

WORKING P A P E R

Assessing the Diffusion of Safe Practices in the U.S. Health Care System

Interim Report to the Agency for
Healthcare Research and Quality

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**Assessing the Diffusion of Safe Practices in the
U.S. Health Care System:
Interim Report to the Agency for Healthcare Research and Quality**

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PREFACE

In 2000, the U.S. Congress mandated the Agency for Healthcare Research and Quality (AHRQ) to take a leadership role in helping health care providers reduce medical errors and improve patient safety. AHRQ is fulfilling that mandate through a patient safety research and development initiative, which is now at the end of its fourth year of operation. In September 2002, AHRQ contracted with RAND to serve as the patient safety evaluation center for this initiative. The evaluation center is responsible for performing a longitudinal, formative evaluation of the full scope of AHRQ's patient safety activities, and providing regular feedback to support the continuing improvement of the initiative over the four-year evaluation period. The contract includes a two-year option for analysis of the diffusion of safe practices in the health care system, for work to be performed from October 2006 through September 2008.

This interim report presents an update on the work RAND has performed during FY 2007 for the practice diffusion assessment. The assessment encompasses five specific analytic components, each of which addresses a distinct aspect of patterns of practice adoption and diffusion across the country. These include development of a survey questionnaire to use for assessing adoption of the safe practices endorsed by the National Quality Foundation, community studies of patient safety practice adoption and related activities, continued analysis of trends in patient outcomes related to safety, lessons from hospitals' use of patient safety tools developed by AHRQ, and a second fielding of the hospital adverse event reporting system survey.

The contents of this report will be of primary interest to AHRQ, but should also be of interest to national and state policy makers, health care organizations, health researchers, and others with responsibilities for ensuring that patients are not harmed by the health care they receive.

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SECTION 1. INTRODUCTION AND BACKGROUND

In early 2000, the Institute of Medicine (IOM) published the report entitled *To Err is Human: Building a Safer Health System*, calling for leadership from the U.S. Department of Health and Human Services (DHHS) in reducing medical errors, and identifying AHRQ as the lead agency for patient safety research and practice improvement (IOM, 2000). Soon thereafter, the U.S. Congress funded the Agency for Healthcare Research and Quality (AHRQ), in the Department of Health and Human Services, to establish a national patient safety initiative. This initiative represents one of numerous, important patient safety efforts being undertaken by organizations across the country, in which AHRQ has played a leadership role. It has done so by funding a portfolio of patient safety research and implementation projects to expand knowledge in this area, providing motivation and guidance for the activities of others, and integrating its work with that of other public and private organizations to achieve synergy through collaboration.

AHRQ contracted with RAND in September 2002 to serve as the evaluation center for the patient safety initiative. The evaluation center was responsible for performing a longitudinal evaluation of the full scope of AHRQ's patient safety activities, and providing regular feedback to support the continuing improvement of this initiative. As specified by AHRQ in the evaluation contract, the overall evaluation design was based on the Context-Input-Process-Product (CIPP) evaluation model, which is a well-accepted strategy for improving systems that encompasses the full spectrum of factors involved in the operation of a program (Stufflebeam et al., 1971; Stufflebeam et al., 2000). The core model components are represented in the CIPP acronym:

- ***Context evaluation*** assesses the circumstances stimulating the creation or operation of a program as a basis for defining goals and priorities and for judging the significance of outcomes.
- ***Input evaluation*** examines alternatives for goals and approaches for either guiding choice of a strategy or assessing an existing strategy against the alternatives, including congressional priorities and mandates as well as agency goals and strategies; stakeholders' perspectives are also assessed.
- ***Process evaluation*** assesses progress in implementation of plans relative to the stated goals for future activities and outcomes; activities undertaken to implement the patient safety initiative are documented, including any changes made that might alter its effects, positively or negatively.
- ***Product evaluation*** identifies consequences of the program for various stakeholders, intended or otherwise, to determine effectiveness and provide information for future program modifications.

This evaluation was completed in September 2006, culminating in a final report that presents evaluation findings over the full four-year evaluation period (Farley et al., 2007c). The final report was preceded by three annual reports, each of which documents the status of the patient safety initiative as of September 2003, 2004, and 2005 (Farley et al., 2005; Farley et al., 2007a; Farley et al., 2007b).

Another two years of work are being undertaken by the Patient Safety Evaluation Center to document and analyze the extent to which patient safety infrastructure and practices are being put into place across the nation's health care system. Within the framework of the CIPP evaluation model, we are focusing entirely on the product evaluation, which encompasses effects on patient safety outcomes as well as on system structures, practices, and stakeholders participating in the system.

This Interim Report presents the current status of RAND's work on each of a set of specific assessments that we identified to develop information on progress in adoption of safe practices in the field. Five assessments have been designed, of which three have been active during FY 2007. A fourth assessment is starting early in FY 2008, after giving sufficient time for experience in the field to accumulate to provide useful information for the assessment. Each of the assessments being performed, and the approaches being taken, are summarized here. The next three sections of the report (Sections 2 through 4) contain information on activities and preliminary results (when applicable) for each of the three active assessments. Section 5 summarizes future work planned for the remaining two assessments.

CURRENTLY ACTIVE DIFFUSION ASSESSMENTS

Assessment of Adoption of NQF Best Practices for Patient Safety

The greatest challenge in developing data on the diffusion of patient safety practices in the U.S. health care system is the inability to measure effectively the extent to which each practice actually is being used by providers. Therefore, we see development of data collection instruments as the first important step to take in this area. We have been working to develop a survey questionnaire that can be used to obtain information from providers about their implementation of some of the NQF safe practices released in late 2006. We will include in this instrument questions that can be used to assess the characteristics and motivations of health care providers that are more likely to pursue adoption of safe practices. The questionnaire will be validated by working with 16 health care organizations that will complete the survey, after which we will compare these results to what we observe from case studies conducted in our community-based study of practice diffusion (described below).

Assessment of Communities' Actions to Improve Safety Practices

This analysis is being done to collect information on how local communities are moving forward with adoption of patient safety practices among health care providers, and to identify the dynamics and issues that might guide how to structure data collection on practice diffusion for a broader number of providers (including the instrument developed that addresses the NQF best practices). We have selected four focus communities that have been studied by the Center for Studying Health System Change (HSC) and also are part of the Leapfrog initiative. We are conducting data collection activities, telephone interviews, and site visits with health care leaders within those communities, to characterize the extent to which they have implemented initiatives to improve patient safety practices, including their use of tools developed by AHRQ. This approach will enable us to draw upon the wealth of information already collected by the HSC on the community environments and providers. It also will allow us to relate choices and progress in practice adoption to other characteristics of the providers and the environments in which they deliver care.

Continued Assessment of Trends in Patient Outcomes

Much of the outcome trend analysis performed during the third and fourth years of the patient safety evaluation will be continued during the next two years, adding data for the years 2004 and 2005 to the trends. Any effects of the patient safety initiative on outcomes might begin to be seen in these two years. We also plan to review the high priority outcome measures identified in the Delphi consensus process conducted with patient safety experts in 2006, for possible addition of some of these measures to the ones we are tracking. Additional geographic analyses will be performed, continuing the analysis started in 2006 to identify possible patterns of outcome differences or changes in relation to possible patterns of diffusion of safe practices in the health care system (e.g., in multi-hospital systems).

FUTURE DIFFUSION ASSESSMENTS TO BE PERFORMED

Use of Patient Safety Improvement Tools Developed by AHRQ

Effects of the Hospital Survey on Patient Safety Culture (HSOPS) on Hospitals' Practices

In this assessment, we are working with a sample of hospitals that have submitted their culture survey data to the HSOPS benchmarking database, which is managed by Westat under contract to AHRQ. We will gather information on the hospitals' experiences in using the survey and will document the actions or changes that have occurred in their organizations as a result of the information they have obtained from the survey. The data will be collected through a series of interviews with representatives from these hospitals. We also are drawing upon information from Westat's analysis of survey data to help inform the interpretation of the interview results. We will collaborate with Westat in carrying out this work, so that results will be useful for its technical support work as well as for policy considerations.

Use and Effects of the TeamSTEPPS Package for Health Care Organizations

The initial emphasis of the evaluation of use of TeamSTEPPS will be to establish a mechanism to document the extent to which providers obtain copies of the TeamSTEPPS package of tools developed by AHRQ and DoD and, if possible, to identify those providers. We also will interview a sample of hospitals that are using the TeamSTEPPS package, which can serve as focused case studies to provide information on the dynamics of implementing TeamSTEPPS and their experiences in doing so.

Trends in Use of Hospital Adverse Event Reporting Systems

It currently is planned that the Hospital Adverse Event Reporting System (AERS) survey will be fielded for a second time in 2009, although the exact timing will depend on the timing for AHRQ's implementation of the patient safety organization (PSO) program. In preparation for data collection, the questionnaire will need to be revised to refine information already being collected, as well as to provide evaluation information specific to PSO implementation. Due to delays in PSO implementation, it is possible that the survey will need to be fielded later than 2009 and, therefore, this work may be done by another organization. If RAND does field the second survey, the revised instrument and sampling strategy will be submitted to OMB for updating of the existing OMB approval. Analyses will be done to characterize hospital event reporting systems and practices, with comparisons to results from the first AERS survey.

SECTION 2.

NATIONAL SURVEY QUESTIONNAIRE ON ADOPTION OF NQF SAFE PRACTICES

SPECIFIC AIM

In this part of the assessment of the diffusion of safe practices in the health care community, RAND is developing survey items that can be used in a national-level survey to estimate the extent to which the 30 safe practices endorsed by the National Quality Forum have been adopted by hospitals across the country (NQF, 2007). The goal is to create a survey that will document whether hospitals are putting systems into place that implement the safe practices, and are tracking their own performance, as it relates to these practices. This survey focuses on the structures and processes that hospitals have in place that indicate they have implemented the safe practices. This survey is not focusing on outcomes, nor does it contain questions that judge the performance of hospitals.

ACTIVITIES COMPLETED OVER THE PAST SEVERAL MONTHS

Three basic types of activities have been undertaken in the past year, as we designed our approach to developing the survey questionnaire for documenting hospitals' use of the NQF safe practices. The first was to establish a collaboration with the Leapfrog Group, which has collected data on hospitals' use of the NQF safe practices for the past two years in its annual hospital survey. The second was to gather historical and contextual information from key individuals involved in both the development of the safe practices and the Leapfrog survey. This allowed us to understand as clearly as possible the nature of related work performed to date, and how it provides a basis for—or differs from—the survey questionnaire and sampling strategy we are developing. The third activity was to identify which of the safe practices are amenable to documentation using a hospital survey (and which are not), and to begin drafting survey items for each of the practices.

The Leapfrog Group staff responded positively to our initial inquiry, in which we described the work we were tasked to do and suggested that RAND and Leapfrog collaborate in this effort. We agreed to work together throughout RAND's survey development process, seeking opportunities to achieve consistency (and hopefully some common survey items) between the two surveys. The Leapfrog staff reported that they were seeking opportunities (1) to ensure that hospitals were being held to one consistent standard by the various standard-setting jurisdictions, and (2) to shorten the Leapfrog survey to reduce the data collection burden for participating hospitals. In this discussion, they also made it clear that the Leapfrog focus was on public reporting for the participating hospitals, which also should provide a stimulus for the hospitals to pursue quality improvement initiatives to strengthen their use of the practices. Leapfrog does not have a goal of collecting nationally representative data, which is the purpose of the survey on which RAND is working.

Discussions with Leapfrog Group staff and other key individuals yielded valuable background information, with the following highlights:

- The Leapfrog staff shared numerous specific lessons and issues that have emerged in their administration of the Leapfrog survey, which have helped guide our item development work.

- Discussions with Gregg Meyer and Charles Denham, the co-chairs of the NQR Safe Practices Consensus Maintenance Committee, enabled us to learn about their experiences developing the NQF safe practices, their perspective on how they relate to the three Leapfrog leaps, and their thoughts on survey design to document practice implementation.
- In the discussions with Charles Denham, we also learned about his role in working with Leapfrog to develop its survey and, in particular, his view that the Leapfrog survey has quality improvement (QI) goals. As such, many of the survey questions are designed to capture stages in the QI process that precede full implementation of a practice (e.g., planning stage, small-scale testing, partial implementation), which also can increase hospitals' scores by giving them credit for progress toward this end. This highlighted the difference in goals for the Leapfrog survey and the national tracking of actual practice diffusion for the survey that RAND currently is developing.
- In discussions with representatives from the Joint Commission, we learned how they assess patient safety practices in their accreditation process. Because of the nature of the Joint Commission site visits and data collection, we could not identify opportunities to draw upon that resource to develop national estimates of the diffusion of these practices.

Examination of Survey Feasibility for the NQF Safe Practices

A team of RAND researchers—including staff from our Survey Research Group (SRG) and two practicing physicians with patient safety experience—reviewed each of the 30 NQF safe practices to determine which of them were most amenable to assessment with a standardized, self-administered survey of hospitals. A key consideration was whether documentation of adherence to the safe practice was better done using in-person observation or medical chart data. We generally determined that a safe practice was not amenable to assessment through a hospital survey if the central component of the practice necessitates observation or chart data to ensure that implementation has occurred. Exceptions to this rule were made in two instances (Safe Practices #4 and #10), given the importance of these particular safe practices.

We determined that eight of the 30 safe practices cannot be assessed effectively through an organizational survey, for the reasons stated below.

- Practice 2 (teach back of consent or information delivered to patients): Use of the teach-back method cannot be evaluated via a survey because the teach-back actions happen in “real time” during patient interactions and are not documented reliably in hospital records. Observation is required to assess whether this safe practice has been implemented appropriately.
- Practice 8 (communication/transmittal of care information to patients and families): This type of communication cannot be evaluated via a survey because the communications take place in “real time” in many locations across the hospital and are not documented in hospital records. Observation is required to assess whether this safe practice has been implemented appropriately.
- Practice 9 (read back of verbal or phone orders): This type of communication cannot be evaluated via a survey because read backs happen at the time orders are given and, although order verification may be documented subsequently in information systems, this does not ensure that verification occurred in the immediate exchange between clinicians.

Therefore, observation is required to assess whether this safe practice has been implemented appropriately.

- Practice 19 (ventilator bundle intervention practices): A key component of this safe practice requires physical manipulation of the patient (opening airway) that is not likely to be recorded in the medical chart. Observation is required to assess whether this safe practice has been implemented appropriately.
- Practice 20 (prevention of CV catheter-associated blood stream infections): Key components in the implementation of this safe practice involve washing hands, using barrier protection (e.g., cap, mask, sterile gloves) and the selection of catheter site. Observation is required to assess whether these steps have been properly implemented. While it is possible to inquire in an organizational survey about the use of chlorhexidine by asking if the hospital requires use of a kit with chlorhexidine in it, this practice is only one component of the multi-pronged prevention strategy outlined in this safe practice. As such, RAND concluded that this safe practice could not be assessed through a survey.
- Practice 21 (prevention of surgical site infections): Key components of this safe practice can only be obtained via clinical chart review (e.g., timing of pre- and post-operative antibiotic administration; glucose management). As such, RAND determined that this safe practice could not be assessed via a survey.
- Practice 22 (handwashing): Assessment of appropriate handwashing cannot be evaluated via a survey because this action should be taken by clinicians at multiple times and locations throughout the hospital, and is not documented in hospital records. Observation is required to assure that this safe practice has been implemented appropriately.
- Practice 24 (provide patients with information on facilities with reduced risk for high-risk elective cardiac procedures): It seems that this practice is more appropriately carried out in a physician's practice or other setting, when patients are considering which group or hospital to use, rather than in the hospital that will be performing the procedures. This type of communication with patients cannot be assessed via a hospital survey.

Design of a Survey Development Strategy

To inform our survey development, we first examined data from the Leapfrog 2006 and (preliminary) 2007 surveys. We found that the data gave us basic information on frequency of responses, but because of the purpose and design of the Leapfrog survey (e.g., no coding for “no” answers), it did not provide other psychometric information for use in item development.

Survey items are being drafted by staff from RAND's Survey Research Group, in consultation with RAND researchers and clinicians. RAND has created groupings of safe practices based on similarity of topic (e.g., medication safety) as well as hospital jurisdiction, such that one or two departments could complete the survey for all practices in a defined group (see Appendix A). To minimize data collection burden, RAND plans to use these groupings to explore development of a modular sampling strategy, whereby any given hospital in the sample will complete survey questions for a subset of the practices included in the survey.

RAND is sharing drafts of survey items with Leapfrog in a collaborative and iterative process, early in the item development process. RAND also will meet with AHRQ staff twice

during the development and testing process, to review the items developed and the results of the validation tests performed as described below.

TIMELINE FOR REMAINDER OF THE DEVELOPMENT WORK

As of September 15, 2007, the RAND team has developed first drafts of survey items for the following safe practices: 3, 5, 6, 7, 12, 14, 15, 16, 18, 23, and 29. Once a set of draft survey items has been developed, RAND will qualitatively test them with four hospitals (two in Los Angeles and two in Pittsburgh), with revisions made as appropriate. The revised survey items then will be tested further with 16 hospitals in the four communities (four per community) that RAND is studying in the community action case studies (see Section 3 for details). We will assess the following aspects of practice modules and survey items via qualitative testing:

1. Interpretation of key phrases as well as item intent (Do terms and phrases have consistent meaning across respondents? Is respondent understanding of item intent uniform?)
2. Data acquisition (Who is the appropriate respondent within an organization for a module or modules? Within a module, is the data required to answer an individual item readily accessible to the respondent?)
3. Disconnect between our request and facility data (Related to data acquisition, does our response task match the data the respondent will use to frame his/her answer?)
4. Feasibility (Also related to data acquisition. Does the information we are asking for exist? Are facilities willing to provide the information we request?)
5. Burden (How many person hours of effort are required to collect the information needed to complete a module? How many person hours of effort are required to complete a module once information is collected? Can we separate the two?)
6. Mode (Is a paper survey the only option? Is there any utility in a Web-based survey?)

Assessing these aspects of modules and survey items will require both cognitive interview sessions (which would help to address issues 1 through 4 and 6) and a practical application of the survey in which we observe the completion of a practice module or modules—or collect process data on the completion of a practice module or modules (to address issues 2 through 6).

Work will continue on the drafting, reviewing, and testing of survey items for the practices to be included in the survey questionnaire according to the following schedule:

- Through January 2008: Draft and review items internally, and with Leapfrog Group
- Late 2007/early 2008: Qualitatively test first version of the survey with two hospitals each in Los Angeles and Pittsburgh
- January/February 2008: Review practice selection, draft survey items, and other results of work-to-date in a meeting with AHRQ staff.
- Spring 2008: Validate revised version of the survey in 16 hospitals in four sites (Cleveland, Greenville SC, Indianapolis, Seattle)
- Summer 2008: Finalize survey and sampling strategy

SECTION 3.

UPTAKE OF PATIENT SAFETY PRACTICES IN FOUR U. S. COMMUNITIES

SPECIFIC AIMS

1. To trace the evolution of patient safety efforts in four communities that are typical of local health care markets in various regions of the United States. The unit of analysis is the community. The focus of the study is to document patient safety initiatives and trends over time across three specific sectors within each community—hospitals, ambulatory settings, and long-term care facilities.
2. To understand in particular how hospitals in those communities made decisions about the adoption of safe practices and how they implemented the same within their institutions. The unit of analysis is the individual hospital. The focus of the study will be on a qualitative validation of the RAND/Leapfrog survey of safe practices in hospitals.

PRIOR STUDIES

Since 1996, the *Community Tracking Study* (CTS), led by the Center for Studying Health System Change (HSC), has conducted biannual site visits to 12 nationally-representative metropolitan areas in order to study “how the interactions of providers, insurers, policymakers and others determine the accessibility, cost and quality of locally delivered health care.” In 2002–2003, HSC conducted a special data collection on patient safety, in which investigators contrasted the patient safety experience of five CTS communities that were also Leapfrog regional roll-out communities¹ (Boston, Lansing, Northern New Jersey, Orange County and Seattle) with the remainder of the CTS communities (Cleveland, Greenville, Indianapolis, Little Rock, Miami, Phoenix and Syracuse). Since 2003, an additional three CTS communities (Cleveland, Indianapolis and Greenville) have become Leapfrog regional roll-out communities.

The rationale for using the CTS sites is that they are nationally representative and HSC already has developed a wealth of contextual information about these health markets, and will continue to do so over time. The rationale for using the Leapfrog regional roll-out sites within the CTS communities is that we will have access to Leapfrog survey data from those sites, as well as Leapfrog contacts within the sites to assist in identifying potential respondents.

SELECTION OF SITES FOR THE COMMUNITY STUDY

Using case study methods, we will assess the uptake of patient safety practices in four of the CTS/Leapfrog communities in 2007–2008. This study period will be approximately five years after HSC’s initial data collection on patient safety, and it will be eight years after the publication of the IOM’s *To Err Is Human* (IOM, 2000) and the start of the AHRQ patient safety initiative.

¹ Leapfrog is using a regional roll-out strategy “to integrate community-wide, multi-stakeholder collaboration.” Regional leaders must be Leapfrog employers or employer coalitions that are expected to “invite not only other local employers but also local hospitals, health plans, physicians, labor unions, consumer groups and others to participate in implementing the Leapfrog action plan.” A Leapfrog regional leader may take on an entire state, part of a state, or only the MSA in which the employer is located—meaning that the CTS site and the corresponding Leapfrog regional rollout site may not always be contiguous.

Criteria for Site Selection

In order to select the four CTS/Leapfrog sites for our study, we collected data on the eight CTS/Leapfrog rollout sites from a number of sources, including information from the Community Tracking Study site, the Area Resource File maintained by the DHHS Health Resources and Services Administration, and internet searches to identify existing patient safety initiatives in the sites. This information was then sorted into a matrix to display the following key parameters to aid in our decision making:

1. Demographics (e.g., population, ethnic diversity, median family income, age 65 or older, number and type of major employers, employment rate, persons living in poverty, percentage Medicare/Medicaid, persons without health insurance, percentage in nursing homes).
2. Health system characteristics (e.g., total number of hospitals, staffed hospital beds per thousand population, penetration of health maintenance organizations, Medicare-Adjusted per Capita Costs rate, types of hospitals, major hospitals, concentration of hospital systems, percentage in hospital networks, presence of safety net providers, total skilled nursing facilities, total skilled nursing, dominant insurers, Medicare managed care penetration rate).
3. Health professionals (e.g., physician per thousand population, physician specialists per thousand population).
4. Health care utilization (e.g., adjusted inpatient admission per thousand population, persons with any emergency room visit in past year, persons with any doctor visit in past year, persons who did not get needed medical care in past year, privately insured families with annual out-of-pocket costs of \$500 or greater).

And two dimensions related to patient safety:

5. Patient safety initiatives (at the state, community and facility level).
6. Penetration of health information technology (health IT) (e.g., electronic health records in hospitals, ambulatory care settings and/or nursing homes; medical records and health IT technicians per thousand).

Sites Selected for the Community Study

Based on an analysis of this information, we chose the following sites for the study:

Seattle WA
Cleveland OH
Indianapolis IN
Greenville SC

All of these sites demonstrated a sufficient level of patient safety activity to provide useful information for the study, with sufficient variation in activities to allow comparisons. In addition, the sites represent different geographic regions, and they exhibit a diversity reflective of typical communities in the U. S. on a number of factors of interest (including types of patient safety activities, and the organization of local healthcare services and insurance). These sites were also favored over Boston (the preponderance of academic medical centers and other specialty services make it an outlier compared to other community health systems); Northern New Jersey (much of the patient safety activity appeared to be the result of “top-down”

regulatory action by the state); Orange County (less apparent patient safety activity); and Lansing (too few hospitals for our purposes).

We also are interested in exploring the concept of “trickle-down” patient safety activity in the Boston and Orange County sites, to the extent that available funds permit. In both cases, there has been substantial activity aimed at improving patient safety at one level of the system, but it is not clear when, and to what extent, these activities have stimulated work by individual mainstream health care providers to improve safety within their organizations. For Orange County, the activity has been at the state level, with numerous governmental and private initiatives underway that should be affecting all counties within the state. For Boston, the intense activity has been on the part of the large and sophisticated health care systems that serve more than local populations. If financially feasible, we will expand our telephone data collection to these two communities, to also examine how these forces have—or have not—affected what community hospitals, medical practices and clinics, or long-term care organizations are doing to provide safer health care for their patients.

DATA COLLECTION AND ANALYSIS

Phase I. The Evolution of Patient Safety Initiatives in Four U.S. Communities

The primary data collection will be a set of telephone interviews with *boundary spanners*² in the four communities. Our first step will be to work with HSC and Leapfrog Group, as well as searching Web sites and reviewing our files on AHRQ initiatives and funding, to identify all stakeholder organizations that have been involved in patient safety in those communities. We envision starting with the organizations and individuals we can identify *a priori* and then use ‘snowball’ sampling³ until we have identified at least ten boundary spanners knowledgeable about the relevant stakeholder groups (i.e., local hospital, ambulatory, and long-term care providers, health plans, safety net providers, employers, key government agencies, policymakers, and consumer groups).⁴ Using a semi-structured interview guide, the team for that site will conduct telephone interviews focused on understanding the community-level dynamics around patient safety—who are the actors, how much and what type of interaction has there been among them with respect to patient safety issues, what initiatives have been undertaken and in what settings, what progress has been made to date, and what have been the barriers and facilitators to change, particularly at the community level.

Phase II. Adoption of Safe Practices within Four Hospitals in Each Study Community

Once we have a clear picture of the evolution of patient safety initiatives in these communities, we will turn our attention to the uptake of specific safe practices within four hospitals in each community. We want to understand the main sources of information and influences on patient safety for each hospital (including AHRQ and Leapfrog), how decision-makers in the hospital prioritize their patient safety efforts and specific practices, which safe practices they have chosen to implement, and their strategies and experiences in implementing

² ‘Boundary spanners’ are individuals within organizations who link their organization with the external environment.

³ ‘Snowball sampling’ is a technique for developing a research sample where existing study subjects help to identify future subjects from among their acquaintances.

⁴ Each boundary spanner may be knowledgeable about more than one stakeholder group within the community, which will greatly reduce the number of informants necessary under this procedure.

different types of practices. We will use the most recent Leapfrog survey data to identify two types of hospitals in each community—‘early adopters’ and ‘later adopters.’ If possible, we will also have at least two academic medical centers and two community hospitals.

Data collection will be by site visit. We will conduct a single three-day visit to each community, which will allow time for a half-day visit to each of four hospitals. We expect the hospital respondents to be similar to those respondents interviewed by HSC in their study—including the patient safety officer or person responsible for or most knowledgeable about the hospital’s patient safety initiatives, and the director of patient care services. While we are interested in talking to top level staff, we also hope to be able to talk to clinicians and other frontline staff who are involved in implementing the practices on a daily basis. In addition, for those safe practices for which it will be appropriate, we hope to be able to do a ‘walk-around’ in an appropriate unit to observe the practice. We will also be able to draw information from the broader set of interviews for those sites (e.g., interviews with community stakeholders such as health plans, medical groups and consumer groups).

In addition to providing more detailed information on the specific patient safety activities of hospitals within the communities, this assessment will be the vehicle for our qualitative validation of the survey items developed to collect data on hospitals’ adoption of the NQF safe practices in a national survey (see Section 2). Therefore, once the hospitals in the study sites have been identified and have consented to participate, we will ask them to complete the Safe Practices Survey prior to our arrival for the site visit in their community. As discussed below, each hospital’s responses to the survey questions will be compared with what we learn about their practice adoption activities during the site visit, and sources of any differences in information will be explored.

We plan to conduct interviews using a semi-structured interview guide to collect information from key informants in the hospitals, such as background on the evolution of patient safety within the hospital and how other organizations—such as employers, health plans or peers—may have affected their adoption efforts.

Once we have identified which safe practices each hospital has adopted, we will examine those practices in depth. First, we will compare the overall list of safe practices implemented by each hospital with the items in the draft RAND survey, in order to identify differences in how specific practices are defined or categorized between the survey and actual practice settings, and to identify any missing safe practices (or aspects of practices).

Then, for each safe practice implemented by a hospital, we will seek to understand how to best capture the extent of implementation through a series of the following types of questions:

1. How did the hospital *operationalize* the safe practice in their setting (assuming the measure is not obvious from the NQF material)?
2. Does the hospital have a written *policy*?
3. Does the hospital have a standardized *procedure* to implement the policy?
4. *Who* is responsible for compliance (where does “the buck stop”)?
5. Does the hospital have a method to *verify* compliance?
6. Does the hospital have a method to *measure* compliance?
7. Does the hospital have data and, if so, how did it generate the numerator and denominator?

8. With whom are these data shared?

Lastly, we will review the data collected on patient safety implementation strategies and experiences within the hospital for issues that may affect any of the above questions.

Information from the interviews will be compared to responses to the RAND survey to generate qualitative findings on the validity of the survey items addressing each NQF safe practice. In addition, we will address questions regarding the appropriate respondent within an organization for survey questions on each safe practice, data availability or other data issues that affect responses to survey items, survey response burden, and survey mode.

Data Analysis

This research design will allow us to trace dynamics and pathways of dissemination of patient safety practices across levels of the health care system, from national sources of patient safety policy and research, through typical communities, to issues of adoption (and measurement of implementation) in individual health care organizations. In particular, the design will help parse out community dynamics, a relatively overlooked, but potentially critical level in the dissemination process. Specific questions that can be addressed include to what degree is the dissemination of patient safety knowledge and practices mediated (amplified, attenuated, modified) by community-level dynamics, unaffected by community-level institutions, or locally generated. The design will also allow comparison of dissemination and adoption dynamics across communities, within different care settings or sectors (hospital, ambulatory, long-term care), and by types of hospitals (community hospitals versus academic medical centers, early adopters versus later adopters).

TIMELINE FOR THE REMAINDER OF THE WORK

During the fall of 2007, we plan to conduct the telephone interview study of the evolution of patient safety initiatives in the four communities (Phase I). Our immediate next steps to prepare for this phase include:

1. Profile all hospitals in each of the four study sites using ARF and Leapfrog survey data.
2. Identify boundary spanners in the four sites.
3. Develop the telephone interview protocol.
4. Conduct telephone interviews.

We will also begin preparation for the site visit/validation study (Phase II) and intend to conduct the community site visits in the spring of 2008.

SECTION 4. PATIENT SAFETY OUTCOMES

Our work in evaluating patient safety outcomes is following several tracks during the two-year assessment focusing on practice diffusion. First, we have continued to estimate trends on several safety outcomes measures based on encounter or reporting system data. We present here updated trends using the AHRQ Patient Safety Indicator (PSI) measures and some measures from the Utah-Missouri (UT-MO) studies, as well as MDS long-term care measures. In the final report in September 2008, we will again update those trends with the latest year of available data. Where we observe changes in the trend lines for any of the measures, we also will perform analyses to estimate the statistical significance of those changes since 2003 (the earliest time at which we estimate the patient safety activities across the country might begin to show effects on patient outcomes).

Second, we are presently engaged in several analytic projects on safety outcomes which we expect to complete in the coming year, including an investigation of patterns by which changes in outcomes might diffuse across organizations in the health care system. Our analysis plans for this work also are described in this section. We see outcomes data as offering an opportunity for testing several different hypotheses about avenues for diffusion of safety performance, looking across institutions and on a broad geographic scale.

Finally, in concluding our work for the Patient Safety Evaluation Center, one of our chief aims is to provide suggestions to AHRQ regarding the structure and processes it might use for ongoing monitoring efforts on safety outcomes, either doing the work itself or through an external contractor. In *Evaluation Reports III* and *IV*, we offered a number of observations about methodological challenges associated with monitoring safety outcomes, and in the final year of our work, we will continue this inquiry.

UPDATED TRENDS IN SAFETY OUTCOME MEASURES

Over the past two years, the evaluation of trends in patient outcome measures has worked with two general sets of measures. The first set consists of already existing measures published by other organizations, including the Joint Commission Sentinel Events, MEDMARx measures, and Medicare measures for long-term care facilities based on the Minimum Data Set (MDS) data. The second set consists of measures we estimated using HCUP data based on the AHRQ PSIs (McDonald et al., 2002) and measures developed by the Utah and Missouri patient safety projects. We present here updated trends for measures that we have been tracking in the evaluation, for which the most current data are available.

Joint Commission Sentinel Events and MedMARx

The Joint Commission has a long-established policy for the facilities it accredits (most notably including hospitals) in regard to reporting of serious adverse events, which the Commission calls “Sentinel Events.” A Sentinel Event is defined as an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof, which requires immediate investigation and response by an affected health care facility. The Joint Commission has promulgated a related set of Sentinel Event guidelines, which individual facilities are expected to use to develop their own criteria for Sentinel Events, and to establish local

mechanisms for identifying and managing them. It collects information on reported Sentinel Events and publishes annual summary statistics on occurrences.

MedMARx is a voluntary reporting system for adverse medication events, which is operated by the United States Pharmacopoeia (USP) through its Center for the Advancement of Patient Safety. MedMARx is a subscription-based system in which health care facilities pay a membership fee for the reporting software and for trend analysis of their own reported data (and benchmark comparisons to other facilities). The USP publishes annual reports with descriptive statistics on aggregated MedMARx data.

In our annual patient safety evaluation reports, we have provided trends for several outcomes drawn from the JCAHO and MEDMARX annual summaries. Unfortunately, the most recent year of summary data from these two sources was not available in time to generate updated trends for this interim report. We plan to update trends on these measures in our final report in September 2008.

MDS Measures for Long-Term Care

In the final *Evaluation Report* submitted to AHRQ in September 2006 (Farley et al., 2007c), we provided updated summary trends for two patient safety measures relevant to long-term care—incidence of patient falls and of pressure ulcers among all nursing home residents. Both measures reflect injuries that residents may experience as a result of inadequate vigilance or attention in care. The Centers for Medicare and Medicaid Services (CMS) requires all nursing home facilities certified by Medicare or by Medicaid to report health-related data on their residents using the MDS form and data elements. CMS uses that data to generate quarterly reports summarizing trends in MDS measures nationally and by state, which are then published on the CMS website.

In Figure 4.1, we present an updated national trend for resident falls, with new MDS data for quarters ending June 2005 through December 2006. The quarterly rate of falls in nursing facilities has remained fairly stable at around 13 percent since 2001. This trend underscores the fact that falls affect a very significant number of nursing home residents each year, and that no change in the frequency of these events has recently been detected in the MDS tracking mechanism.

Figure 4.1 also reflects that we have not updated the trend in resident pressure ulcers since the first-quarter of 2005. Unfortunately, CMS has not published any new quarterly data on that measure since 2005—thereby demonstrating one of the focal vulnerabilities in any effort to track outcomes using published summary data, namely that the publisher may discontinue or modify its reporting practices.

CMS has continued to generate newer summary data on two other MDS measures pertaining to rates of pressure ulcers: prevalence among residents designated at high-risk, and prevalence among residents designated at low-risk. In our final report next year, we will present outcome trends for those two MDS measures. In the meantime, we reiterate our finding from *Evaluation Report IV*: that the national trend in pressure ulcer prevalence for all nursing home residents has been basically flat from 2001 through 2005.

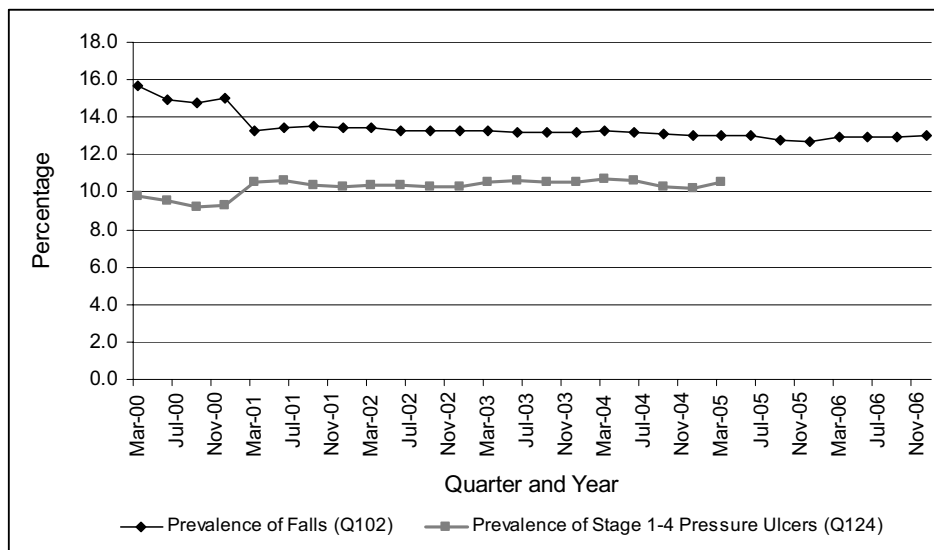


Figure 4.1 National Rates of Falls and Pressure Ulcers Among Nursing Home Residents, MDS Data, 2000–2006

Updated Trends on Encounter-Based Safety Measures

In *Evaluation Reports III* and *IV*, we analyzed trends in patient safety outcomes using encounter-based measures, including selected measures from AHRQ’s PSIs and the Utah-Missouri (UT-MO) measure set (Farley et al., 2007b; Farley et al., 2007c).⁵ These measures were estimated using National Inpatient Sample (NIS) data from AHRQ’s Healthcare Cost and Utilization Project (HCUP). In this interim report, we have extended the outcome trends by: (1) adding the latest year of discharge data (2004) available through the HCUP NIS database; and (2) adding several more PSIs to the set that we are tracking, based on recommendations from experts who participated in a Delphi consensus process, and on our independent analysis to identify canary measures among the PSIs. Table 4.1 lists the 11 specific PSI measures for which we provide updated national trends. A detailed explanation of how we selected these specific measures is provided in Appendix B. We also update trends for the UT-MO measures, based on adding the newest available year of claims data to the trends.

Trends for Selected PSI Measures.⁶ In updating the PSI outcome trends for the current report, we added a new data point for calendar year 2004. Also, we re-analyzed the HCUP NIS dataset from 1994–2004 using the latest PSI definition and software, Patient Safety Indicators, Version 3.1, released by AHRQ in March 2007. This allowed us to update the trend estimates to reflect any revisions AHRQ made in the most recent year to its PSI definitions and algorithms, to incorporate annual updates to the International Classification of Diseases, Ninth Revision (ICD-9), diagnostic codes and Diagnosis Related Group (DRG) codes, which define key data elements

⁵ The UT-MO measures set was originally developed with support from an AHRQ patient safety grant. We describe some of the features of the UT-MO measures in *Evaluation Report III*.

⁶ As was the case in *Evaluation Report IV*, all of our PSI analyses involved adjusted HCUP data, which is standardized to reflect the age and gender distributions in the at-risk population to those for the year 2000. See *Evaluation Reports III* and *IV* for more discussion and technical details regarding this adjustment.

used in calculating PSI rates. As we discussed in *Evaluation Reports III* and *IV*, shifting coding practices and annual revisions to the PSI definitions make it important to re-examine trends on a regular basis using the most current set of PSI definitions, since the measures themselves are subject to periodic change.

Table 4.1 AHRQ PSIs Used in this Analysis

PSI Measure	Analyzed in Previous Reports	Recommended by Delphi Experts	Identified as Canary Measure
Death in low mortality DRGs	X	X	
Postoperative PE or DVT	X	X	
Failure to rescue	X	X	
Postoperative hip fracture (NS)	X		
Postoperative hemorrhage or hematoma	X		
Foreign body left during procedures		X	
Postoperative sepsis		X	
Obstetric trauma–vaginal delivery with instrument		X	
Obstetric trauma–Cesarean delivery		X	
Birth trauma–injury to neonate		X	
Selected infection due to medical care			X

Figures 4.2 through 4.5 show the updated trends in outcomes, with separate trend lines for each PSI. We did not observe any radical changes in PSI rates based on the most recent year of data (2004). Three measures continue to show increasing rates (*postoperative PE or DVT*, *postoperative sepsis*, and *selected infections due to medical care*).

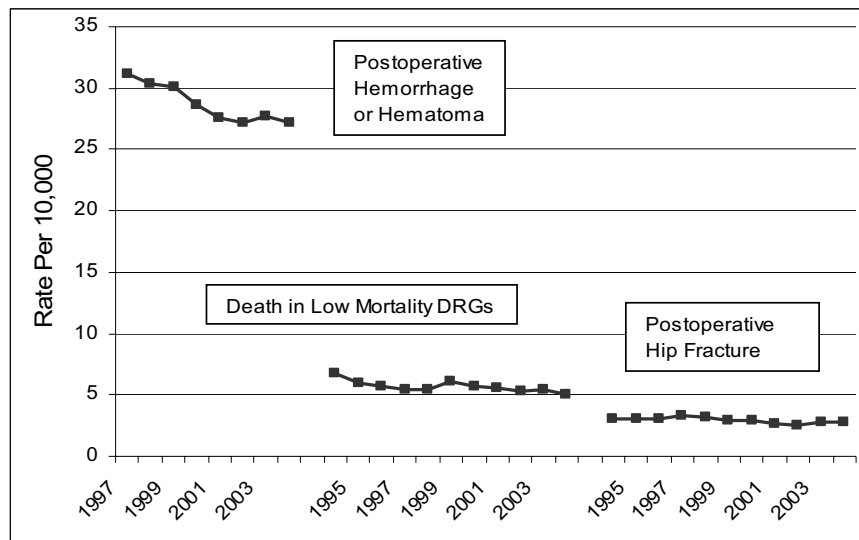


Figure 4.2 Trends for Selected PSI Measures, 1994-2004 (I)

Three other measures show a fairly flat trend over time (*postoperative hip fracture*, *obstetric trauma–Cesarean delivery*, and *foreign body left during procedure*), and three more

reflect a continuing trend of decreasing rates (*failure to rescue; obstetric trauma–vaginal with instrument; birth trauma–injury to new neonate*). Finally, two additional measures (*death in low mortality DRGs and postoperative hemorrhage or hematoma*) have shown basically flat rates in the most recent years, after an earlier period when rates declined somewhat.

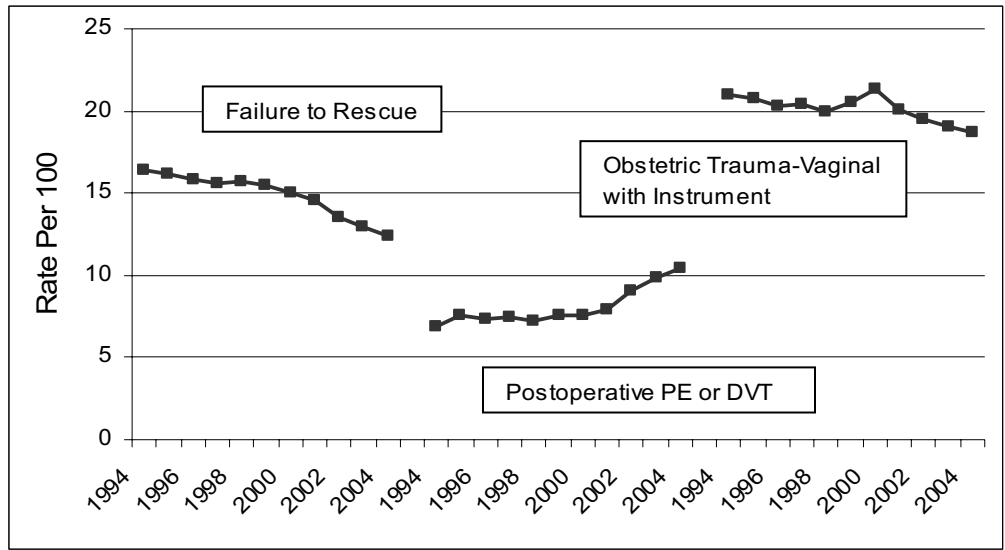


Figure 4.3 Trends for Selected PSI Measures, 1994-2004 (II)

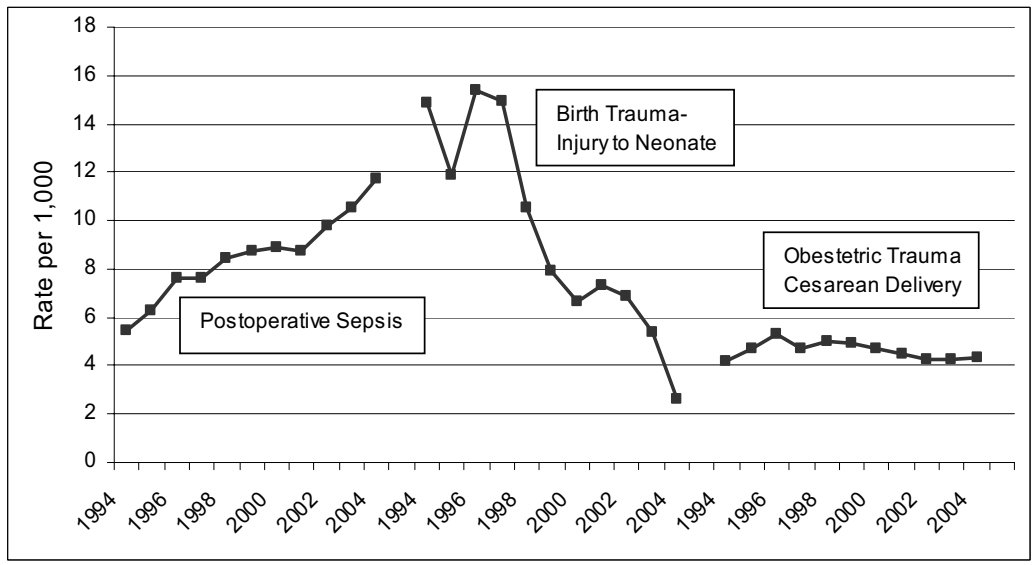


Figure 4.4 Trends for Selected PSI Measures, 1994-2004 (III)

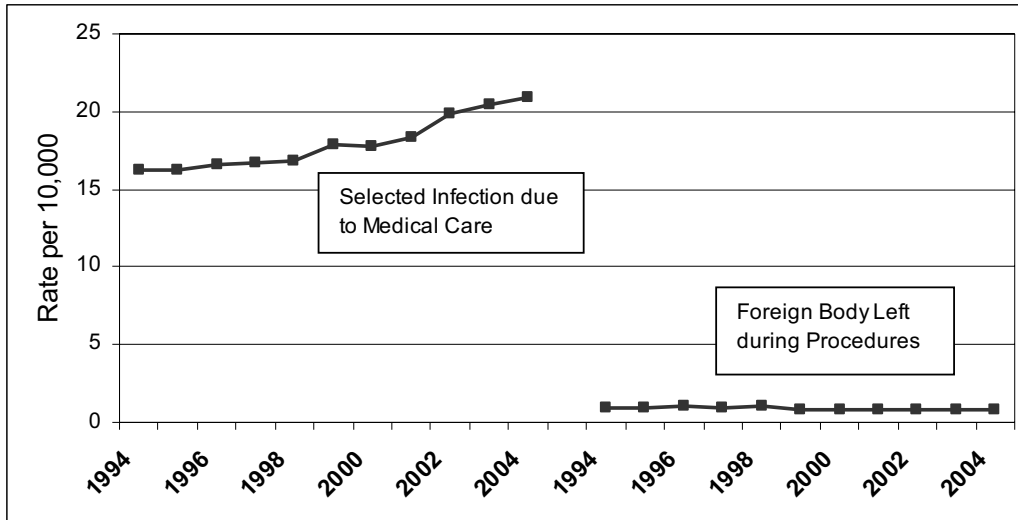


Figure 4.5 Trends for Selected PSI Measures, 1994-2004 (IV)

Trends for Selected UT-MO Measures. For this report, we also updated outcome trends for the UT-MO measures to include the new data point for calendar year 2004. However, as described in *Evaluation Report IV*, changes in technical characteristics for the underlying HCUP data have resulted in some challenges for extending trends for the UT-MO measures. In 2003, AHRQ modified the structure of the HCUP National Inpatient Sample (NIS) by changing the way the ICD-9 E-codes (which denote external causes of injury) are incorporated into the dataset. These codes are used for computing rates for several UT-MO measures. Previously, the HCUP NIS data had associated E-codes with primary and secondary diagnosis fields, but the data for 2003 and 2004 no longer makes those associations. The designation of primary and secondary diagnosis fields is important, because primary diagnoses are usually present on admission to the hospital, and therefore cannot have resulted from care during that hospital-stay.

Because the new HCUP NIS format is ambiguous regarding the primary versus secondary status of E-codes, we calculated *two separate rates for each of the UT-MO measures since 2003*. The first rate was an upper-bound estimate, for which we assumed that all observed E-codes reflected secondary diagnoses, and the second rate was a lower-bound estimate, for which we assumed that the first observed E-code for each hospitalization was a primary diagnosis. Figures 4.6 and 4.7 show the updated trends for the UT-MO measures, with upper-bound estimates for 2003 and 2004 marked by triangles, and lower-bound estimates marked by asterisks.

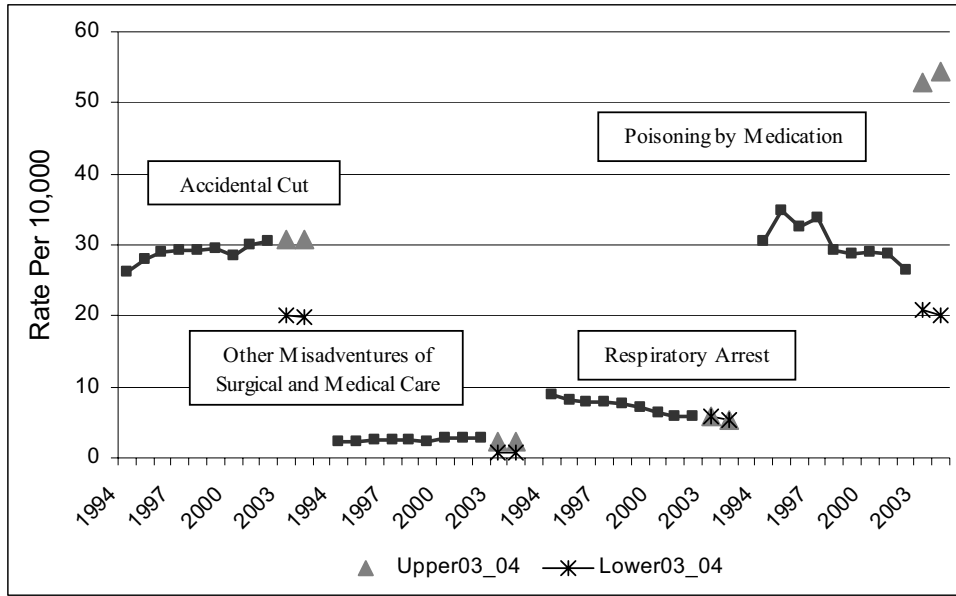


Figure 4.6 Trends for Selected UT-MO Measures, 1994-2004 (I)

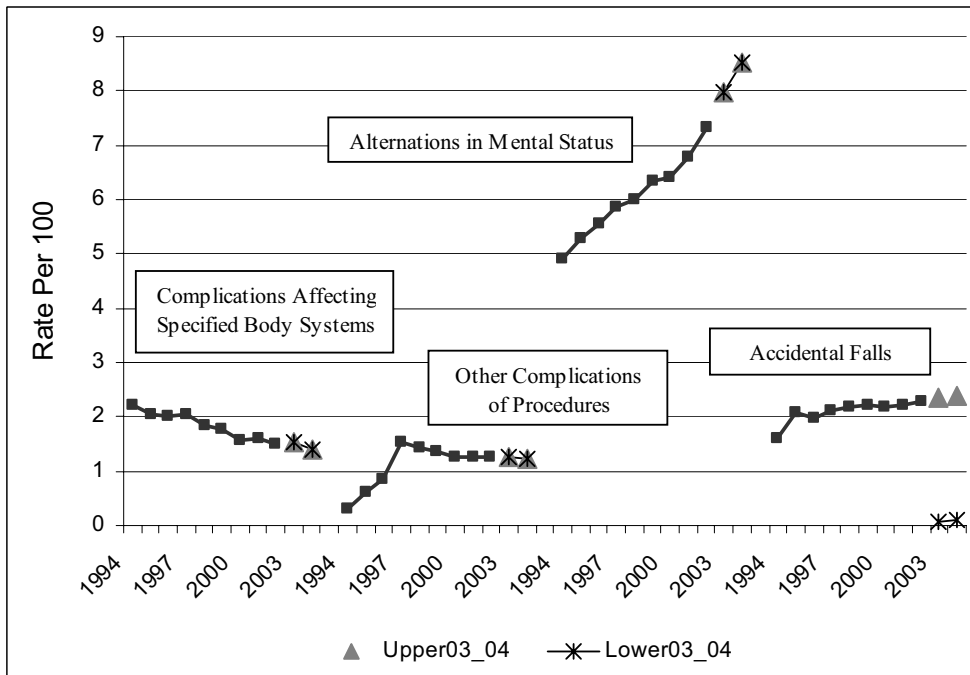


Figure 4.7 Trends for Selected UT-MO Measures, 1994-2004 (II)

For five of the eight UT-MO measures, the upper- and lower-bound estimates for 2004 are very similar, and appear to represent continuations of previous trends over time.⁷ For three of the UT-MO measures (accidental falls, accidental cuts, and poisonings by medication), however, the upper- and lower-bound estimates are quite different. We suspect that the *upper-bound* estimates may be more accurate for accidental falls and accidental cuts, in that those estimates result in smooth continuation of existing trends, and reflect the likelihood that few patients are admitted to hospitals with accidental falls or accidental cuts listed as the primary diagnosis. By contrast, it seems likely that the *lower-bound* estimate is more plausible for poisonings by medication, reflecting a greater likelihood that patients are sometimes admitted to hospitals with a primary diagnosis of medication poisoning. If the latter interpretation is correct, then the claims data appear to suggest that the frequency of medication poisonings may have declined somewhat over the interval from 2000–2004.

ANALYSIS PLANS ON SAFETY OUTCOMES AND DIFFUSION

The major thrust of our analytic work on patient safety outcomes during the two-year extension period involves examination of patterns of diffusion for improvements in patient outcome measures. In *Evaluation Report IV*, we performed an analysis that explored AHRQ's investments in patient safety projects, and we explored a strategy for linking those investments to baseline patterns in safety outcomes. At this time, however, we have shifted our focus instead to exploring several different pathways by which improvements in safety outcomes might diffuse across institutions. One of those possibilities is geographic: we might observe that high-performing institutions or regions at baseline tend to spread their superior performance to physically nearby institutions over time. Alternately, we might imagine that diffusion would occur more rapidly within (or perhaps across) urban areas, where information-sharing or competition between hospitals is plausibly more intense, as compared to rural areas. Another diffusion possibility involves ownership networks: we might observe that patterns of superior institutional safety outcomes tend to propagate more rapidly among hospitals with shared ownership and management structures. Finally, we may be able to identify other sorts of network affiliations that link hospitals, such as quality-improvement collaboratives, which might also serve as a basis for diffusion of superior patient safety practices and outcomes across organizations.

We plan to test several of these alternative hypotheses about diffusion in safety outcomes, drawing on comprehensive claims datasets for CA and NY (and possibly for a couple of other states as well), to estimate trends for several of the PSIs. We already have prepared the necessary claims data for these analyses, and we are currently working to identify the ownership and affiliative networks of hospitals that we want to test in the analyses. Our next immediate step is to formalize several of the alternative models for diffusion, particularly in terms of how we identify initially high-performing institutions (e.g., whether that corresponds to improving performance over some baseline period of time, or instead to superior performance at the start).

Beyond our analyses on diffusion in superior safety outcomes, we also will be undertaking several other analytical projects over the course of this year. We already have one

⁷ Not surprisingly, these are measures that are not based on the use of E-codes, or else use E-codes only minimally. Thus, these five measures are unaffected by our assumptions about the primary vs. secondary status of E-codes.

empirical manuscript under review at a health services research journal, examining patterns of co-variation among the PSIs, and investigating candidate “canary measures” within the inventory. In addition, we anticipate completing another two or three empirical projects over the course of this year. One of these will involve analyzing the HCUP NIS to describe the co-occurrence of multiple PSI events within a single hospitalization for a single patient. Another project may involve looking at geographic patterns in PSI rates across institutions in CA, and at disparities in PSI rates based on population demographics in different regions. We hope to send at least two additional manuscripts out for publication during this year, and we will summarize our analyses and preliminary findings from this work in the final evaluation report to AHRQ.

RECOMMENDATIONS FOR ONGOING MONITORING EFFORTS

During the first four years of the evaluation, we worked on tracking safety outcomes across a number of available measures and data sources, while simultaneously recording the difficulties and challenges involved in attempting to do this. Some of those challenges involved limitations in available data sources and measures. Other difficulties included the selection and definition of appropriate measures for monitoring efforts, the adoption of consistent strategies for measuring and monitoring safety outcomes over time, and the countervailing need to revise and reconsider those strategies as the technology of safety measurement progresses.

In recognition that AHRQ will be continuing its own patient safety monitoring efforts long after the current RAND evaluation ends, we plan in next year’s report to synthesize a set of observations and suggestions for AHRQ’s national monitoring of safety outcomes, based on everything that we have learned during the course of the evaluation. In preparation for doing this, we will meet with AHRQ staff to discuss the agency’s current plans and priorities regarding outcomes measurement and national monitoring efforts, and regarding any specific questions or concerns where the agency would like consultation or additional support. Using the perspectives gained from these discussions, along with the information we have developed through the years of doing the outcome evaluation, we will prepare draft specifications and suggestions for how AHRQ might establish an effective ongoing patient safety outcome monitoring system. This draft document will be provided to AHRQ staff for review and comment. A final document then will be completed, with revisions in response to the AHRQ review, for inclusion in the final report from the two-year practice diffusion portion of the patient safety evaluation.

SECTION 5.

ADDITIONAL ASSESSMENTS NOT ACTIVE IN FY 2007

Two assessments have been held inactive during the first year of the two-year diffusion assessment portion of the patient safety evaluation, each for a different reason—diffusion and use of AHRQ patient safety tools and fielding of the second round of the hospital adverse event reporting system survey. Our current status and planned work for each of these assessments are presented in this section.

DIFFUSION AND USE OF AHRQ PATIENT SAFETY TOOLS

We have waited until FY 2008 to begin data collection on the use of patient safety tools generated by AHRQ to allow as much time as possible for use of these tools by health care organizations since they have been made available to them. The two tools being addressed are the Hospital Survey on Patient Safety Culture (HSOPS) and the TeamSTEPPS Strategy and Tools Package. For both of these key sets of products and tools, our primary focus will be on gathering information on the experiences of hospitals that have chosen to adopt one or both of them. To do this, we will conduct interviews with 20 to 30 hospitals that have used each of the tools during the winter of 2007–2008. Short descriptions of these AHRQ tools are provided below, followed by a discussion of our planned methods and assessment timelines.

Hospital Survey on Patient Safety Culture

Early in the patient safety initiative, QuIC sponsored the development of the AHRQ-funded HSOPS to provide hospitals a measurement tool to help them assess how well their cultures emphasize patient safety, as well as to facilitate open discussion of error, encourage error reporting, and create an atmosphere of continuous learning and improvement. The survey contains 51 questions that assess 12 areas or dimensions of patient safety, with three to four questions addressing each area (AHRQ, 2005).

AHRQ partnered with the American Hospital Association (AHA) in early 2005 for disseminating the culture survey to U.S. hospitals and health care systems through a coordinated set of informational, training, and support activities. A growing number of U.S. and other hospitals are using the culture survey. Feedback from these hospitals suggests that the dimensions measured on the survey are relevant at the operational level, and are being used for quality improvement work. However, quantified data are not yet available to verify this assessment.

AHRQ contracted with Westat to build and manage a benchmark database, into which hospitals can submit their survey data and obtain information on how they compare with others. The first benchmark report, entitled *Hospital Survey on Patient Safety Culture: 2007 Comparative Database Report*, was released in March 2007 (Sorra et al., 2007), and a second benchmark report is planned for release in 2008. The 2007 report contains comparative results on 108,621 hospital staff respondents to the culture survey from 382 participating hospitals.

AHRQ also contracted with Westat to develop patient safety culture surveys for long-term care, ambulatory care, and individual physicians. These surveys are currently in the OMB approval or piloting stages.

TeamSTEPPS Strategy and Tools Package

TeamSTEPPS™ is an evidence-based system aimed at optimizing patient outcomes by improving communication and other teamwork skills among health care professionals. A TeamSTEPPS toolkit was developed by the Department of Defense (DoD) in collaboration with AHRQ (AHRQ, 2007). Included in the toolkit are ready-to-use materials and training curricula necessary to integrate teamwork principles successfully into a hospital's operation, including the following tools:

- An instructor guide for trainers on TeamSTEPPS, which also provides an evidence base for each lesson.
- A multimedia resource kit with contents of the instructor guide in electronic form plus video vignettes of teamwork situations.
- A spiral-bound pocket guide that summarizes TeamSTEPPS™ principles in a portable format.
- PowerPoint® presentations that convey basic TeamSTEPPS™ principles.
- A poster announcing adoption of TeamSTEPPS™ in an organization.

Planned Assessment Design and Schedule for FY 2008

During FY 2007, RAND tracked the progress by AHRQ and its contractors in disseminating the HSOPS and TeamSTEPPS package. This preparation established a context for the central part of our assessment, which will be to conduct telephone interviews with a sample of hospitals that have used each of the tools to learn their experience in using them and related effects on their patient safety culture, practices, and outcomes.

We will interview key representatives from 20 to 30 hospitals that have used each of the AHRQ tool sets. The interviews will be unstructured, guided by a written protocol to ensure that we cover all the topics of interest during each interview. The selection of hospitals to interview will be made in partnership with AHRQ staff working on each set of tools and with Westat, the support contractor for the HSOPS. For the interviews on the HSOPS, we will include some hospitals that have submitted data for two rounds of fielding the culture survey, which should help us to characterize factors that are contributing to culture change.

In the interviews, we will ask hospital respondents for factual background on how they used the tools, and we will ask them to identify the most important lessons they have learned thus far from working with the tools. We also will explore the dynamics of reactions from, and interactions with, various staff stakeholder groups as the hospitals implemented the tools, including how those interactions changed over time. A key focus of the interviews will be questions on how use of the tools has changed the practices of the hospital, where those changes occurred within the hospital, and how the changes have affected quality and other outcomes of their care delivery processes.

The interview results will be analyzed to identify patterns of common experiences across hospitals as well as differences among them. Issues raised by the hospitals will be summarized, with consideration of the implications for future work by AHRQ in its product packaging and dissemination activities, or by health care providers as they work with these tools. We also will draw upon information from Westat's HSOPS benchmark data report on to help inform interpretation of the interview results for hospitals using the culture survey.

SECOND NATIONAL SURVEY OF HOSPITAL EVENT REPORTING SYSTEMS

In its report, *To Err Is Human: Building a Safer Health System*, the Institute of Medicine highlighted the importance of event reporting as a foundation for patient safety improvement and identified the fragmented nature of reporting as a significant barrier to achieving improvements (IOM, 2000). Despite growing activity in recent years to improve patient safety reporting and practices, little is known about the extent to which individual health care organizations have systems for reporting incidents of errors and adverse events, or how they use the reported data for quality improvement actions to implement safer practices (Barach and Small, 2000).⁸

In September 2005 through January 2006, RAND and the Joint Commission collaborated in administering the Hospital Adverse Event Reporting Survey for a national sample of hospitals, to establish this information base. The survey questionnaire, developed by Westat under contract to AHRQ, was designed to characterize the extent, characteristics, and use of event reporting systems operated by U.S. hospitals. To guide our analysis of the survey data, we identified four system components that should be in place for effective operation of hospital event reporting processes:

- A supportive environment that protects the privacy of staff who report events;
- Broad reporting to the system by a range of types of staff;
- Timely distribution of summary reports that document reported events for use in action strategies to prevent future events from occurring; and
- Senior-level review and discussion of summary reports by key hospital departments and committees for policy decisions and development of action strategies.

In addition to profiling the current status and developmental needs of hospital event reporting systems, the data from this survey established baseline information for two policy-related purposes. The first is to track trends in improvements for patient safety practices across the country as part of the patient safety evaluation, and the second is to assess effects of implementation of the PSQIA on hospital reporting processes. To gather data for both of the policy-related purposes, RAND plans to administer this survey again as part of the diffusion assessment phase of its patient safety evaluation contract, including revisions to the survey questionnaire to add items that address the PSO program.

AHRQ has not yet been able to issue the regulations for the PSO certification program, which has delayed its implementation of the program. Because the second fielding of the event reporting system survey is intended to identify effects of the PSO program on changing reporting practices by hospitals, we cannot field the survey again until the program has been in operation long enough to be able to yield such effects. Therefore, the second round of the survey has been delayed until at least 2009 and perhaps later, depending on the timing of the PSO program start-up. Decisions regarding the fielding of the survey will be made during 2008, based on AHRQ's status and information needs for the PSO program and national network of patient safety databases.

⁸ Errors are defined as actions or inactions that lead to deviations from intentions or expectations. Adverse events are occurrences during clinical care that result in physical or psychological harm to a patient or harm to the mission of the organization.

APPENDIX A.
GROUPINGS FOR NQF SAFE PRACTICES INCLUDED IN SURVEY

Safe Practice Groups	Hospital Jurisdiction
<p>Patient Safety Culture 1. Create, sustain a healthcare culture of safety</p>	Executive management, Patient Safety Office
<p>Communication With Patients or Families 3. Ensure written documentation of patient's preferences for life-sustaining treatments 4. Timely and clear communication to families about serious unanticipated events</p>	Quality Management, Patient Safety Office
<p>Transparency Across Continuum of Care 10. Implement policies, processes, systems for accurate labeling of diagnostic studies 13. Standardize list of abbreviations “not to be used” 14. Develop and communicate accurate medication list throughout continuum of care 11. Prepare discharge plan for each patient at time of discharge with summary given to receiving caregiver and confirmation by him/her</p>	Patient Safety Office
<p>Surgery Procedures 25. Implement universal protocol for wrong site, procedure, person surgery for all procedures 26. Evaluate patients with elective surgery for risk of acute cardiac events; consider prophylactic treatment</p>	Chief of Surgery
<p>Medical Evaluation and Prevention 23. Immunize health care workers and patients who should be immunized against influenza annually 27. Evaluate patient for pressure ulcers upon admission and regularly thereafter; implement preventive methods 28. Evaluate patient for risk of VTE/DVT upon admission and regularly thereafter; use appropriate thromboprophylaxis methods 29. Monitor patients on long-term oral anticoagulants by qualified health professional using a careful strategy 30. Use validated protocols to evaluate patients at risk for contrast media-induced renal failure; use appropriate method to reduce risk based on kidney function evaluation</p>	Chief of Medicine, Medical Administration
<p>Medication Safety Management 12. Implement CPOE on foundation of re-engineered, evidence-based care, staff readiness, and integrated IT infrastructure 15. Pharmacists participate in medication management systems with other health professionals 16. Standardize methods for labeling and packaging of medications 17. Identify “high alert” drugs and have policies and procedures to minimize risks associated with them 18. Dispense medications in unit-dose or unit-of-use form whenever</p>	Pharmacy, Patient Safety Office

Safe Practice Groups possible	Hospital Jurisdiction
<p>Workforce</p> <p>5. Implement critical components of nursing workforce that reinforce patient safeguards</p> <p>6. Ensure non-nursing direct care staffing levels are adequate, competent, trained</p> <p>7. Manage ICU patients by physicians with training in critical care medicine</p>	<p>Nursing Administration, Medical Administration, Human Resources</p>

APPENDIX B.

SELECTION OF MEASURES FOR THE OUTCOME EVALUATION

A key aspect of our analytic work involved the selection of available claims-based measures for use in our analysis of trends in patient safety outcomes. Claims-based patient safety measures have the advantage of containing rich data that are used extensively for health care payments. Claims for hospital inpatient services that use the uniform billing format also are consistent in content and format, enabling aggregation over populations and geographic areas. The measurement of the Patient Safety Indicators by AHRQ, using HCUP NIS data, is based on hospital discharge data. Several organizations and investigators have tested use of the PSIs in other settings, using other sets of claims data (Miller, Elixhauser, Zhan, and Meyer, 2001; Rosen et al., 2005; Sedman et al., 2005).

While establishment of the PSIs has been an important step in building an effective monitoring capability for patient safety outcomes, work remains to be done for development of additional outcome measures. Many aspects of inpatient health care are not addressed by the PSIs, and little work has been done on identifying which nodes of care represent the greatest risk for patient harm, and therefore are the most important ones to monitor. In addition, some of the PSIs have been challenged as not representing patient safety issues.

For this interim report, we presented trend analyses on 11 of the PSIs. We included the five indicators that we had tracked in *Evaluation Reports III* and *IV*, and added another five PSIs that were identified as important by experts in the Delphi consensus process we conducted in 2006. We also added an 11th PSI which was identified as a “canary measure” in our analysis of correlations among PSIs. The purpose of this Appendix is to explain how all 11 of these PSIs were selected. First, we recap from *Evaluation Report III* the explanation of how we chose the original five PSIs. We then briefly describe how we obtained additional PSI measures through the Delphi panel process and our investigation of “canary measures.”⁹

SELECTION OF FIVE PSIS FROM PREVIOUS REPORTS

In order to select the strongest and most safety-related PSI measures, we originally reviewed information in the existing literature on the PSIs, and we also obtained the input of several physician-researchers regarding which PSI measures are the strongest candidates. We asked the physicians to assess qualitatively (1) the extent to which they would interpret each measured event as being the result of an error, mishap, or other preventable occurrence, and (2) the importance of the event in terms of both frequency and severity. The physicians were asked to identify the three to five PSIs that best met these criteria. Then, by drawing on the Technical Review of the PSIs (McDonald et al., 2002) and the Guide to the PSI (AHRQ, 2005), we discarded any of our physician-selected measures that (based on the literature) had been flagged as rare, having unclear preventability, coding problems, or low sensitivity. Through this process, we selected the following five PSIs that were used in *Evaluation Reports III* and *IV*, as described in Table B.1.

⁹ We described the process by which we originally selected outcomes measures from the UT-MO inventory in *Evaluation Report III*.

Table B.1
Selected Patient Safety Outcome Measures Used in the Baseline Analysis and Their
At-Risk Populations, Based on Year 2000 HCUP NIS

Outcome Measure	At-Risk Population, Based on Year 2000 HCUP NIS
<i>PSI Measure</i>	
Postoperative hemorrhage or hematoma	8,285,160
Death in low mortality DRGs	9,937,040
Postoperative hip fracture (NS)	5,413,820
Postoperative PE or DVT	8,262,587
Failure to rescue	927,729

SELECTION OF ADDITIONAL PSIS IN THE DELPHI PROCESS

As a separate part of our evaluation activities in 2006, we conducted a Delphi consensus process with a panel of patient safety experts, designed to identify a priority set of safety outcomes measures for use in national monitoring efforts. That process drew on a source list of hundreds of candidate safety measures that addressed a number of different types of clinical settings and data. Ultimately, 47 clinical and research experts identified sets of outcome measures as being strongly important for tracking safety in inpatient, ambulatory, and long-term care settings. The identification of these measures represents the first step in a larger process, with needed follow-up work and additional validation research to ensure the measures are documented as valid for the relevant applications (For details, see Farley et al., 2007d).

Among the safety outcome measures that were highly rated by the Delphi panel were eight PSIs, as listed in Table B.2 below. Because these PSIs specifically emerged from an expert consensus process to identify the most important and valid safety measures currently available, we decided to add them to our trend reporting for this year. In the 2008 final report, we will revisit the pros and cons of adding or removing specific outcome measures, in context of ongoing efforts to monitor trends in patient safety outcomes.

Table B.2
Selected Patient Safety Outcome Measures from the Delphi Process

Outcome Measure
Foreign body left during process
Postoperative PE or DVT
Birth trauma–injury to new neonate
Obstetric trauma–Cesarean delivery
Obstetric trauma–vaginal delivery with instrument
Postoperative sepsis
Death in low mortality DRGs
Failure to rescue

SELECTION OF AN ADDITIONAL PSI BASED ON CORRELATION DATA

Despite the utility of the AHRQ PSIs for evaluating adverse events in American hospitals, the large number of PSIs can make it difficult to summarize broad trends, and may obscure which safety measures are actually most useful to focus on for national trending. In one of our analytical activities in 2006, we attempted to identify one or more “canary measures” among the PSIs that were best suited to be a quick index of general patient safety status for epidemiological purposes. To do this, we examined correlations among the different Patient Safety Indicators using the 1997–2002 HCUP NIS data, first by estimating risk-adjusted rates of PSIs at the hospital level, and then by performing pair-wise correlation analyses and multivariate analyses. Full results from this work are currently under review for academic publication (Yu et al., 2007), but briefly, they show that PSI #7 (*selected infections due to medical care*) was significantly correlated with at least half of the other PSIs in 2002, and that all of the significant correlation coefficients for PSI #7 were small but positive. Similar correlation results were found for PSI #7 for other years between 1997 and 2002.

Based on these findings, we concluded that there are significant correlations among various PSIs at the hospital level, and that PSI #7 appears to be the best “canary measure” among the PSIs. Consequently, this indicator also was added to our outcomes trending in this interim report.

REFERENCES

- Agency for Healthcare Research and Quality, *AHRQ Quality Indicator—Guide to the Patient Safety Indicators*, Version 2.1, Rev. 3, AHRQ Pub. No. 03-R203, Rockville, Md., 2005.
- Agency for Healthcare Research and Quality, *Hospital Survey on Patient Safety Culture*, Rockville, Md., April 2005b. As of August 21, 2007:
<http://www.ahrq.gov/qual/hospculture/>
- Agency for Healthcare Research and Quality, *TeamSTEPPS*. As of September 2007:
<http://www.ahrq.gov/qual/teamstepps/>
- Barach, P., S. Small, “Reporting and Preventing Medical Mishaps: Lessons from Non-Medical Near Miss Reporting Systems,” *British Medical Journal*, vol. 320, March 2000, pp. 759-763.
- Farley D. F., S. C. Morton, C. Damberg, A. Fremont, S. Berry, M. Greenberg, et al., *Assessment of the National Patient Safety Initiative: Context and Baseline, Evaluation Report I*, Santa Monica, Calif.: RAND Corporation, TR-203-AHRQ, 2005.
- Farley D. F., S. C. Morton, C. Damberg, S. Ridgely, A. Fremont, M. Greenberg, et al., *Assessment of the National Patient Safety Initiative: Moving from Research to Practice, Evaluation Report II (2003–2004)*, Santa Monica, Calif.: RAND Corporation, TR-463-AHRQ, 2007a.
- Farley D. F., C. Damberg, S. Ridgely, M. E. Sorbero, Greenberg, et al., *Assessment of the AHRQ Patient Safety Initiative: Focus on Implementation and Dissemination, Evaluation Report III (2004–2005)*, Santa Monica, Calif.: RAND Corporation, TR-508-AHRQ, 2007b.
- Farley D. F., C. Damberg, S. Ridgely, M. E. Sorbero, M. Greenberg, et al., *Assessment of the National Patient Safety Initiative: Final Report, Evaluation Report IV (2005–2006)*, Santa Monica, Calif.: RAND Corporation, TR-XXX-AHRQ, 2007c.
- Institute of Medicine, *To Err Is Human: Building a Safer Health System*, L. T. Kohn, J. M. Corrigan, and M. S. Donaldson, eds., Washington, D.C.: National Academy Press, 2000.
- McDonald, K, P. Romano, J. Geppert, et al., *Measures of Patient Safety Based on Hospital Administrative Data: The Patient Safety Indicators*, Technical Review 5 (prepared by University of California at San Francisco-Stanford Evidence-based Practice Center, under Contract No. 290-97-0013), Rockville, Md.: Agency for Healthcare Research and Quality, AHRQ Publication No. 02-0038, 2002.
- Miller, M. R., A. Elixhauser, C. Zhan, G. S. Meyer, “Patient Safety Indicators: Using Administrative Data to Identify Potential Patient Safety Concerns,” *Health Services Research*, Vol. 36 (6 Pt 2), 2001, pp. 110-32.
- National Quality Forum, *Safe Practices for Better Healthcare, 2006 Update: A Consensus Report*, No. NQFCR-17-07, Washington, D.C., 2007.
- Rosen, A. K., P. Rivard, S. Zhao, S. Loveland, D. Tsilimingras, C. L. Christiansen, et al., “Evaluating the Patient Safety Indicators: How Well Do They Perform on Veterans Health Administration Data?” *Medical Care*, Vol. 43, No. 9, 2005, pp. 873-84.

- Sedman, A., J. M. Harris, 2nd, K. Schulz, E. Schwalenstocker, D. Remus, M. Scanlon, et al., "Relevance of the Agency for Healthcare Research and Quality Patient Safety Indicators for Children's Hospitals," *Pediatrics*, Vol. 115, No. 1, 2005, pp. 135-45.
- Sorra J, V. Nieva, T. Famolaro, N. Dyer. Hospital Survey on Patient Safety Culture: 2007 Comparative Database Report (prepared by Westat, Rockville, MD, under contract No. 233-02-0087, Task Order No. 18), AHRQ Publication No. 07-0025, Rockville, Md.: Agency for Healthcare Research and Quality, March, 2007.
- Stufflebeam, D, W. J. Gephart, E. G. Guba, R. L. Hammond, H. O. Merriman, and M. M. Provus, *Educational Evaluation and Decision Making*, Itasca, Ill.: F. E. Peacock Publishers, Inc., 1971.
- Stufflebeam, D. L., G. F. Madaus, T. Kellaghan, *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Norwell, Mass.: Kluwer Academic Publishers, 2000.
- Yu, H., M. D. Greenberg, A. M. Haviland, D. O. Farley, "Canary Measures Among the AHRQ Patient Safety Indicators," under review, 2007.