

WORKING P A P E R

Adverse Event Reporting Practices by U.S. Hospitals

Survey Results from 2005 and
2009

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Summary

Little has been known about hospitals' adverse event reporting systems, or how they use reported data to improve safety performance. This information is needed to assess effects of national patient safety initiatives, including implementation of the Patient Safety and Quality Improvement Act of 2005 (PSQIA). The survey results presented in this report provide baseline information on the characteristics of hospital adverse event reporting systems and processes. The goal of the survey was to establish estimates of the percentage of hospitals that have such systems, the status of reporting practices, and how information on reported occurrences is disseminated and used for process improvements. These baseline survey results would be used for two purposes – to track trends in improvements for adverse event reporting practices across the country, and to assess effects of the implementation of the national actions under PSQIA, intended to support hospitals in improving their internal reporting processes.

Two rounds of the Adverse Event Reporting System (AERS) Survey were administered, the first in 2005 and the second in 2009, using a mixed mode (mail/telephone) survey design with stratified random samples non-federal U.S. hospitals. The surveys were completed with the risk manager at each hospital in the sample. We used the same data collection methods for both the 2005 and 2009 surveys, which were chosen because the methods were known to yield fairly high response rates. The survey mode was a mail survey with two waves of mail follow-ups, which was followed by a Computer-Assisted Telephone Interviewing (CATI) telephone survey for the remaining non-responders. The CATI survey was tested to ensure that the questionnaire items appeared as designed, that the logical flow was correct, that there were appropriate range checks and that the data were being recorded correctly. The survey questions for both years took approximately 25 minutes to complete.

In September 2005 through January 2006, we administered the first AERS survey to risk managers at a stratified randomized sample of 2,050 non-federal hospitals, excluding those in southern portions of Louisiana and Mississippi. Hospitals in those areas had been affected by Hurricane Katrina at the time we went into the field for survey data collection, so we were not able to contact them for the survey. The sample was thus representative of non-federal hospitals nationally excluding these areas. The sample was stratified by Joint Commission accreditation status, hospital ownership, and staffed bed size, which also yielded good representation on teaching, urban/rural, and multi-hospital system status. An 81 percent response rate was obtained, for a sample of 1,652 completed surveys.

In April through September 2009, we administered the second AERS survey to risk managers at a subset of the hospitals that responded to the 2005 survey. A stratified random sample of 1,200 hospitals was drawn from the 1,652 hospital Risk Managers who completed the 2005 survey, using random selection within the strata established for the 2005 survey. To achieve a representative sample in this survey across strata, different proportions of responders to the 2005 survey were selected. A 79 percent response rate was obtained, for a sample of 952 completed surveys.

The samples for the 2005 and 2009 surveys have similar profiles of characteristics. For both surveys, the characteristics of the hospitals that completed surveys reflected those of the larger hospital population, as reflected in small differences between the un-weighted and weighted distributions of hospitals in each sample. The mixes of hospital service types also were

similar in the samples for the 2005 and 2009 surveys. Greater than 60 percent of the hospitals in both samples were general medical/surgical hospitals that were not critical access hospitals (CAHs), and another 20 percent were CAHs. The remaining hospitals were a mix of other specialty care hospitals.

INDEXES OF REPORTING PERFORMANCE

We established four indexes as summary measures of hospitals' reporting performance. Each index addressed one of four components identified for an effective adverse event reporting system: supportive environment, reporting by a range of staff, timely distribution of summary reports, and review of reports by key departments and committees. Each index was measured based on data from relevant survey questions (see Table S.1):

- A supportive environment – one point if a hospital provides for anonymous reporting for all reporters and one point if it always keeps identity private for reporters who identify themselves (on 3-point scales of all, some, none).
- Reporting by a range of staff – one point if a hospital reported that at least some of its reports came from physicians, and one point if it reported that at least some reports were submitted by technicians, therapists, pharmacy staff, or other staff (on 5-point scales of all to none).
- Timely distribution of summary reports – one point if a hospital distributes summary reports within the hospital (yes/no response), one point if it produces summary reports on a monthly basis or more frequently (from a 4-point scale of weekly, monthly, quarterly, annually), and one point if reports are distributed within two weeks after the end of reporting period (from a 5-point scale of less than one week to two months or more).

Table S.1 Composition of Hospital Reporting Performance Indexes

Index	Index Values*	Survey Items in the Index
Supportive environment	0, 1, 2	Provides for anonymous reporting for all reporters. Always keeps identity private for reporters who identify themselves.
Reporting by a range of staff	0, 1, 2	At least some of its reports came from physicians. At least some reports were submitted by technicians, therapists, pharmacy staff, or other staff.
Timely distribution of reports	0, 1, 2, 3	Distributes summary reports within the hospital. Produces summary reports on a monthly basis or more frequently. Distributes reports within two weeks after the end of reporting period.
Review of reports by key departments and committees	0, 1, 2	Always provides reports to all of hospital administration, nursing department, and medical administration. Discusses adverse events at both the hospital board or board committee and the medical executive committee.

* Default value = 0 for all indexes.

- Review of reports by key departments and committees – One point if a hospital always provides reports to all of three key departments: hospital administration, nursing department, and medical administration (5-point scale of always to never, conditional on having the department); and one point if adverse events are discussed at both the hospital board or board committee and the medical executive committee (yes/no response, conditional on having the committee).

CROSS-SECTIONAL COMPARISONS OF 2005 AND 2009 SURVEY RESULTS

Virtually all hospitals reported in both 2005 and 2009 that they had centralized adverse event reporting systems. The hospitals varied in the system types they were using, however, across paper-only systems, paper-and-computer systems, and computer-only systems.

Comparison of Performance Index Results, 2005 and 2009

We used the four performance indexes, described above, to characterize hospitals' performance on each of four key aspects of the process of reporting and acting on information on adverse events. Ideally, all hospitals should achieve a maximum score for each of these indexes, which would reflect their having a proactive system, not only to report events but also to take actions to prevent such events from occurring again in the future.

In 2005, only 32 percent of hospitals had established environments that supported reporting, only 13 percent had broad staff involvement in reporting adverse events, and 20-21 percent fully distributed and considered summary reports on identified events (Figure S.1 through Figure S.4). For the supportive environment and timely reporting indexes, hospitals were somewhat evenly distributed across the scores. For the index on type of staff reporting, 69 percent of hospitals had index scores of one point, suggesting that occurrences in their hospitals were likely to be reported by either physicians or other staff, but not both. A similar pattern was found for reporting to key departments and committees, indicating that their reports were being considered by either internal departments or committees, but not both. Because survey responses were self-reported by risk managers, these may be optimistic assessments of hospital performance.

The distributions of index scores improved somewhat in 2009 for the first two indexes. For the supportive environment index, only 21 percent of hospitals had a score of 0 in 2009, compared to 24 percent in 2005, and those with a score of 2 increased from 32 percent to 36 percent (Figure S.1). The increase in hospitals with a score of 2 was significant ($p=0.041$), but the decrease of hospitals with a score of 0 was not significant ($p=0.13$).

For the index on types of staff reporting (Figure S.2), the overall distribution of scores changed between 2005 and 2009 ($p=0.002$). Within the distributions of scores, the decrease in percentage of hospitals with a 0 score from 18 percent in 2005 to 12 percent in 2009 was significant ($p<0.001$), but the increase in the percentage of hospitals with a score of 2 was not significant ($p=0.299$).

By contrast, no significant difference was found between 2005 and 2009 in the score distributions for the index on timely distribution of adverse event reports ($p=0.09$) (Figure S.3).

For the index on discussion of event reports with key departments and committees (Figure S.4), we also found a decrease in the percentage of hospitals with a score of 0, and also in the percentage with a score of 2. As a result, hospitals with a score of 1 increased from 56 percent in 2005 to 64 percent in 2009. The decrease in the percentage of hospitals with a

score of 0 was statistically significant ($p=0.007$), but the decrease in the percentage of hospitals with a score of 2 was not significant ($p=0.15$).

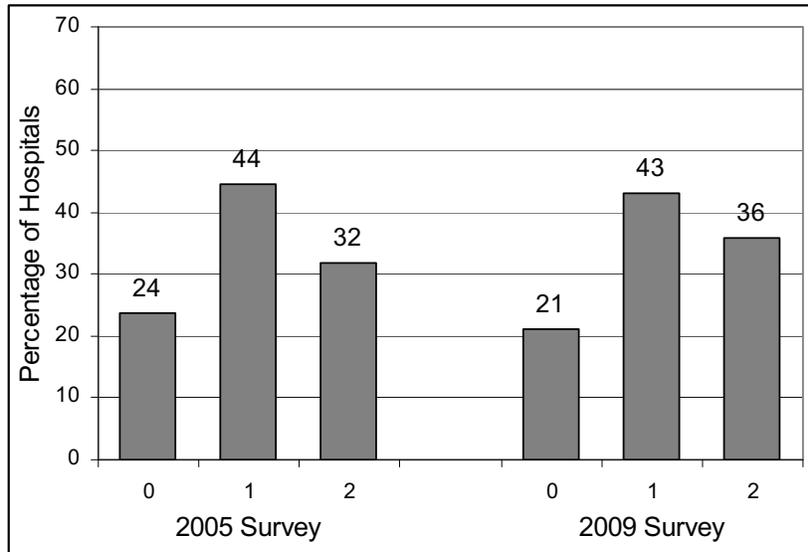


Figure S.1 Supportive Environment for Reporting, 2005 and 2009

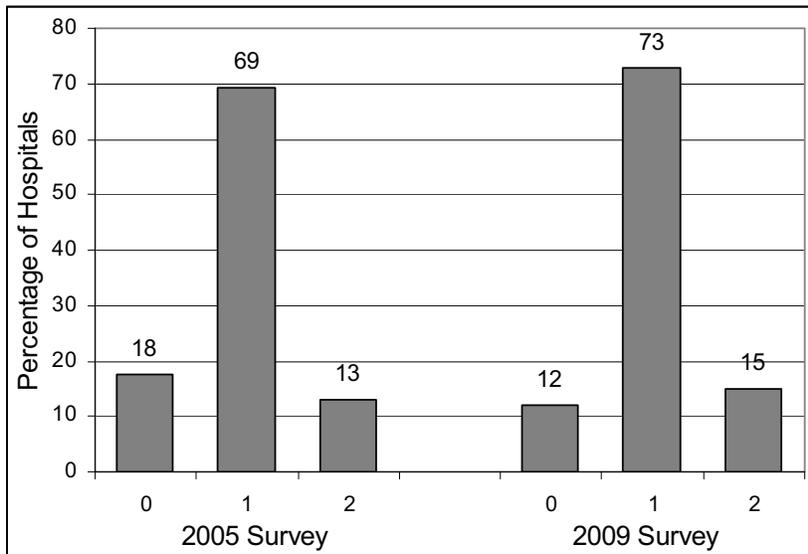


Figure S.2 Types of Staff Reporting, 2005 and 2009

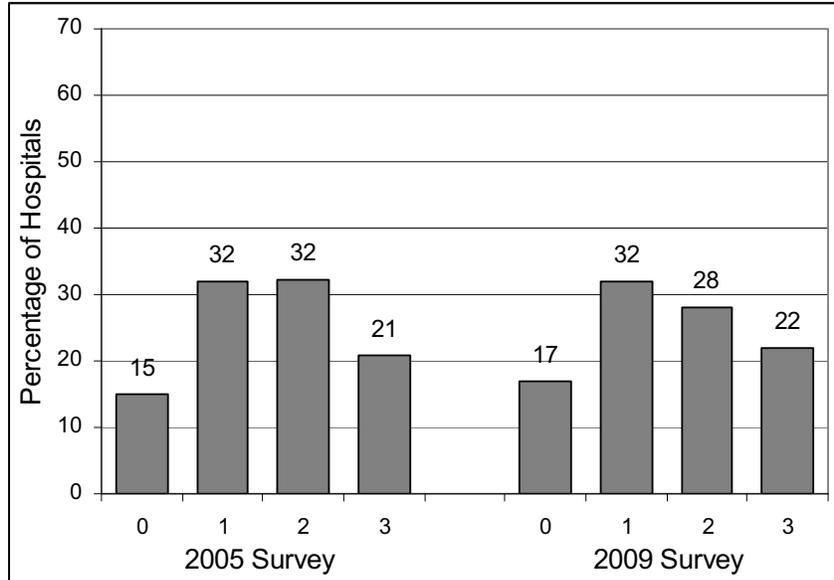


Figure S.3 Timely Distribution of Adverse Event Reports, 2005 and 2009

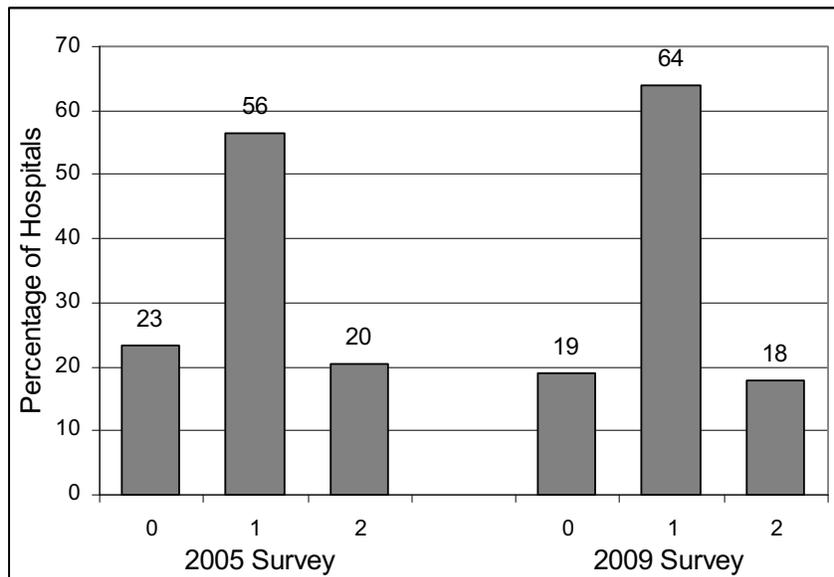


Figure S.4 Discussion with Key Departments and Committees, 2005 and 2009

Summary of Cross-Sectional Findings

These survey results for two points in time (2005 and 2009) document needs and highlight priorities for reporting improvements in U.S. hospitals. In particular, the relatively poor performance of hospitals in both years on each of the four performance indexes for event reporting systems suggests that hospitals have not pursued a clear trajectory of action during the past four years to strengthen their event reporting processes. This is a troubling finding that

points to a need for additional intervention by AHRQ and other organizations to stimulate hospital actions through incentives and provision of technical support.

As AHRQ's PSO Program moves forward and growing numbers of hospitals report their adverse event data to the PSOs with which they are working, it has the potential to provide some of the needed technical support and structure for improvement. The results from the 2005 and 2009 surveys establish baseline data that can be used in future monitoring of improvement progress by hospitals through that work.

Although results from the 2005 and 2009 AERS surveys tended to be similar, a few indications of improved practices were found in comparing specific results from the two surveys. We interpret these results with caution, however, because of within-hospital inconsistencies that we found in responses to 2005 and 2009 surveys, which we discuss below. We identified the following possible trends that the combined survey results suggest may be occurring in the internal adverse event reporting systems and practices of U.S. hospitals:

- The percentage of hospitals that have computer-only event reporting systems may have increased from 2005 to 2009, which appears to have occurred across all types of hospitals, with or without a patient safety program.
- Hospitals may have been obtaining increased information on adverse events from two sources: hotlines and hospital rounds or walk-arounds.
- Hospitals may have improved on three of the four indexes we created to summarize hospital performance on four key aspects of event reporting processes:
 - Supportive environment for reporting – improvement in both measures from which the index is constructed.
 - Types of staff reporting – improvement related to increased reporting by technicians, therapists, pharmacy staff, or other staff; no increase in reporting by physicians.
 - Timely distribution of adverse event reports – no improvement in this index
 - Discussion with key departments and committees – improvement related to increased rates of discussion with committees; no increase in discussion with departments.
- Compared with 2005, hospital characteristics appear to be less important in 2009, as factors related to the various measures of hospital reporting performance.
- Critical access hospitals and hospitals with patient safety programs, both of which performed better than other hospitals in 2005, continued to show better performance in 2009, but they did not differ from other hospitals in improvements made from 2005.

LONGITUDINAL CHANGES FOR THE 2005–2009 HOSPITAL COHORT

The sample of hospitals for the 2009 AERS survey was designed to allow us to analyze within-hospital changes in adverse event systems and practices over time. Both the 2005 and 2009 surveys generated data on baseline reporting practices by hospitals before national initiatives were undertaken to support hospitals in improving their reporting processes. Therefore, we did not expect large changes in the measures included in the survey. For the longitudinal analysis, we hypothesized that some of the hospitals would show improvements in their reporting practices and others would not. Conversely, we did not expect the performance levels of many hospitals to decrease between 2005 and 2009. To test these hypotheses, we analyzed data for the cohort of 952 hospitals that had responded to both the 2005 and 2009

surveys, which allowed us to compare responses given by each hospital regarding their adverse event reporting systems and practices.

Although our goal was to analyze within-hospital changes in adverse event systems and practices over time, we quickly found inconsistencies in the information provided by the risk managers at the cohort of hospitals in the 2005 and 2009 surveys. Our results suggested that some of the hospitals had changed their reporting systems in the four-year period, some in the direction of improvements and others in the opposite direction.

For example, of the hospitals that reported they had paper-only reporting systems in 2005, 43.9 percent reported in 2009 that they had paper-and-computer systems and another 5.0 percent reported they had computer-only systems. These changes represent upgrades, which one might expect to take place. However, responses that indicated changes in the opposite direction raised concern regarding the accuracy of the risk managers' responses. For hospitals with paper-and-computer systems in 2005, 10.4 percent said in 2009 that they had paper-only systems. Further, for hospitals with computer-only systems in 2005, 36.1 percent said in 2009 that they had paper-and-computer systems and another 0.9 percent said they had paper-only systems.

We also examined patterns across 2005 and 2009 for hospitals' production of summary reports of adverse events reported into their systems. For this measure, 95.7 percent of the hospitals reported that they produced reports in 2005. Of these, 3.4 percent reported they did not produce reports in 2009. This change is plausible because production of reports is an operating process that would be easy to change, so it would be more likely to occur than the apparent reduction in types of system. Conversely, a small number of hospitals said they did not produce reports in 2005, and 90.1 percent of them said they did in 2009, which also is reasonable.

We found quite mixed results in the cross-tabulations of the four index scores for 2005 and 2009, with substantial percentages of hospitals that had higher scores on the indexes in 2005 having lower scores in 2009. For example, as shown in Table S.2, only 47.8 percent of hospitals that had the highest score on the Supportive Environment index in 2005 also had the highest score in 2009; another 42.2 percent had a score of 1 and 10.0 percent had a score of 0.

Table S.2
Hospital Scores on Performance Index for Supporting Environment, 2005 and 2009

Supportive Environment Index in 2005	Number of Responses	Supportive Environment Index in 2009		
		0	1	2
0	195	37.4	43.1	19.5
1	418	19.6	44.3	36.1
2	289	10.0	42.2	47.8

We note that the responses from the risk managers suggested that many hospitals' performance on reporting process measures had improved, even as we found declines for other hospitals. If the apparent declines were not real, however, they also cast doubt on the accuracy of the apparent improvements reported by other hospitals.

We estimated multivariate logistic regression models to explore potential contributing factors for these reporting inconsistencies, including a set of hospital characteristics and a measure of risk manager turnover between 2005 and 2009. We could not find any factors that

were clearly affecting apparent declines in hospital performance. We found no effect of any of the hospitals structural characteristics on performance declines, and effects of turnover in risk manager staff were limited to two of the performance measures.

The risk manager turnover variable was a dichotomous variable that was given the value=1 if the risk manager reported he/she had a nursing degree in only one of the two years, otherwise it had a value=0. We chose this measure because it represented one professional degree, and there was a substantial turnover in risk managers between 2005 and 2009, based on nursing degree.

Our analysis of the effects of risk manager turnover was limited by the absence of a measure that captured all of the turnover that occurred from 2005 to 2009. Because we did not include a question on the 2009 survey that specifically asked whether a risk manager also had completed the 2005 survey, we did not have a definitive measure of the extent of turnover that occurred. However, we have anecdotal information from our survey data collection staff that as many as half of the risk managers that responded to the 2009 survey may have been new since we conducted the 2005 survey.

We know from previous work that hospitals are in the relatively early stages of implementing patient safety practices in general, including adverse event reporting practices, which are likely to involve both successes and failures (Farley et al., 2009). For example, the decommissioning of poorly performing health information systems could result in a shift of a hospital's reporting system from a computerized to paper-based system. Changes in hospital leadership or risk management staff also may have brought with them a change in priorities away from some patient safety activities. In addition, concerns about lack of protection from legal discovery, and related liability exposure, could lead a new manager to move away from reporting activities. Given this context, some of the apparent declines in performance on the measures used in these surveys may be real.

We believe, however, that some of the observed declines in performance may be related to differences in perspectives by new risk managers regarding the reporting practices at their hospitals, or differences in interpretation of the survey questions. Either factor could lead to differences in how they completed the survey, compared to their predecessors. It was found in the field testing of the original survey that the risk managers were the best positioned personnel in the hospital to provide valid information (Ginsberg et al., 2003), but we also knew that they would be using some judgment in responding to the survey questions.

Given that AHRQ is using this survey to track effects of the PSO program on hospitals' event reporting practices over time, it will be important to ensure that the survey responses are as accurate and consistent over time as possible. Therefore, there is a need to examine this issue further before proceeding with another survey. We suggest that a study be performed using case study methods, to explore the reasons for the apparent declines in performance on the reporting process measures. This information can only be obtained by talking with the risk managers and other management staff at some of the hospitals in the sample whose risk managers changed between 2005 and 2009. This study should assess how much of the apparent declines in reporting process performance was real, as opposed to being differences in staff definitions or perceptions of those processes. The study results would guide revisions to the questionnaire for future surveys, to increase the accuracy and consistency of the survey data collected.

USE OF THE AHRQ PATIENT SAFETY TOOLS BY U.S. HOSPITALS, 2009

Since the inception of AHRQ's patient safety initiative, the agency has developed an array of tools that hospitals (and other providers) can use to support their patient safety activities. AHRQ has been actively disseminating these tools over the past few years.

The survey contained a set of questions that asked if a hospital had used each of a list of patient safety tools developed by AHRQ (with yes/no responses). A total of 10 tools were addressed, which were organized into three groups, as well as the toolkits developed by the Partnerships in Improving Patient Safety projects funded by AHRQ. The groups of tools were general patient safety products, publications and materials, and AHRQ patient safety Web sites.

The results of the AERS survey indicate that the AHRQ patient safety tools are being used actively in the U.S. hospital community. Although rates of use vary across the specific tools, we estimate that more than half of all hospitals in the U.S. are using at least one tool in each of the three tool categories (patient safety products, publications and materials, and Web sites). Lower use was found, however, for the toolkits developed by the PIPS projects. In addition, we estimated use rates of less than 20 percent for several specific tools: the AHRQ fact sheets for patients (19.4 percent), TeamSTEPPS (19.2 percent), the WebM&M Web site (15.7 percent), and the Patient Safety Improvement Corps DVD (3.1 percent).

This information on hospital use of the AHRQ tools can guide future steps by AHRQ to modify or update tools and to focus tool dissemination strategies. The first step would be for AHRQ to assess estimated levels of use for each of the specific tools, relative to the patient safety priorities it has established, in order to identify which tools should be the focus of additional development or dissemination efforts. Hospitals may not be using some tools because they are not aware that the tools are available, or because the tools are not useful to them. If lack of awareness of a tool is a problem, then AHRQ's strategy would be to pursue more active dissemination of the tool. If lack of usefulness is a problem, then AHRQ may have to invest further development resources for tool modification, including seeking input and guidance from hospitals regarding improvements needed to make it more useful to them.

Another, more indirect, strategy to encourage greater use of the AHRQ patient safety tools by hospitals might be to work actively with hospitals to help them establish organized and comprehensive patient safety programs. The survey results show a strong relationship between having such a safety program and use of AHRQ tools. It is not clear, however, what the nature or direction of causality might be in this relationship. Hospitals may have made a broad commitment to patient safety, through which they both established strong patient safety programs and used the tools available to them, including the AHRQ patient safety tools. On the other hand, hospitals might first have made active use of the AHRQ tools and then developed a strong safety program, or they might have done the reverse, starting with the safety program and then seeking tools. Regardless of the underlying dynamics, encouraging hospitals to take a comprehensive approach to patient safety could enhance their likelihood of making improvements as well as their use of AHRQ tools that are available to help them in these efforts.