
 - d. To save money.
 - e. To ease anxiety over the loss of self-control of their care.
4. According to the event reports submitted to the Pennsylvania Patient Safety Authority involving patients taking their own medications, all of the following statements in regard to the types of medications brought into the hospital by patients are true EXCEPT:
 - a. Fifteen of the top 25 drugs mentioned involved controlled substances.
 - b. Almost 20% of the reports mentioned patients taking more than one medication.
 - c. Patients also brought in over-the-counter medications, including Tylenol®, Zantac®, aspirin, Pepcid®, and diphenhydrAMINE.
 - d. Insulin and warfarin were the types of high-alert medications mentioned most often in the reports.

SELF-ASSESSMENT QUESTIONS (CONTINUED)

While in the hospital, a patient self-administered atenolol 50 mg from her own supply. The patient brought in her medication from home because she thought that it was okay to take her high blood pressure medicine. However, the patient's attending physician had not ordered this medication for the patient.

5. What proactive strategies may help to prevent these types of errors?
 - a. Develop a screening method for patients admitted to the facility who have a previous history of bringing in their own medications.
 - b. Inform the patient and family upon admission to the facility about the facility's policies in regard to patients' use of their own medications.
 - c. If the medication was brought in for reconciliation purposes, ask the patient's family to take the medication home.
 - d. All of the above are true.
 - e. Only B and C are true.



Reducing Risk of Air Embolism Associated with Central Venous Access Devices

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ABSTRACT

Air embolism is a rare but potentially lethal complication of certain medical and surgical procedures. Because air embolism is a preventable hospital-acquired condition that can result in serious harm, it has been labeled a serious reportable event with nonpayment for harm by the Centers for Medicare and Medicaid Services. Between June 2004 and December 2011, the Pennsylvania Patient Safety Authority received 74 reports related to air embolism. The majority of confirmed or suspected air embolisms were attributed to central venous access devices. The widespread use of these devices, along with a high mortality rate attributed to air embolisms related to central venous access devices, warrants special attention. Hospitals can decrease the risk for air embolism by establishing policies and procedures that contain specific air embolism prevention protocols for central venous access device insertion, management, and removal. Other measures to decrease risk include education and competency certification for staff and equipment safety controls. (Pa Patient Saf Advis 2012 Jun;9[2]:58-64.)

INTRODUCTION

Intravascular air embolism is a preventable hospital-acquired condition that can result in serious harm, including death. Intravascular air embolism was labeled a serious reportable event by the National Quality Forum in 2002.¹ In 2006, this list was updated and adopted by the Centers for Medicare and Medicaid Services (CMS) as part of the Inpatient Prospective Payment System, which became effective October 1, 2008, instituting nonpayment to hospitals in situations of patient harm due to occurrence of these serious reportable events.²

Intravascular air embolism occurs when two conditions are met: (1) there is direct connection between a source of air and the vascular system and (2) the pressure gradient favors the entry of this air into the bloodstream. This can occur through active injection of air into the bloodstream or through passive movement of air into the bloodstream when the venous pressure is less than the prevailing atmospheric pressure. Except in cases of trauma and decompression sickness, most air embolisms occur due to medical procedures, including surgical procedures (especially those performed with the patient in the upright position), intravascular catheterization (such as through the use of central venous access devices [CVADs]), radiologic procedures (especially those using automatic contrast media injectors^{3,4}), and the use of air insufflation and positive pressure ventilation.^{5,6}

The sequelae of air embolisms depend on the amount of air entering the bloodstream, the rate at which the air enters, and the route of administration (venous versus arterial). The body can tolerate small amounts of air introduced into the peripheral venous system at slow rates, often without symptoms. Small volumes of air travel to the right side of the heart and into pulmonary vasculature, where the air is dissipated. With larger volumes and rapid infusion of air, pulmonary artery pressures rise, putting strain on

the right side of the heart. In some cases, this can create an air lock in one or more of the pulmonary arteries, obstructing pulmonary circulation and causing complete circulatory collapse. In general, the closer to the heart the air embolism is introduced into the venous system, the smaller the volume of air is required to be symptomatic. Apart from these effects, air embolisms, even when small, can cause tissue ischemia or inflammatory changes within blood vessels, leading to a host of potentially lethal complications (e.g., systemic inflammatory response syndrome, pulmonary edema, myocardial and cerebral ischemia).^{5,6,7}

In contrast to venous air embolism, arterial air embolism is very poorly tolerated, and even a small amount of air can be lethal. Of special concern, 25% of the general population is estimated to have a patent foramen ovale (PFO), an opening between the left and right atria that normally closes at birth and is usually asymptomatic and undetected.⁸ The presence of a PFO in the setting of a venous air embolism is highly dangerous since there exists a pathway by which the venous air embolism can quickly pass into the arterial circulation and enter the cerebral circulation (causing a stroke) or the coronary circulation (causing a myocardial infarction).^{5,6,7}

The widespread use of CVADs, both within the hospital and community settings, warrants special attention due to the risk for air embolism associated with their use. The frequency of venous air embolisms related to CVADs is estimated to range from 1 in 47 to 1 in 3,000.^{6,7} While the frequency of this complication may be low, mortality rates attributed to venous air embolisms associated with CVADs range from 23%⁹ to 50%.¹⁰

AIR EMBOLISM REPORTS IN PENNSYLVANIA

Between June 2004 and December 2011, Pennsylvania acute healthcare facilities reported 74 air embolism events to the Pennsylvania Patient Safety Authority:

41 confirmed events of air embolism, 18 suspected events of air embolism (in which the patient was symptomatic in the presence of known risk factors for air embolism without radiographic confirmation), and 15 events involving conditions in which the patient was placed at high risk of developing an air embolus (see Figure 1). Of the 59 events of confirmed or suspected air embolisms, 25 were reported as Incidents in which no harm was caused to the patient and 34 were reported as Serious Events resulting in harm, including seven cases of permanent harm and six deaths. Twenty-four of the 59 confirmed or suspected air embolism event reports were associated with CVADs; the next most common associated clinical features were surgical procedures, intravascular procedures, and peripheral venous access devices (see Figure 2). Despite the inclusion of air embolism as a serious reportable event for nonpayment by CMS, with presumably increased attention to prevention, air embolism event reports to the Authority have increased over time (see Figure 3). Examples of these reports include the following:

An interventional radiology resident came to the floor and removed the catheter while the patient was sitting semirecumbent in a chair. A gauze dressing, combined with an occlusive dressing, was placed over the access site. Not too long after that, another resident came in to visit the patient and noted [the patient] sitting in the chair, tachypneic and desaturated. The patient was moved to the ICU [intensive care unit] with a possible air embolism.

A patient came to interventional radiology for a tunneled catheter placement. During the procedure, the patient got an air embolus. After talking to the physician, [it was determined that] the cause of the embolism came from the catheter as it was being passed into the patient due to the lack of [occlusion (e.g., no

Figure 1. Air Embolism Reports to the Pennsylvania Patient Safety Authority, June 2004 to December 2011

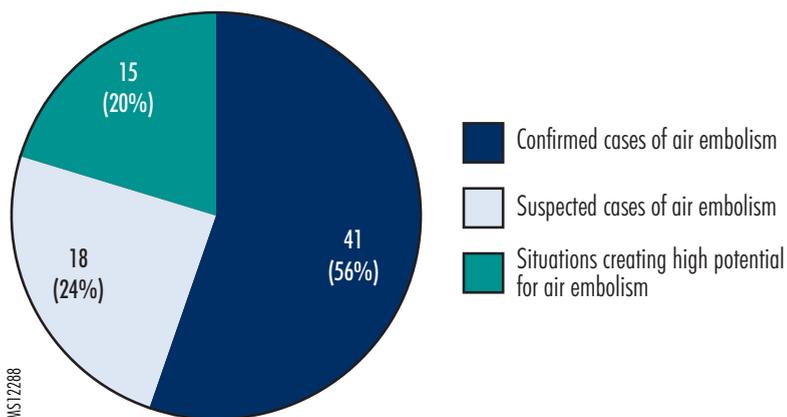
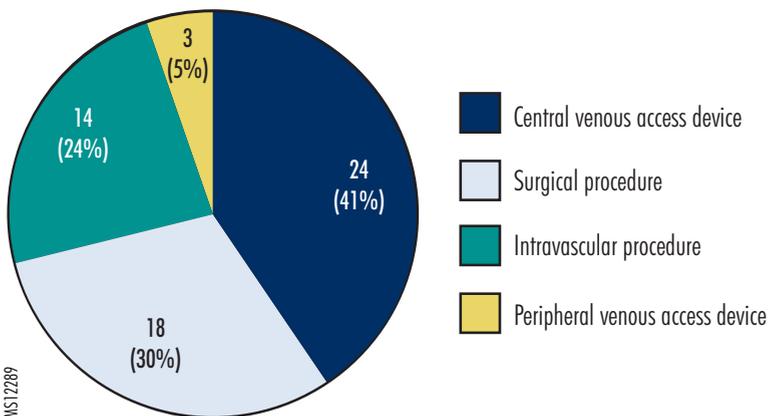


Figure 2. Confirmed and Suspected Air Embolism Reports to the Pennsylvania Patient Safety Authority, by Associated Clinical Feature, June 2004 through December 2011



caps, not clamped, lumen not covered by thumb]). The staff heard the air sucking in and knew right away. The patient was cared for immediately by being placed on his left side and administering increased oxygen. The patient was transferred back to the ICU with the ICU nurse and physician. The patient was monitored closely and needed no further treatments.

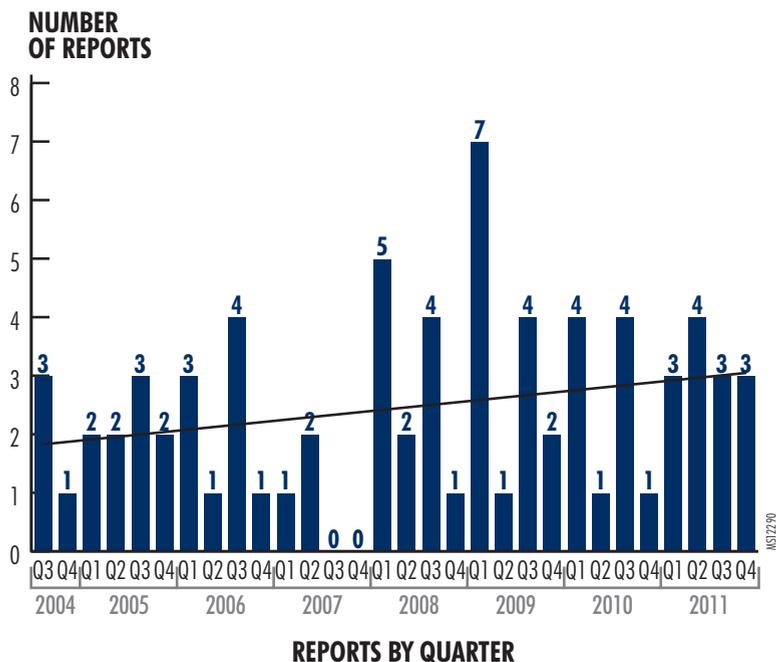
A patient was admitted with a stroke. The physician placed a subcla-

vian central line. A follow-up chest x-ray was obtained. Intravenous fluids were administered through the central line. The patient was taken for a CT [computed tomography] scan of the head. During the CT scan, the physician was made aware by radiology that the central line was in the artery. The CT scan of the head showed intracranial air consistent with an air embolus.

An infant was admitted to the ICU. . . . She acutely developed bradycar-



Figure 3. Air Embolism Reports to the Pennsylvania Patient Safety Authority, by Quarter, June 2004 to December 2011



dia, mottling, and hypotension. She required multiple rounds of medications, including epinephrine, atropine, and sodium bicarbonate, as well as tracheal intubation and cardiac compressions. An echocardiogram performed during the resuscitation showed severely depressed myocardial function, no pericardial effusion, and what appeared to be echo-bright areas of the myocardium consistent with potential air embolus. Following resuscitation, the infant returned to her previous cardiac baseline hemodynamics. The nurse caring for the child subsequently reported that approximately one-half hour before the event, he had changed the IV [intravenous] fluid administration tubing that was infusing into the patient's umbilical venous catheter. The nurse reported that he had followed the hospital's nursing procedure for IV tubing change.

The patient's caregiver disconnected the patient's IV line from the central line so that the patient could ambulate into the bathroom. After returning to bed, the patient coded. After one minute of cardiopulmonary resuscitation and oxygen bagging, the patient began to respond. The patient was also placed in Trendelenburg and turned for suspected air emboli. The patient was transferred to the ICU for further observation.

The 24 confirmed or suspected reports of air embolisms related to CVADs were further analyzed by the Authority to identify associated factors (See Table).

PREVENTION METHODS

Although uncommon, air embolism can have serious adverse effects on patients and is largely preventable through the application of evidence-based practices.^{1,2} Joint Commission Resources has published a

resource with a summary of updated information and research on air embolisms and their treatment and prevention.¹¹ The Infusion Nurses Society is also a resource for guidelines, policies, and procedures related to CVAD care, including steps to prevent and manage air embolisms.^{12,13}

Insertion of Central Venous Access Devices

- Take steps to increase central venous pressure (CVP). Increasing CVP decreases the pressure gradient that would normally favor movement of air into the bloodstream. CVP is normally lower in all blood vessels located above the level of the heart and during inspiration.

- Place the patient in the Trendelenburg position with a downward tilt of 10 to 30 degrees during central line placement.^{5,7,11,13}
- Avoid CVAD insertion during patient inspiration. Instruct the patient to hold his or her breath, and perform a Valsalva maneuver if able.^{5,7,11}
- Hydrate the patient to correct hypovolemia prior to insertion whenever possible.^{5,7,11,14}

- Ensure all catheters and connections (especially in two-piece systems) are intact and secure.^{5,7,11,13}
- Occlude the catheter and/or needle hub.^{5,7,11,14}
- Ensure that all self-sealing valves are functioning properly.^{7,11}

Care and Maintenance of Central Venous Access Devices

- Ensure that all lumens are capped and/or clamped.^{5,11,14}
- Use Luer-lock connections for needleless IV ports and self-sealing valves.^{11,12,13}
- Use infusion pumps with air-in-line sensors for all continuous infusions.¹¹

Table. Reports to the Pennsylvania Patient Safety Authority of Confirmed or Suspected Air Embolisms Related to Central Venous Access Devices, by Identified Associated Factors, June 2004 through December 2011

CONTRIBUTING FACTORS IDENTIFIED	NUMBER
Insertion	
Venous catheter placed in artery	2
Injection of air	1
Line exchange with head elevated	1
Lines not clamped or capped	1
No Valsalva maneuver	1
Not specified	3
Total	9
Care and Maintenance	
Contrast media injector	1
Other injection of air	1
Line not clamped or capped	1
Line mishandled by unlicensed staff	1
Total	4
Removal by Healthcare Provider	
Head elevated during removal	6
Not specified	3
Total	9
Removal by Patient	1
No Cause Identified in Report	1
Total	24

- Fully prime all infusion tubing, and expel air from syringes prior to any injection or infusion.^{11,12}
- Use an air-eliminating filter on infusion tubing sets whenever appropriate.^{11,13}
- Remove air from infusion bags when infusing fluids using inflatable pressure infusers.¹¹
- Fully prime contrast media injectors, and check for air prior to each injection.¹¹
- Trace lines, double-check all connections, and take all steps necessary to prevent tubing misconnections.^{11,13,15}
- Inspect the insertion site, catheter, and all connections regularly to assess for breaks or openings through which air could enter the system.^{11,14}
- Ensure the integrity of the central line dressing surrounding the insertion site.¹¹
- Use caution when moving or repositioning patients to prevent pulling

on the central line. A break in the closed system, combined with decreased CVP (due to movement to an upright position and deep inspiration), creates a high risk for air embolism.¹¹

- Teach patients and/or caregivers managing infusion therapy how to perform all steps necessary to prevent air embolism.^{11,12,13}

Removal of Central Venous Access Devices

- Place the patient in the Trendelenburg position when possible. If not possible, the supine position is sufficient.^{5,11,14,16,17}
- Position the catheter exit site (e.g., neck, arm) at a height lower than the height of the patient's heart.¹³
- Cover the exit site with gauze and apply gentle pressure while removing the catheter in a slow, constant motion.^{16,17}

- Instruct the patient to hold his or her breath, and perform a Valsalva maneuver as the last portion of the catheter is removed; if unable to do so, time the removal during patient expiration.^{5,11,13,14,16,17}
- Place pressure on the site until hemostasis is achieved. One to five minutes is suggested.^{11,13,16,17}
- Apply a sterile occlusive dressing, such as gauze impregnated with petroleum jelly and covered with a transparent film dressing. Leave dressing in place for at least 24 hours. Change the dressing every 24 hours until the exit site has healed. (Plain gauze dressings have been associated with air passing through a persistent catheter tract into the bloodstream, resulting in air embolisms, as have occlusive dressings left in place for shorter periods of time.)^{11,13,14,16,17}
- Instruct the patient to remain lying flat for 30 minutes after removal of the catheter.^{11,13,16,17}

TREATMENT FOR SUSPECTED AIR EMBOLISM

A high degree of suspicion for air embolism should be maintained when inserting, removing, or otherwise manipulating CVADs. Though often asymptomatic, the following are clinical signs of an air embolism: dyspnea, tachypnea, decreased oxygen saturation, sense of impending doom, anxiety, agitation, change in mental status, chest pain, tachycardia or bradycardia, hypotension, pallor, and light-headedness. If the patient is being monitored by capnography during the insertion, decreased or erratic end tidal carbon dioxide can indicate air embolism. Emergency management includes preventing the further entry of air, placing the patient in a left side-lying position in Trendelenburg, and administering 100% oxygen. This position helps the air embolus to move toward the apex of the right ventricle, away from the

pulmonary artery and right ventricular outflow tract. The administration of oxygen supports the patient with cardiovascular instability or collapse and helps decrease the size of the embolus through its effects on the partial pressures of oxygen and nitrogen within the blood, which causes nitrogen to move from the embolus into the bloodstream.^{5,7,11,16,17}

Withdrawing the air through the CVAD may be beneficial in some cases if it can be done. Hemodynamic support should be provided with inotropic drugs and fluid resuscitation to increase CVP. Cardiopulmonary resuscitation and/or intubation may be necessary. Chest compressions may have the added benefit of helping to break up air emboli and move them away from the right ventricular outflow tract. Once stabilized, hyperbaric oxygen therapy can mitigate further effects of air emboli and decrease their size.^{5,7,11}

RISK REDUCTION STRATEGIES

Beyond the prevention measures taken by individual clinicians, hospitals can take the following measures to reduce the risk of CVAD-related air embolism:

- Establish hospital policies and procedures that contain specific air embolism prevention protocols for CVAD insertion, management, and removal.^{11,12}
- Ensure practitioners inserting and removing CVADs have had adequate training and experience in performing the procedure.^{12,17,18}
- Consider the use of a standardized insertion bundle kit or cart and standardized removal kit.
- Provide all nurses and other clinical staff handling CVADs with ongoing training in proper line care, and assess staff for competence. Reassess competency annually.^{17,18}
- Consider establishing a vascular access nurse team with 100% ownership for placement, daily assessment, and removal of nontunneled short-term central venous access catheters, including peripherally inserted central venous catheter lines.¹⁹
- Do not purchase nonintravenous equipment that can be connected to needleless IV ports.^{11,15}
- Utilize equipment with safety features that are designed to prevent air embolism (e.g., vascular access catheters and caps with self-sealing or one-way valves, infusion pumps with air-in-line detection, infusion tubing with in-line filters).^{11,15}
- Inform nonclinical staff, patients, and family members that they must ask a clinician to assist whenever a central line needs to be disconnected or reconnected.¹¹

CONCLUSION

Air embolism is an infrequent but potentially lethal complication of CVAD utilization. The implementation of specific evidence-based prevention measures, along with risk reduction strategies, can significantly decrease, or eliminate, this Serious Event.

ACKNOWLEDGEMENTS

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NOTES

1. National Quality Forum. Serious reportable events in healthcare—2011 update: a consensus report [online]. 2011 [cited 2012 Mar 8]. Available from Internet: http://www.qualityforum.org/Projects/sz/Serious_Reportable_Events_in_Healthcare_2010/Final_Report.aspx.
2. Centers for Medicare and Medicaid Services. Medicare program; listening session on hospital-acquired conditions in inpatient settings and hospital outpatient healthcare-associated conditions in outpatient settings. *Fed Regist* 2008 Oct 30;73(211):64618-9. Also available: https://www.cms.gov/HospitalAcqCond/Downloads/1422_N_FEDERAL_REGISTER_VERSION_PUB_10_30_08_508.pdf.
3. Venous air emboli and automatic contrast media injectors. PA PSRS Patient Saf Advis [online] 2004 Dec [cited 2012 Mar 8]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2004/dec1\(4\)/Pages/13.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2004/dec1(4)/Pages/13.aspx).
4. A word about air detection devices. PA PSRS Patient Saf Advis [online] 2004 Dec [cited 2012 Mar 8]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2004/dec1\(4\)/Pages/16.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2004/dec1(4)/Pages/16.aspx).
5. O'Dowd LC, Kelley MA. Air embolism [online]. Up to Date 2000 Mar 2 [cited 2012 Mar 8]. Available from Internet: <http://cmbi.bjmu.edu.cn/uptodate/critical%20care/embolic%20disease/air%20embolism.htm>.
6. Natal BL, Doty CI. Venous air embolism [online]. *eMedicine* 2009 Jul 27 [cited 2012 Mar 8]. Available from Internet: <http://emedicine.medscape.com/article/761367-overview>.
7. Mirski MA, Lele AV, Fitzsimmons L, et al. Diagnosis and treatment of vascular air embolism. *Anesthesiology* 2007 Jan;106(1):164-77.
8. Cleveland Clinic. Patent foramen ovale [online]. 2010 Jan [cited 2012 Mar 14]. Available from Internet: <http://my.clevelandclinic.org/heart/disorders/congenital/pfo.aspx>.
9. Heckmann JG, Lang CJ, Kindler K, et al. Neurologic manifestations of cerebral air embolism as a complication of central venous catheterization. *Crit Care Med* 2000 May;28(5):1621-5.
10. Kashuk JL, Penn I. Air embolism after central venous catheterization. *Surg Gynecol Obstet* 1984 Sept;159:249-52.
11. Joint Commission Resources (JCR). *Clinical care improvement strategies: preventing air embolism*. Oak Brook (IL): JCR; 2010 Jul. PDF e-book.

12. Infusion Nurses Society (INS). *Infusion nursing standards of practice*. Hagerstown (MD): INS; 2011.
13. Infusion-related complications. In: Infusion Nurses Society. *Policies and procedures for infusion nursing*, 4th ed. Hagerstown (MD): Lippincott, Williams and Wilkins; 2011:96-123.
14. Brockmeyer J, Simon T, Seery J, et al. Cerebral air embolism following removal of central venous catheter. *Mil Med* 2009 Aug;174(8):878-81.
15. Tubing misconnections: making the connection to patient safety. Pa Patient Saf Advis [online] 2010 Jun [cited 2012 Mar 14]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/Jun7\(2\)/Pages/41.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/Jun7(2)/Pages/41.aspx).
16. Drewett SR. Central venous catheter removal: procedures and rationale. *Br J Nurs* 2000 Dec 8-2001 Jan 10;9(22):2304-15.
17. Ingram P, Sinclair L, Edwards T. The safe removal of central venous catheters. *Nurs Stand* 2006 Aug 16-22;20(49):42-6.
18. McGee DC, Gould MK. Preventing complications of central venous catheterization. *N Engl J Med* 2003 Mar 20;348(12):1123-33.
19. Rosenthal K. Targeting "never events." *Nurs Manage* 2008 Dec;39(12):35-8.

LEARNING OBJECTIVES

- Recognize risk factors that contribute to air embolism.
- Recall the predominant contributing risk factors for air embolisms related to central venous access devices (CVADs), according to reports submitted to the Pennsylvania Patient Safety Authority.
- Distinguish between circumstances leading to CVAD-related air embolism that create a high risk for harm and those that create a low risk for harm.
- Identify strategies for prevention and treatment of CVAD-related air embolism.

SELF-ASSESSMENT QUESTIONS

The following questions about this article may be useful for internal education and assessment. You may use the following examples or develop your own questions.

1. Which of the following scenarios would *not* increase the risk for air embolus formation?
 - a. Placement of a CVAD in a patient who is hyperventilating and unable to hold his breath
 - b. Stopcock on CVAD left in open position and uncapped after blood sample drawn from the line
 - c. Peripherally inserted central venous catheter (PICC) inserted in a patient with hypertension and fluid overload status
 - d. Pressure applied to catheter exit site for five minutes after removal of central line, then dry sterile gauze dressing applied
2. Which of the following is the contributing risk factor associated with CVAD-related air embolism that is most frequently reported to the Pennsylvania Patient Safety Authority?
 - a. Removal of the central line while the patient's head is elevated
 - b. Inadvertent placement of the venous catheter in an artery
 - c. Injection of air using contrast media injectors
 - d. Accidental removal of the central line by the patient
3. Complete the following sentence: Air embolism associated with the presence of a patent foramen ovale (PFO) is highly dangerous _____.
 - a. in neonates only
 - b. in 10% of adults who have confirmed PFOs
 - c. only in patients with symptomatic PFOs that have been unable to be closed surgically
 - d. because it allows air to move from the venous system into the arterial circulation, where it can cause a stroke or myocardial infarction
4. Which of the following conditions for CVAD-related air embolism formation carries the highest risk of harm?
 - a. 5 mL syringe of air injected into a peripheral intravenous (IV) line over 10 minutes
 - b. 5 mL of air injected into a CVAD over one minute
 - c. 5 mL of air injected into a CVAD by rapid IV push
 - d. 5 mL of air from unprimed IV tubing infused into a PICC line over five minutes

**SELF-ASSESSMENT QUESTIONS (CONTINUED)**

5. All of the following are risk reduction strategies that a hospital can take to reduce the incidence of CVAD-related air embolism EXCEPT:
 - a. Require training and annual competency evaluation for all nurses and physicians who perform central line removal.
 - b. Mandate an evaluation by biomedical engineering when considering the purchase of any new nonintravenous medical equipment to ensure that it cannot be connected to intravenous lines or needleless IV ports.
 - c. Instruct patients and families to disconnect themselves from their IV lines when ambulating to the bathroom in order to minimize tripping hazards.
 - d. Consider establishing a vascular access nurse team with ownership for central line placement, daily assessment, and removal.

An elderly patient with Alzheimer's disease has been admitted with a urinary tract infection and is being cared for on a medical-telemetry unit where he has been receiving IV antibiotics through a right upper arm double-lumen PICC line. The patient has been placed on constant observation with a sitter at the bedside due to his delirium and wandering behaviors. The patient has a pattern of becoming agitated in the evenings after his wife leaves for the day. At 7 p.m., the sitter calls the nurse into the room because the patient is more agitated than usual and is getting out of bed and pulling on his IV lines. When the nurse assesses the patient, she discovers that the patient has been incontinent and is standing next to the bed yelling, "They are trying to kill me!" He has ripped his infusion tubing, the PICC line dressing is off, and the line is out approximately 10 cm. His heart rate is 110 bpm, with a blood pressure of 88/50 mmHg, respiratory rate of 22 breaths per minute, and pulse oxygenation of 90%.

6. In the above scenario, which combination of assessment findings is MOST suggestive of air embolism?
 - a. Change in mental status, incontinence, and hypoxia
 - b. Tachycardia, hypotension, and agitation
 - c. Tachycardia, dyspnea, incontinence, and multiple potential points of entry for air into the bloodstream
 - d. Tachypnea, tachycardia, hypotension, change in mental status, and multiple potential points of entry for air into the bloodstream
7. Which of the following BEST describes the appropriate immediate actions to be taken in this scenario?
 - a. Notify the rapid response team, speak to the patient in a reassuring manner, and attempt to get the patient to lie down on his left side, putting the bed in the Trendelenburg position and applying 100% oxygen via a nonrebreather mask while waiting for the team to arrive.
 - b. Call security to help get the patient back in bed and apply four-point limb restraints, administer Haldol that has been prescribed as needed for agitation, and place the bed in the Trendelenburg position while applying 100% oxygen.
 - c. Ask the sitter to help reassure the patient while assisting him back to bed in a left side-lying position, putting the bed in the Trendelenburg position and applying 100% oxygen. At the same time, delegate another staff member to notify the rapid response team and the physician responsible for the patient, continue to reassure the patient while applying an occlusive dressing to the PICC insertion site, and clamp all lines.
 - d. Assist the patient back to bed, administer Haldol as ordered for agitation, and call the vascular access nurse to come assess the PICC line.



National Violence Prevention Training Standards for Hospital Security Officers Are Overdue

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News accounts about violence in hospital emergency departments (EDs) help explain why a survey by the Emergency Nurses Association found that 27.2% of ED nurses have considered leaving the ED.¹ ED staff have been severely injured by violent acts in the ED and, although patients and visitors were not injured in the following incidents—which are summarized from recent news articles—they could have been.

A young nurse staffing the ED reached out, as she was trained to do, and asked a seemingly extremely anxious man in the ED what was troubling him. The man beat the nurse so severely she was out of work for six months and permanently traumatized.²

A patient smashed his fist into the jaw of an emergency room nurse, fracturing the nurse's jaw. The nurse, who had worked in the emergency room for 32 years, decided he could no longer tolerate patients hitting, yelling, cursing, or spitting at him.³

A drunk, naked patient covered in blood burst out of his emergency room cubicle brandishing scissors. He lunged at two nurses and began chasing them. It took two police officers and three zaps from a Taser to subdue him.⁴

Events reported to the Pennsylvania Patient Safety Authority indicate that patients are sometimes injured by violent acts in the ED.

The patient was in the ED waiting room when he was assaulted [hit] by another patient in the ED waiting room without provocation.

A patient in the ED being transported to radiology was hit in the head by a boot thrown by another ED patient.

A patient was in the waiting area when another patient approached the patient and punched the patient's head several times. Prior to being assaulted, the patient had gone to the registration window to alert staff that another patient was verbally assaulting others in the waiting room area. Security was called to the ED three times.

Security officers are the first line of defense for patients and staff, underscoring the need for a well-trained security force.¹ On January 12, 2012, AlliedBarton Security Services, in conjunction with HR Plus, the International Association for Healthcare Security and Safety (IAHSS), the National Capital Healthcare Executives, and the ASIS International Maryland Chapter sponsored a Workplace Violence in Healthcare Communities seminar. One focus of the seminar was the issue of violence in the ED. The lack of national training standards for security officers was raised as an ongoing concern of the hospital and contracted security communities, and understandably so, if one considers the current state of violence prevention training in hospitals.⁵

An Authority survey of ED violence prevention practices showed that only 36% of respondents reported mandatory training for ED staff in violence protection practices.⁶ Not only is mandatory training of ED staff not widespread, mandatory training of hospital security officers may be similarly limited. According to the Authority survey, of the hospital respondents that employ security officers, 70% require that security officers complete a national training program. Although the survey indicates that the majority of respondents report mandatory training of hospital security officers, arguably the percentage should be closer to 100% in light of the pervasiveness of violence in the ED. Even if training were mandatory, the lack of national training standards, as previously noted, raises the issue of the sufficiency and consistency of training. Moreover, mandatory training requirements in the absence of national training standards serves to put the cart before the horse.

Currently, there are no federal guidelines governing mandatory training or training standards for security guards. Consequently, each state determines licensing requirements,

background checks, and training for security companies and guards providing contracted security. In Pennsylvania, a private security guard requires a state-issued license to engage in the private detective business, defined in the Private Detective Act as the business of private detectives; investigators; or watch, guard, or patrol agencies.⁷ The Private Detective Act also governs independent or proprietary commercial organizations whose activities include safeguarding the employing party's assets. The licensing process is different from most other states and involves submitting information to the county clerk of courts and petitioning for a license to the court. Training requirements are imposed by the court and vary by county but generally involve a 40-hour training course to be taken at a state-certified training center. Nonsecurity organizations that employ their own security services, such as hospitals, are not regulated under the Pennsylvania act.

A recent query of a job search website for hospital security officer positions in Pennsylvania showed that the required qualifications generally included being age 18 or older and possessing a valid driver's license.⁸ Armed security guards in Pennsylvania must become Act 235-certified,

which requires a lethal weapons training program allowing a security officer to legally carry a sidearm while on duty.⁹ This requirement may help explain why only 4% of respondents in the Authority ED survey reported that security officers in their ED carried firearms.³

At the hospital level, employee security officer training requirements in Pennsylvania are left to individual hospital policy. The Joint Commission's Sentinel Event Alert 45 recommends guidelines for the reduction of violence in the workplace as outlined within its requirements for a safe and secure healthcare environment, but the alert falls short of mandating a standardized violence reduction program.¹⁰ A number of organizations, such as IAHS, ASIS International, and the Crisis Intervention Institute, provide certification and training programs for security officers; however, these programs are not standardized or mandatory. The Occupational Safety and Health Administration, ASIS International, and IAHS have independently developed and published guidelines on workplace violence; however, adoption of these guidelines is voluntary. Lack of standardization may contribute to the diversity of training programs at the hospital level,

as demonstrated by Peek-Asa et al. in a study of 50 hospital security programs in New Jersey. Diversity in security training programs was evidenced by training materials from many different sources, varied training formats, variations in orientation and retraining, and training delivered by different individuals. Peek-Asa et al. recommend systematic evaluations of the various training programs studied to identify the most effective and efficient methods to deliver workplace violence training, including training content, length, and modality, as well as trainer fidelity.¹¹ Budget constraints and perceived lack of the need or value of security training by hospital administration have also been cited as barriers to effective violence prevention training in hospitals.¹

Violence in hospitals is a growing and complex issue. Current workplace violence prevention guidelines are a good start. However, the ongoing risk to patients and hospital staff is a compelling reason for a change in the current assortment of regulations, guidelines, and training programs for hospital security officers. Development and adoption of minimum national criteria for the selection and training of all hospital security officers is long overdue.

NOTES

1. Emergency Nurses Association. Emergency department violence surveillance study [online]. 2011 Nov [cited 2012 Apr 10]. Available from Internet: <http://www.ena.org/IENR/Documents/ENAEVDVReportNovember2011.pdf>.
2. Hammel P, Stoddard M. Tougher penalties for assaulting nurses. *Omaha World-Herald* 2012 Mar 2;Sect. B:1.
3. Violence is not part of anybody's job. *Hosp Employee Health* 2011 Nov 1.
4. Garrison J, Hennessy-Fiske M. Violence afflicts ER workers. *Los Angeles Times* 2011 Jul 31;Part A:1.
5. Sheets RL. Remarks at: Workplace Violence Seminar; 2012 Jan 11; Silver Spring (MD).
6. Martindell D. Survey of emergency department practices in Pennsylvania hospitals to protect patients and staff. Pa Patient Saf Advis [online] 2011 Dec [cited 2012 Apr 26]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/dec8\(4\)/Pages/126.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/dec8(4)/Pages/126.aspx).
7. Private Detective Act of 1953. P.L. 1273, No. 361, Cl. 22. Also available: <http://www.legis.state.pa.us/WU01/LI/LI/US/PDF/1953/0/0361..PDF>.
8. Indeed [job search website; search term: hospital security in Pennsylvania]. [cited 2012 Feb 20]. Stamford (CT): Indeed. Available from Internet: <http://www.indeed.com>.
9. Lethal Weapons Training Act. 22 P. S. § 41-50. Also available: <http://www.pacode.com/secure/data/037/chapter21/chap21toc.html>.
10. Joint Commission. Preventing violence in the health care setting [online]. Sentinel Event Alert 2010 Jun 3 [cited 2011 Nov 10]. Available from Internet: http://www.jointcommission.org/assets/1/18/SEA_45.PDF.
11. Peek-Asa C, Valiante D, Blando J, et al. Workplace violence prevention and training programs in New Jersey hospital emergency departments. Summary report on 50 New Jersey hospitals participating in the evaluation of California initiatives to reduce violence against healthcare workers study [online]. [cited 21 Feb 2012]. Available from Internet: http://nj.gov/health/surv/documents/njhospsec_rpt.pdf.

Opportunity Knocks for More Patient Safety Education



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INTRODUCTION

Ongoing learning is an important part of healthcare, with many specialties and subspecialties continuously emerging. Patient safety officers occasionally ask about educational opportunities outside of those offered by the Pennsylvania Patient Safety Authority. Patient safety is a relatively new specialty that has historically had limited opportunities to demonstrate advanced knowledge. However, as the science behind patient safety matures, more opportunities are available for advanced education and certification in the field.

CERTIFICATE PROGRAMS

For those who are not ready to commit to a full graduate program, certificate programs are one option. Three universities offer certificate programs in patient safety. Generally, these credits can later be applied toward graduate degrees from the same program.

- Northwestern University in Chicago, Illinois, offers a 12-month Certificate Program in Healthcare Quality and Patient Safety consisting of five courses. Introduction to Healthcare Quality and Introduction to Patient Safety are completed on-site during the first two weeks. An independent study is completed over a six-month period, and Advanced Healthcare Quality and Advanced Patient Safety are taken on-site at the end of the program.¹
- Thomas Jefferson University's Jefferson School of Population Health in Philadelphia, Pennsylvania, also offers a certificate program in healthcare quality and patient safety. This program consists of six three-credit-hour courses completed online over the course of one to two years. Required courses are U.S. Healthcare Delivery and Organization, Health Law and Regulatory Issues, Policy and Regulatory Issues in Healthcare, Organizational Behavior and Change in Healthcare, Health Informatics, and Quality and Safety Tools and Methods.²
- Regis University in Denver, Colorado, offers a certificate program in healthcare quality and patient safety as well. Theirs is a 15-credit-hour program, but additional classes may be required prior to enrollment depending on the professional and educational background of the applicant.³
- A certificate in patient safety, error science, and full disclosure is available from the University of Illinois at Chicago's College of Medicine. This program is offered online and can be completed in six months. It requires completion of 12 credit hours from three courses: Patient Safety and Quality Care Improvement; Error Science, Risk, and Disclosure; and Communication and Collaboration.⁴

DEGREE PROGRAMS

Advanced degrees are required for many upper-level jobs and demonstrate a high level of knowledge in a specific area. A master of science in healthcare quality and patient safety (MS-HQS) is one option for obtaining an advanced degree in the field of patient safety. Both Northwestern University and Thomas Jefferson University offer this degree.

- Northwestern University's program is completed over 20 months as a combination of independent study and on-site "intensive" courses. The courses are the same as the ones for the certificate program with the addition of Introduction to Health Management, Fundamental Methods for Quality and Safety, the Business of Quality and Safety Improvement, and a capstone project.⁵
- Thomas Jefferson University's Jefferson School of Population Health offers 24-month and 48-month options to obtain a MS-HQS. Courses are completed

online; however, students are required to spend one week on campus at the end of the program. In addition to a capstone project, the courses Research and Evaluation Methods for Quality and Safety Improvement, Economic Analysis in Healthcare, Quality and Safety Measurement and Outcomes Analysis, and Advanced Applications of Healthcare Quality and Safety Methods in Clinical Settings are required.⁶

- The University of Illinois at Chicago offers a master of science in patient safety leadership. This program can be completed in 18 months and is conducted online with a five-day residency at the end of the program. In addition to the courses mentioned for the certificate program, five courses and a capstone project are required.⁴

CERTIFICATION

New in 2012 is an opportunity to become a certified professional in patient safety

NOTES

1. Certificate Program in Healthcare Quality and Patient Safety [website]. [cited 2012 Apr 13]. Chicago: Northwestern University. Available from Internet: http://www.feinberg.northwestern.edu/ihf/education/healthcarequality/hqps_certificate.html.
2. Jefferson School of Population Health graduate certificate programs [website]. [cited 2012 Apr 13]. Philadelphia: Thomas Jefferson University. Available from Internet: http://www.jefferson.edu/population_health/academic_programs/certificate_programs.html.
3. Certificate quality and patient safety [website]. [cited 2012 Apr 13]. Denver: Regis University. Available from Internet: <http://www.regis.edu/rh.asp?page=study.qps>.
4. Master of science in patient safety leadership (or graduate certificate in patient safety, error science and full disclosure) [website]. [cited 2012 Apr 13]. Chicago: University of Illinois at Chicago. Avail-

able from Internet: <http://uic.edu/orgs/online/programs/master-of-science-in-patient-safety-leadership/index.shtml>.

5. Master of science in healthcare quality and patient safety [website]. [cited 2012 Apr 13]. Chicago: Northwestern University. Available from Internet: http://www.feinberg.northwestern.edu/ihf/education/healthcarequality/hqps_masters.html.
6. Master of science in healthcare quality and safety (MS-HQS) [website]. [cited 2012 Apr 13]. Philadelphia: Thomas Jefferson University. Available from Internet: http://www.jefferson.edu/population_health/academic_programs/quality_safety.html.
7. Certified Board for Professionals in Patient Safety (CBPPS): about certification [website]. [cited 2012 Apr 13]. CBPPS. Available from Internet: <http://cbpps.org>.

OTHER OPTIONS

Several options are available to expand patient safety knowledge. Fellowships are offered by several patient safety organizations, and many professional organizations offer education related to patient safety within their specialty. Examples include the following:

- The American Hospital Association and the National Patient Safety Foundation cosponsor the Comprehensive

Patient Safety Leadership Fellowship. This yearlong fellowship program requires completion of a project and participation in on-site and online learning sessions.⁸

- The Institute for Healthcare Improvement offers a one-year fellowship at its office in Cambridge, Massachusetts. This requires temporary relocation for those not currently living in the area.⁹
- The Institute for Safe Medication Practices offers a more specialized fellowship in medication safety. This is also a yearlong program that requires working from the institute's offices in Horsham, Pennsylvania.¹⁰

CONCLUSION

Continuing education is necessary to stay ahead of the curve in this very specialized area. This list of programs is not intended to be all-inclusive but rather a sampling of the options available to individuals interested in pursuing more education in the emerging field of patient safety.

8. AHA-NPSF Comprehensive Patient Safety Fellowship [website]. [cited 2012 Apr 13]. Chicago: Health Research and Educational Trust. Available from Internet: <http://www.hpoe.org/fellowships/PSLF/index.shtml>.
9. Fellowship programs at IHI [website]. [cited 2012 Apr 13]. Cambridge (MA): Institute for Healthcare Improvement. Available from Internet: <http://www.ihf.org/offerings/Training/Fellowships/Pages/default.aspx>.
10. ISMP Safe Medication Management Fellowships [website]. [cited 2012 Apr 13]. Horsham (PA): Institute for Safe Medication Practices. Available from Internet: <http://www.ismp.org/profdevelopment/managementfellowship.asp>.

Quarterly Update on Preventing Wrong-Site Surgery

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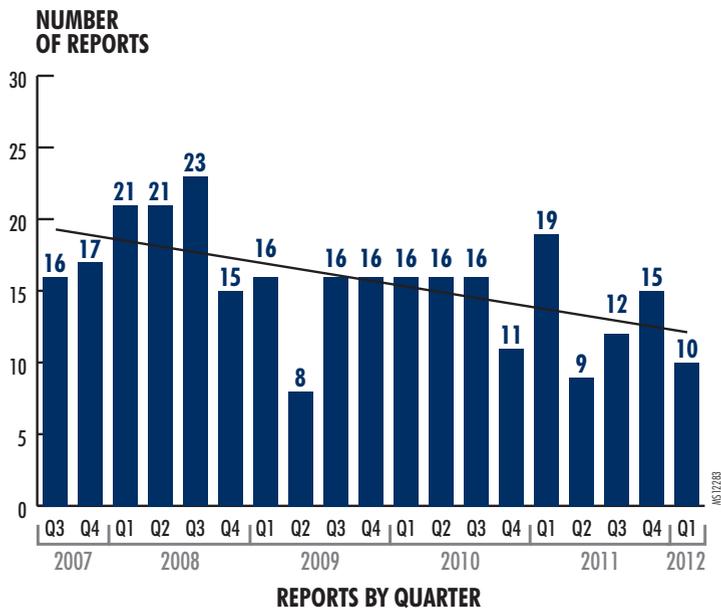
There were 10 reports of wrong-site surgeries this quarter (plus a belated report of an event in the third quarter of 2011), increasing the total to 480 since reporting began in July 2004. The program to prevent wrong-site surgery began at the end of June 2007.¹ The trend since then has been encouraging, albeit slower than desired, with a 37% decrease over 4¾ years from an average of 19 reports per quarter to an average of 12 per quarter.

As noted in the March 2012 issue of the *Pennsylvania Patient Safety Advisory*,² all of the improvements have occurred in those facilities that have made a serious commitment to implement wrong-site surgery prevention programs, including evidence-based best practices. This commitment to preventing wrong-site surgery continues with 26 facilities making the institutional commitment to join the upcoming collaborative learning initiative led by the Pennsylvania Patient Safety Authority as part of the Hospital and Healthsystem Association of Pennsylvania (HAP) Hospital Engagement Network funded by the Centers for Medicare and Medicaid Services.

Facilities that wish to join a collaborative learning project to prevent wrong-site surgery should contact the Authority or HAP. In particular, 11 facilities that have statistically significant higher rates than the state average of 1.7 per 100,000 procedures may wish to make the institutional commitment to join the upcoming collaboration.

To identify individual facilities that were outliers and could benefit from collaborative learning, the Authority obtained the number of procedures done in Pennsylvania hospitals and ambulatory surgical facilities from July 1, 2007, through June 30, 2011, from the Pennsylvania Health Care Cost Containment Council. The numbers of procedures were available for 273 licensed facilities. Less than 5,000 procedures were done in 79 facilities, less than 10,000 procedures were done in another 24 facilities, and the remaining 170 facilities did 10,000 or more procedures.

Figure 1. Pennsylvania Patient Safety Authority Wrong-Site Surgery Reports by Quarter



Scan this code with your mobile device's QR reader to access the Authority's wrong-site surgery prevention toolkit.

During the four-year time period, a total of 11,942,912 procedures were done. During the same time period, a total of 207 wrong-site surgeries were reported from these facilities. The rate of wrong-site surgery was 1.7 per 100,000 procedures (95% CI: 1.5 to 2.0); one wrong-site surgery occurred every 57,696 procedures (95% CI: 50,354 to 66,110 procedures). Wrong-site surgeries were reported by 101 facilities, while 172 facilities reported none during this four-year period. None of the facilities without wrong-site surgery had a sufficient volume of procedures to have a rate that was statistically significantly lower than the state average.

The improvement noted in Figure 1 was verified by a comparison of the first year

of the program to prevent wrong-site surgery, July 2007 through June 2008, to the last year for which the number of procedures is known to PHC4, July 2010 through June 2011.

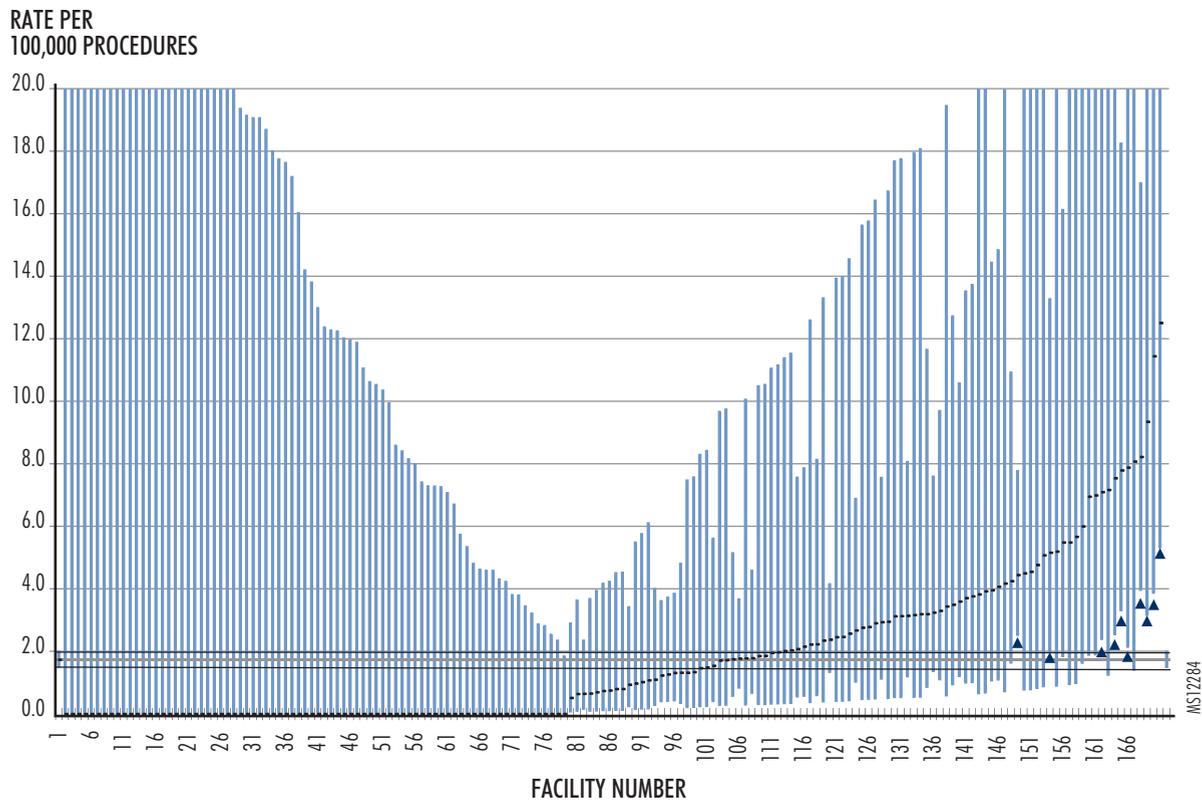
During the first year of the program (2007 to 2008), a total of 2,842,323 procedures were done in the 273 facilities. During the same year, a total of 68 wrong-site surgeries were reported from these facilities. The rate of wrong-site surgery was 2.4 per 100,000 procedures (95% CI: 1.9 to 3.0); one wrong-site surgery occurred every 41,799 procedures (95% CI: 32,975 to 52,984 procedures).

During the last full year for which the number of procedures is known (2010 to 2011),

a total of 3,159,511 procedures were done in these facilities, an 11% increase. During the same year, a total of 45 wrong-site surgeries were reported from these facilities, a 34% decrease. The rate of wrong-site surgery was 1.4 per 100,000 procedures (95% CI: 1.1 to 1.9); one wrong-site surgery occurred every 70,221 procedures (95% CI: 52,476 to 93,940 procedures). The rate of wrong-site surgery decreased 40%. This improvement was statistically significant by chi-square ($X^2 = 7.4, p > 0.01$).

Nineteen facilities had wrong-site surgery rates that were statistically significantly higher than the state average, although only 11 facilities were outliers with more than one wrong-site surgery event. These facilities may wish to make the

Figure 2. Rates of Wrong-Site Surgery with 95% Confidence Intervals (truncated at 20.0 if beyond)



institutional commitment to join the next collaboration to prevent wrong-site surgery. The other eight facilities were outliers because one event occurred among a small numbers of procedures.

Figure 2 illustrates the rates of wrong-site surgery per 100,000 procedures for each of the 170 licensed Pennsylvania facilities that did more than 10,000 procedures, including 10 (▲) of the 11 outliers that had more than one wrong-site surgery.

CRITICAL NEAR-MISS REPORTS INVOLVING INCORRECT CONSENTS

In the December 2011 issue of the *Advisory*,³ the Authority discussed three types of wrong-site near-miss events identified by the World Health Organization's High 5s project as critical near misses worthy of root-cause analyses, perhaps using the Authority's standard form. In the March 2012 *Advisory*,² the Authority suggested a fourth type.

Reports of critical wrong-site near misses:

1. Procedures that are done correctly on the correct patient despite incorrect information.
2. Errors caught by the last step of the Universal Protocol, the time-out.
3. Near-miss situations resulting in cancellation of the procedure.
4. Medically indicated procedures done, with prior approval, that differ from the originally scheduled procedure because of a near-miss event caught during the preparation of the patient for surgery.

This quarter saw four critical near-miss events in which a correct operation was done in the presence of an incorrect consent.

The patient's consent stated left vocal cord injection. Patient was marked on left neck, and left side was stated in the time-out procedure. Surgery was

performed on the right vocal cord, which was the correct site; all other documentation and the surgeon's notes confirmed the right vocal cord as the correct site. The consent was incorrect.

[The patient was] scheduled for a left leg procedure. Patient came into the operating room [OR] with the left leg marked by the doctor. The left leg was prepped and draped. The time-out was initiated. Both the surgeon and I stated the left leg was being operated on. Everyone in the room agreed. I did look at the consent during the time-out but overlooked what was actually written. [My relief nurse] noticed . . . the consent stated the right leg. The correct leg was the one that was operated on.

A patient was consented for a cervical laminectomy with decompression at C4/5. At the operative time-out, the consent was read per policy. The surgeon stated he was doing a cervical laminectomy with decompression at C3/4 and C4/5. The surgeon was informed that the patient was not consented for the [C3/4] procedure. . . . The surgeon was aware of the incorrect surgical consent, which he had signed, and proceeded with the case anyway.

A patient signed consent for right elbow medial epicondyle injection. The surgeon verified with the patient where the pain was. The patient indicated pain over the lateral epicondyle. The surgeon marked . . . the lateral elbow. OR nurse and pre-op nurse verified the consent and all other necessary documents were completed [and that the] patient was marked. During the time-out [in the OR], the OR nurse held up the consent for the surgeon to read. Then, the OR nurse read the consent to the room to verify the procedure. All staff members agreed to the time-out.

Surgeon performed the procedure. Upon completion of the procedure, it was determined the surgeon did the procedure on the lateral aspect of the elbow. It was then determined that the surgeon had not changed the consent to reflect the patient's [identification] of pain on the lateral side.

It is fortunate that these patients did not receive an operation at an incorrect site. However, the risk is high. Since this class of critical near-miss events has been monitored, there have also been two wrong-site surgeries involving an incorrect consent. Hence, one-third of the reports of operating with an incorrect consent involved doing a wrong-site procedure.

Furthermore, two of the facilities reporting these near-miss events involving an incorrect consent have had wrong-site surgeries involving an incorrect consent in the past. One of these two wrong-site events was a wrong-site vocal cord injection in the facility reporting the critical near miss during a vocal cord injection this quarter.

These failures of the Universal Protocol, to verify the correct surgical site against the consent, suggest real vulnerabilities for the occurrence of wrong-site procedures.

Related is another report received this quarter:

Consent for surgery states, "Posterior lumbosacral fusion at appropriate levels." . . . Surgeon was informed about missing information on consent and stated, "Consent is appropriate because it is written in general terms."

The use of general terms decreases the chances that other members of the OR team can assist the surgeon by maintaining situational awareness. If the other members of the OR team do not know the information the surgeon knows, how are they going to help the surgeon stay on the correct path?

NOTES

1. Doing the “right” things to correct wrong-site surgery. PA PSRS Patient Saf Advis [online] 2007 Jun [cited 2012 May 8]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2007/jun4\(2\)/Pages/29b.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2007/jun4(2)/Pages/29b.aspx).
2. Clarke JR. Quarterly update on preventing wrong-site surgery. Pa Patient Saf Advis [online] 2012 Mar [cited 2012 May 8]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/mar;9\(1\)/Pages/28.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2012/mar;9(1)/Pages/28.aspx).
3. Clarke JR. Quarterly update: what might be the impact of using evidence-based best practices for preventing wrong-site surgery? Results of objective assessments of facilities’ error analyses. Pa Patient Saf Advis [online] 2011 Dec [cited 2012 May 8]. Available from Internet: [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/dec8\(4\)/Pages/144.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/dec8(4)/Pages/144.aspx).

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