FINAL PROGRESS REPORT

Incident Reporting Practices in Nursing Homes

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ABSTRACT

Purpose: The purpose of this study was to examine the incident reporting practices in nursing homes (NHs) and identify to what extent these data are used for improving the safety of residents.

Scope: In this project, we examined what type of information is collected from incident reports and asked: how are they maintained; what are the data used for; and are there differences in reporting and maintaining incident reports? We also describe state governmental surveyors practices for collecting individual nursing home adverse incident data.

Methods: This study is primarily a descriptive study of incident reporting practices, though it also includes qualitative analysis of open-ended questionnaire responses. We examine incident reporting practices by using a survey of nursing home administrators and telephone interviews with Department of Health State Surveyors.

Results: Identifying ways to improve safe care processes is an increasing priority in NHs. To our knowledge, this is the first study to report incident reporting processes in the NH setting. This study found numerous barriers and few facilitators to adverse event reporting. From the administrator survey, we found that only 15% of responding facilities have a system in place for staff to enter adverse event data using health information technology (HIT) at the unit level. Almost 18% of responding facilities do not use HIT to manage incident reporting processes, and one third of NHs conduct analyses by hand. The Department of Health State Surveyors results indicate that the variable state reporting policies in the US widely impact both the frequency and the type of incidents reported. There are some consistencies across states, however; for example, abuse incidents are taken very seriously, but falls, other incidents, and pressure ulcers are not.

Key Words: Nursing homes, quality, incident reports

PURPOSE
Specific Aims

Each year, approximately 8 million adverse incidents occur among vulnerable nursing home residents.[1,2] An adverse incident is defined as "unplanned events which caused, or had the potential to cause, harm to patients" (p. 556).[3] There are various adverse incidents that occur in the nursing home setting, including falls; adverse drug events or medication errors; resident altercations or other types of abuse; and non-fall related injuries, such as burns, skin tears, or bruises.[2,4-6] Depending on their severity, the occurrence of these incidents can lead to significant morbidity and mortality and subsequently result in considerable nursing home staff time and increased costs to care for them. Clearly, these incidents represent a significant problem in nursing homes. One start to reducing adverse incidents is to use reporting systems. The Institute of Medicine reports[7,8] call for enhancements in adverse incident reporting. Improvements in reporting practices are significant because incident reporting systems have been used successfully in other disciplines, such as aviation safety, to significantly augment safety initiatives.[9] Investigating the circumstances surrounding an adverse incident is important to improve prevention and intervention efforts, and use of incident reporting systems is aimed at improving healthcare processes through the analysis of data.[7] This process requires standardized definitions of the incident, data elements, and approaches for collecting and integrating the data.

Nevertheless, the practice of monitoring adverse incidents in nursing homes is unclear, because there is currently no standardized method to investigate, document, and disseminate adverse incident information.[10] There currently are no national policies governing patient safety related data in nursing homes, though a standardized taxonomy has been developed for categorizing patient safety issues in hospitals.[11] Several states have laws for reporting adverse incidents[8]; however, many are focused on hospital incidents or only require hospitals and nursing homes to report sentinel events (e.g., unexplained deaths). Furthermore, the compliance to this reporting statute is unknown.

The most commonly used method of reporting an adverse incident in nursing homes is through documentation on a written narrative incident report. In our pilot research conducted on incident reports in nursing homes, we showed wide variation of incident reporting practices. We were also able to show that, by providing a systematically structured incident report, nursing staff improved documentation of care processes specific to falls.[12,13] In one recently published study on adverse drug events among nursing home residents, researchers found that 42% of all the adverse drug events were preventable.[14] These results also provided compelling evidence that use of information technology and systematic management systems can improve communications among nursing home staff to prevent adverse drug events.

Thus, further research is necessary on the current practice of how incidents are evaluated in nursing homes. Moreover, in order to improve how incidents are reported and analyzed for quality improvement, the role Health Information Technology (HIT) plays in this endeavor should be investigated. The purpose of this study was to examine the incident reporting practices in nursing homes and identify to what extent these data are used for improving the safety of residents.

SCOPE

Incident Reporting Systems

Historical Foundations: In the 1950s, Flanagan developed the critical incident technique to investigate air accidents. This technique, a precursor to incident reports, proved to be a valuable tool in identifying flight crew behaviors associated with successful or flawed flight missions.[15] In the 1970s, the NASA Aviation Safety Reporting System was established to record voluntary, anonymous reports from airline workers. Data from this reporting system has led to significant improvements in airline safety.[16] A shift in the culture of aviation safety resulted from the use of data obtained and serves as a template for improving incident reporting in healthcare settings, such as the nursing home.[10]

Incident Reports in Healthcare: Use of incident reports used in medicine can be traced to a landmark study that examined sentinel events in anesthesia.[17] Although, the motivation for this study was the rising cost of malpractice insurance, it was instrumental in changing anesthesia practice, which has ultimately led to significant improvements in anesthesia safety.[18] Anesthesiology is now acknowledged as the leading medical specialty addressing patient safety.[19] Incident reporting systems have also been implemented in transfusion medicine. Battles and colleagues have described how they successfully implemented an electronic system in several nationwide blood centers.[20] A key attribute of this electronic system is its ability to analyze incident data at the individual and institution level as well as its effect on both risk management and quality improvement.

Use of Incident Reports for Quality Improvement: Incident reports document clinical errors and other adverse incidents. As noted in the AHRQ evidence reports, incident reports also can target "no-harm" events and "near misses."[21] Efforts to improve patient safety can be significantly enhanced by the use of incident reports.[22] However, there is no current standardized method of investigating, documenting, and disseminating adverse incidents in healthcare.[23]

Increased attention to quality improvement has led to greater detection of adverse incidents.[24] Incident reporting systems can complement existing quality improvement efforts[3] and provide valuable data sources and analysis.[25] The ultimate goal of a successful incident reporting system is effective prevention of similar future incidents.[26, 27] The best way to assess the value of incident report data for quality improvement purposes is for the healthcare team to regularly review the incidents for potential individual and institutional-wide characteristics associated with an error. This mechanism provides a feedback loop whereby staff can take the incident report information and use it, for example, to reorganize the environment, replace faulty equipment, change policy, establish protocols, analyze trends, or provide education.[3,27,28]

Use of Computerized Incident Reporting Systems: Computers are increasingly being implemented in healthcare to improve safety and reporting incidents. Their design allows ease of entering and analysis of adverse incidents. Most of the computer-based incident reporting research has targeted prevention of incidents, such as adverse drug events.[29-32] Computer software systems can provide detailed analyses that are useful in the development of intervention strategies aimed at reducing adverse incidents.[60]

Computerized incident reporting systems not only can be used to minimize the time it takes to report an incident but also have been shown to increase the detection and reporting of adverse drug events.[29, 33] These systems also prompt the reporter to describe circumstances related to the incident.[34] Redesigning incident reports so that clinically relevant data can be quickly documented and easily interpreted can improve the identification of risk factors for future incidents.[35]

METHODS
Opinions of Nursing Home Administrators
Study Participants and Setting

The participants in our study included NH administrators (NHAs) from 1,000 NHs in the United States. These NHAs were selected using a random sampling approach of NHs (>40 beds and non-hospital-based facilities) obtained from the Online Survey, Certification, and Recording (OSCAR) database. Ethics approval was obtained from the University of Pittsburgh Institutional Review Board.

Survey Development

The survey was developed using the structured format detailed by Waltz and colleagues.[36] The survey was constructed following a thorough literature review and focus groups with eight NHAs and then pilot tested with three NHAs and three academic researchers with expertise in NH quality; then, it was revised again and retested. In the final phase of of pilot testing, NHAs and academic experts reported adequate clarity, utility, face validity, and content validity at a rate greater than 75%.

The survey was seven pages in length and required approximately 30 minutes to complete. Respondents were asked to report on the following categories: (1) NH profile; (2) incident reporting frequency and type; (3) incidents reported within the facility and to the state department of health; (4) barriers; and (5) role of HIT facilitators in incident reporting processes. This paper focuses on categories 4 and 5, barriers and facilitators to the reporting of adverse events.

Survey Administration

In the Spring and Summer of 2008, survey packets were distributed by mail to the NHA in selected facilities. These packets included (1) a letter providing information on patient safety; (2) a letter describing the study; (3) a copy of the survey; (4) a self-addressed stamped envelope; (5) a copy of the letter from the IRB approving of the study; and, (6) copies of prior related publications. Anonymity of respondents was guaranteed. As an additional incentive, each administrator was offered a $10 gift card that would be sent to the address indicated on a card that could be mailed separately from the survey, to ensure anonymity. After 4 weeks, a second packet was distributed by mail. If no response was received until this point, two follow-up phone calls to NHAs were made.

Survey Analysis

For all statistical analyses, we used SPSS Statistics 17.0. Associations between facility characteristics and facilitators to adverse event reporting were calculated using t-tests as well as chi-squared and other non-parametric tests. To analyze associations between technology-related facilitators and facility characteristics, we summed the scores from 10 items that focused on presence of or absence of the type of report (e.g., menu-driven versus narrative) and level of technology used for incident reporting processes (e.g., entering, analyzing).

Summated scores is a method of combining several variables to measure the same concept and increase the reliability of measurement through multivariate measurement.

To investigate barriers to adverse event reporting, we slightly modified (by changing "medication error" to "adverse event") and embedded a 20-item survey used in a previous study on medication error reporting.[37] Of these, 11 of the factors are classified as organizational-level barriers and nine are barriers focused at the individual staff member level. Respondents were asked to use a 5-point Likert scale (1: "very likely" to 5: "very unlikely") to rate the likelihood that each factor acts as a barrier to prevent adverse events reported in their facility. The immediate action factors are those that should be a high priority for improving adverse event reporting, because they are likely to act as barriers to reporting (overall mean <3.0). Awareness factors are less likely to act as barriers (overall mean >3.0).[37]

Inferential statistics were then calculated to identify associations between barrier factors and facility characteristics of the respondents. To conduct this analysis, the scores of the 20 barrier factors were summed, with lower scores indicating a greater perception of barriers. When the ANOVAs were significant, Tukey's post-hoc tests were conducted to identify the significant mean differences.

Opinions of Department of Health State Surveyors
Study Participants and Setting

We conducted a mailed survey to the 50 US State Departments of Health (DOH). We contacted the department responsible for regulation and oversight of nursing home care in each state. The study received ethics approval from the University of Pittsburgh Institutional Review Board.

Survey Development

The survey was developed using a structured format. Steps of the survey development included determination of information to be sought, development of items, determination of item sequence, expert review, draft survey, pretest, and---finally---administer and score the survey. After the survey was at a complete state, it was pilot tested with three nursing home administrators, three academic reseachers, and three Centers for Medicare and Medicaid services/state and federal representatives via in-person and telephone interviews. This was used to make changes to some questions and in order to establish content validity and reliability. The resulting comments from reviewers were then incorporated in the survey. In all phases of pilot testing, greater than 75% of the time, they reported adequate clarity (e.g., options easily understood), utility (e.g., likely to elicit candid information), face validity (e.g., questions accurately reflected incident reporting processes), and content validity (e.g., degree of gaps in the items in the survey).

The survey was six pages in length and took approximately 30 minutes to complete based on our pilot testing. Respondents were asked to report generally on the following categories: State and Respondent Profile and State Incident Reporting Policies and Practices, including types of incidents reported (e.g., abuse, witnessed falls, medication errors), methods of data collection (e.g., web-based form, reporting software), and types of health information technology used. The survey included a variety of structured, open- and closed-ended multiple choice questions.

Such items include the following: background/demographic information, types of incidents that are reported to the DOH, and follow-up procedures for incidents that are reported.

Survey Administration:

In Spring to Summer 2008, survey packets were distributed to a contact in each of the states Department of Health, requesting their participation. This included (1) a letter explaining information on patient safety; (2) a letter describing the study; (3) a copy of the survey; (4) a self-addressed stamped envelope; (5) our IRB protocol; and (6) a copy of prior published literature.

As an incentive to complete the survey, each DOH respondent was given a $10 gift card if they chose. An electronic version of the survey was also made available for responders who preferred to submit it electronically. In order to increase the response rate, after 4 weeks, a second packet was distributed. In addition, three follow-up phone calls were conducted to further increase response rates. Information such as the type and degree of data that are collected (e.g., minor to sentinel events), how these data are collected (e.g., telephone, fax), and what is done with these data once they are collected (e.g., trend analysis, department of health visit to the nursing home) was obtained by the research team.

Analysis

We conducted a descriptive statistical analysis consisting of the percent for each of our close-ended questionnaire items. A content analysis approach with the open-ended questions was conducted following the methods described by Berg[38] and Krueger.[39] We chose to keep many of the survey items as open ended as possible to capture all possible options, because practices and policies varied widely based on our pilot testing.

Content analysis allows for systematic extraction of themes. A research assistant transcribed verbatim the open-ended text questions. These data were then coded using an emergent coding approach. Two researchers (L.W. and K.R.) independently reviewed the text responses and categorized them to form a checklist. Next, we compared notes and reconciled any differences. Third, we used a consolidated checklist to apply coding of the data. Fourth, inter-rater reliability checks (Cohen's kappa >.80) were conducted to ensure consistency of coding before coding was applied to the remainder of the analysis.

RESULTS
Nursing Home Administrators

Of the 1,000 surveys distributed, 65 surveys were returned without completion due to various reasons (e.g., return-to-sender). Thus, 935 surveys were received by potential respondents. Of these, we were able to contact 43 NHAs by phone who openly disclosed that they were not able to complete the survey (e.g., not permitted to share incident report information or did not have time). We obtained full data on 399 surveys, which yielded a 43% (399/935) response rate. Fewer than 5% of the completed surveys had missing data.

The median number of years an NHA had been working in the current facility of employment was 3.0 years (range 0-36).

Nearly half (48.8%) of respondents were from the Midwest (48.8%), and over half (55.3%) were identified as rural and employed at a facility run by a corporation (55.7%); 60.4% were at homes ranging in bed size from 41 to 99 beds. Profit status was evenly distributed between for-profit (41.1%) and non-profit (42.1%) homes, with the remainder of homes falling into the category of "other" (e.g., governmental); 90% of responding homes did not have Joint Commission or Commission on Accreditation of Rehabilitation Facilities accreditation.

Very few NHs had HIT processes in place for incidence reporting. For example, only 15% (60/935) of the facilities had a system in place in which a nurse on the unit entered data on adverse events. Only 22.1% of facilities reported using HIT to trend data across time periods and units for quality improvement purposes. Forty-three percent (43%) of facilities included a system wherein data are entered into a computerized spreadsheet (e.g., Microsoft Excel) or database (e.g., Microsoft Access) after first being documented by hand. Finally, 17.6% of respondents reported that HIT was not used to track, monitor, or maintain data, with 33% of NHs reporting that quality improvement analyses occurred by hand.

All 20 barrier factors in the survey had likelihood scores less than 3.0; as a result, they were categorized as requiring immediate action (Table 1). Three factors identified as being the most important barriers to reporting were prominent. These were (1) "lack of recognition that an adverse event has occurred"; (2) "fear of liability, lawsuits, or sanctions"; and (3) "fear of disciplinary action," which was tied to "fear of being blamed."

When we compared HIT use/incident reporting facilitators and barriers with the NH facility characteristics of our sample, we found that ownership status and accreditation were significantly associated with the barrier/facilitator rankings (Table 2). On the other hand, NH size and location was not found to be significantly related to the rankings. Interestingly, for-profit facilities ranked lower in usage of technology facilitators to adverse event reporting and had a higher perception of reporting barriers. Tukey's post hoc test revealed that respondents working in for-profit settings reported more positive safety culture perceptions than respondents working in non-profit (p=.038) settings and governmental settings (p=.007).

Department of Health State Surveyors

In total, 32 states responded. The remainder (n=18) of the states were unable to consent despite repeated phone calls, said that they were either unable to discuss state policies, or were too busy to participate, despite multiple efforts to accommodate them.

Table 3 shows the adverse events required to be reported to the state DOH juxtaposed with facility visits from a DOH surveyor following these events; 28.6% of responder states reported that the necessity of a surveyor visit is determined via a triage process. Abuse is the only adverse event that is almost always required to be reported to the state DOH (96.6%) and has the highest incidence of follow up with a surveyor visit (77.8%). Adverse events that are less commonly required to be reported to the state DOH include near falls (2.8%), witnessed falls (3.5%), "found on floor" (5.2%), and skin tears (5.3%). Other serious events that always require reporting include infectious disease outbreak (61.8%), suicide/attempted suicide (60.9%), and elopement (60.4%).

Only 12.5% mandate a surveyor visit for witnessed falls. Compared to 38.5% surveyor visits for burns and 22.7% for pressure ulcers, the numbers are fairly low. These figures are interesting, given that only 18 of the 32 responder states described their reporting system as mandatory.

Of the 32 responder states, less than one quarter (21.9%) investigate adverse event reports with a site visit, and only 10 (31.3%) publicly disseminate information about adverse events to stakeholders. Less than half of the responder states (43.8%) document the incident in a spreadsheet, and even fewer (37.5%) require nursing homes to document a root cause analysis of the incident. There was also wide variation on how often the data are analyzed by the state DOH, ranging from yearly to never. Table 4 outlines the various methods that the state DOH use to track and monitor adverse events, indicating that there is wide variability here also in terms of both data protection methods and incident documentation policy.

DISCUSSION
Nursing Home Administrators

Identifying ways to improve safe care processes is an increasing priority in NHs. To our knowledge, this is the first study to report incident reporting processes in the NH setting. This study found numerous barriers and few facilitators to adverse event reporting. Only 15% of responding facilities have a system in place for staff to enter adverse event data using HIT at the unit level. Almost 18% of responding facilities do not use HIT to manage incident reporting processes, and one third of NHs conduct analyses by hand.

Another important finding was that all potential barrier factors to incident reporting were classified as requiring "immediate action." It is also noteworthy that two of the top three most significant barrier factors influencing the reporting processes were related to fear of reporting the incident. Unless such fears are addressed and reduced, it is likely that such fears will deter staff members from reporting.

This study also found that reporting perceptions differed depending on the ownership status of the respondent's workplace. For-profit settings had more negative perceptions of reporting barriers and fewer technology-related facilitators available to encourage or ease reporting compared to those in non-profit and governmental settings. This finding is comparable to other studies that have found significant differences between patient safety and profit status, with for-profit NHs providing a lower quality of care in process and outcome measures.[40,41]

Unfortunately, the use of HIT for incident reporting is lagging in NHs.[42] Our study found that very few NHs have computerized incident reporting systems to facilitate reporting processes, yet computerized software systems are increasingly being used in other clinical settings, such as in acute care, to facilitate this process. Computer software systems can provide detailed analyses that are useful in the development of intervention strategies.[43] These systems also prompt the reporter to describe circumstances related to the incident.[44] Though best practices have been identified,[45] further work to reduce multiple reporting agencies and methods of reporting is needed in order to improve information sharing and efficiency.

The current study has several implications for practice, policy, and research to advance the field in the NH setting. Our study identifies numerous vulnerabilities of the current disjointed system and supports the need for a standardized reporting process in NH settings.

The present study will help to further our development of a standardized reporting mechanism, including taxonomies to classify adverse incidents so that data can better drive safety improvements.[46] Future research should focus on how to best recognize, report, and analyze events; examine the risk to residents; identify process vulnerabilities; and disseminate proposed changes.[47] These data also advance the field by informing health policy on the urgent need to improve incident reporting systems. Because one of the most commonly cited barriers toward adoption of HIT in NHs is the lack of a cost-benefit analysis,[48] further research on the role of incident reporting and quality outcomes is warranted. A new model of care with a focus on HIT would offer NH staff a more efficient and systematic way to assess and evaluate residents. Of course, such an overhaul would need to occur in a blame-free environment to encourage open reporting without fear of repercussions.

This study has a few limitations worth noting. One challenge with this study is endogeneity. In other words, it is likely that we had a greater response rate from the "better" NHs. Our sampling plan and maintenance of anonymity with the surveys helped to reduce this threat. We also experienced a disproportionately high response rate from Midwest NHs. Thus, caution should be exercised in the interpretation of the results. Our response rate of 43% was modest; however, many NHA non-responders acknowledged that they were not permitted to share data regarding their incident reporting processes, which we feel was a major factor in reducing the response rate. Nevertheless, when collecting sensitive data, a low response rate is to be expected, and we conclude on the basis of response rates from other research[49] that our response rate is appropriate given the subject matter.

Improved incident report data have led to practice changes in process, organization, supervision, training, and teamwork.[50] Unfortunately, in the NH setting, numerous barriers to reporting are present that have limited the full potential of using incident reports. Furthermore, few facilitators are currently available in the NH setting. The use of a more standardized system to assess, analyze, and disseminate adverse event data to facilitate this process is warranted.

Department of Health State Surveyors

These results indicate that the variable state reporting policies in the US widely impact both the frequency and the type of incidents reported. There are some consistencies across states, however; for example, abuse incidents are taken very seriously, but falls, other incidents, and pressure ulcers are not.

The results of this research is expected to increase the knowledge base that will assist stakeholders to improve the workflow design of adverse event evaluation and the role HIT and healthcare policy development plays in this. This information furthers our development of a standardized adverse event reporting mechanism recommended by the Institute of Medicine and others. Understanding the variability in incident reporting could help policymakers set better standards through the Medicare/Medicaid certification process in which almost all facilities participate.

There is no systematic collection format and analysis of data and most incident reporting systems describe only that an incident occurred. Regulations and policies mandate the use of incident reporting systems in healthcare settings. However, the lack of a standardized incident reporting system limits the ability of nursing homes to manage adverse incidents with the goal of improving resident safety.

Limited attention is paid to what actually could have caused the incident and how the data could be used to prevent future occurrences.[9] Additionally, the majority (81.3%) of the responder states impose sanctions on nursing homes that have fully disclosed adverse events. This could then be a major deterrent for nursing homes to disclose adverse events.

Enhancing resident safety involves the ability to learn from previous incidents.[15] Standardized national reporting systems have been used successfully in other disciplines, such as the airline industry, blood transfusion services, and anesthesiology, to improve safety. These programs may serve as a model for improving incident reporting system in nursing homes.

The Joint Commission is also participating in the National Quality Forum initiative as well as conducting research on using health information technology to improve incident reporting, quality improvement initiatives, and promotion of a national incident reporting system. A new model of care could replace the current procedures and perhaps offer nursing home staff a more efficient and systematic way to assess and evaluate the resident, ultimately improving resident safety.

This study provides an important step by increasing our knowledge base of the current state of adverse event reporting at the state level and will identify potential vulnerabilities of the system. This research provides us with information to conduct future research on implementing health information as well as identify policy implications regarding incident reporting in nursing homes.

Publications:
Wagner & Castle (in preparation). State Policies Associated with Adverse Event Reporting in Nursing Homes.

Wagner, Handler, & Castle (in review). Barriers and Facilitators to Adverse Event Reporting in Nursing Home Settings.

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Table 1. Barriers to Adverse Event Reporting

Factor	Likelihood (SEM †)	Barrier Classification	Rank ‡
Lack of recognition that an adverse event has occurred	2.35 (0.06)	Organizational	1
Fear of disciplinary action	1.98 (0.05)	Individual	2
Fear of being blamed	2.08 (0.06)	Individual	2
System or forms used to report adverse events are long and time-consuming	2.18 (0.06)	Organizational	4
Extra time involved in documenting an adverse event	2.19 (0.06)	Individual	5
Difficulty in proving that an adverse event actually occurred	2.09 (0.05)	Organizational	6
Belief that it is unnecessary to report adverse events not associated with patient harm	2.20 (0.06)	Individual	6
Lack of knowledge of which adverse events should be reported	2.16 (0.05)	Organizational	8
Lack of knowledge of the actual or potential harm of an adverse event	2.07 (0.05)	Individual	9
Fear of liability, lawsuits, or sanctions	1.97 (0.06)	Individual	10
Lack of feedback to the reporter or rest of facility on adverse events that have been reported	1.97 (0.05)	Organizational	10
Lack of a consistent definition of an adverse event	2.04 (0.05)	Organizational	12
Belief that reporting adverse events have little contribution to improving the quality of care	1.94 (0.05)	Individual	12
Lack of knowledge of the usefulness of reporting adverse events	2.06 (0.05)	Individual	12
Lack of information on how to report an adverse event	1.76 (0.04)	Organizational	15
Fear of losing respect of co-workers	1.85 (0.05)	Individual	15
Lack of a culture of reporting adverse events	1.71 (0.04)	Organizational	17
Not knowing who is responsible for reporting an adverse event	1.56 (0.04)	Organizational	18
Lack of an anonymous adverse event reporting system	1.93 (0.05)	Organizational	19
Lack of a readily available adverse event reporting system	1.50 (0.04)	Organizational	20

† Standard Error of the Mean.
‡ Most (1) to least (20) important barrier to event reporting.
Note. Respondents were asked to use a 5-point Likert scale (1: "very likely" to 5: "very unlikely") to rate the likelihood that each factor acts as a barrier to prevent adverse events reported in their facility. The average for each factor was calculated. The immediate action factors are the ones that should be a high priority for improving adverse event reporting, because they are likely to act as barriers to reporting (overall mean <3.0). Awareness factors are less likely to act as barriers (overall mean >3.0).

Table 2. Facility Characteristics Associated with Barriers & Facilitators to Incident Reporting

Characteristic	n (%)	Facilitators		Barriers		
		Test statistic (df)	p value	Mean (SD)	Test statistic (df)	p value
Ownership						
For profit	159 (41.1)	Kruskal-Wallis H = 8.79 (2)	0.012	37.15 (11.70)	F (2, 369) = 5.70	0.004
Not for profit	163 (42.1)			40.56 (12.26)		
Governmental	51 (13.2)			43.20 (14.76)		
Location						
Urban	75 (19.9)	Kruskal-Wallis H = 2.59 (2)	0.274	37.93 (12.42)	F (2, 373) = 1.89	0.153
Suburban	93 (24.7)			37.83 (12.69)		
Rural	208 (55.3)			40.39 (12.46)		
Bed Size						
Small (44-99)	236 (60.5)	Kruskal-Wallis H = 1.43 (2)	0.490	39.93 (13.06)	F (2, 387) = 0.70	0.496
Medium (100-199)	138 (35.4)			38.72 (11.92)		
Large (≥200)	390 (4.1)			36.94 (13.31)		
Chain						
Yes	215 (55.7)	Mann-Whitney U = 17775	0.606	38.67 (12.35)	t (383) = 1.19	0.234
No	171 (44.3)			40.22 (13.06)		
JC/CARF accredited						
Yes	29 (7.3)	Mann-Whitney U = 4056	0.027	39.76 (15.58)	t (31) = 0.15	0.881
No	71 (92.7)			39.31 (12.42)		

* JC=The Joint Commission; CARF=Commission on Accreditation of Rehabilitation Facilities

Note. Facilitators were defined as technology-related facilitators and were summed scores from 10 items focusing on the presence of or absence of the type of report and level of technology used for incident reporting (Kuder-Richardson 20 reliability coefficient=0.681). Barriers were measured by summing 20 barrier factors; lower scores indicating a greater perception of barriers (Cronbach's α reliability coefficient=0.921).

Table 3: Adverse Events Reported to State Departments of Health

	Reported to your department of health					Surveyor visit following report				
	N	Never (%)	Only when a minor event occurs (%)	Only when a major event occurs (%)	Always, regardless of outcome (%)	N	Never (%)	Only when a minor event occurs (%)	Only when a major event occurs (%)	Always, regardless of outcome (%)
Witnessed falls	24	23.4	3.0	70.0	3.5	24	25.0	8.3	54.2	12.5
"Found on floor"	21	20.9	3.8	70.1	5.2	19	21.0	5.3	57.9	10.5
Near-falls (i.e., intercepted falls)	20	53.7	4.8	38.8	2.8	17	64.7	0.0	35.3	0.0
Skin tears	26	34.3	4.4	56.0	5.3	26	19.2	3.8	61.5	15.4
Medication errors (e.g., dispensing, administration, adverse drug event)	27	17.3	6.3	69.3	7.1	24	12.5	4.2	66.7	16.7
Pressure ulcers	26	38.4	4.0	49.2	8.5	22	18.2	9.1	50.0	22.7
Burns	26	12.1	4.4	65.4	18.1	26	11.5	0.0	50.0	38.5
Abuse (e.g., physical, sexual)	29	0.5	1.0	1.8	96.6	27	3.7	18.5	0.0	77.8
Elopement	22	4.8	2.9	31.9	60.4	19	5.3	73.7	0.0	21.1
Infectious disease outbreak	19	5.1	3.2	29.8	61.8	17	17.8	64.7	0.0	17.8
Suicide/attempted suicide	20	6.0	1.6	31.5	60.9	18	11.1	5.6	55.6	27.8
Equipment malfunction	21	19.6	6.3	63.6	10.5	18	11.1	5.6	77.8	5.6
Resident to resident violence/aggression	22	1.9	8.0	45.1	45.1	18	5.6	11.1	77.8	5.6
Resident to staff violence/aggression	21	6.7	2.7	31.8	58.8	18	44.4	33.3	0.0	22.2

Table 4: Technology Characteristics of Monitoring and Tracking Adverse Events Data (n=32)

	Frequency
Internet firewall	19
Identifiers removed	14
Electronic password	20
Personal computer	21
Web-based form	12
Reporting software	11
Scantron	2