

## **Contract Final Report**

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# **Environmental Scan of Patient Safety Education and Training Programs**

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# Contents

<b>Introduction .....</b>	<b>1</b>
<b>Chapter 1. Environmental Scan .....</b>	<b>3</b>
Define Patient Safety .....	3
Identify Sources of Information .....	4
Determine Inclusion .....	6
Results of Environmental Scan .....	7
Track Results .....	7
<b>Chapter 2. Electronic Searchable Catalog .....</b>	<b>9</b>
Standardized Taxonomy .....	9
Standardized Database Template for Data Abstraction .....	12
Database Development .....	15
Results from Data Abstraction .....	18
<b>Chapter 3. Qualitative Analysis of Consumer Perspectives .....</b>	<b>25</b>
Description .....	25
Themes from the Qualitative Analysis .....	26
<b>Chapter 4. Results and Next Steps .....</b>	<b>27</b>
Summary of Themes .....	27
Next Steps .....	28
<b>References .....</b>	<b>29</b>
<b>Appendixes</b>	
Appendix A. Key Search Terms for Environmental Scan .....	31
Appendix B. Data Entry Screens .....	37
Appendix C. Query Screen .....	51
Appendix D. Sample Query Results .....	55
Appendix E. Frequency Analyses for Content Area and Clinical Area .....	57



# Introduction

As the leader in patient safety education, the Agency for Healthcare Research and Quality (AHRQ) must ensure that its efforts to improve patient safety not only reflect the state of the art, but also account for the most current, evidence-based practice. At the conclusion of the Patient Safety Improvement Corps (PSIC) program in 2008, AHRQ realized the need to adapt future efforts (whether via another iteration of PSIC or another delivery model) to ensure comprehensive and accurate coverage of the current patient safety education domain. In 2009, AHRQ's Center for Quality Improvement and Patient Safety (CQuIPS) identified a need to conduct an environmental scan of existing patient safety education and training programs with the ultimate goal of building a searchable database for the general public. A contract was awarded to the American Institutes for Research (AIR) to support AHRQ in this effort.

The project consisted of the following core tasks to meet the stated objectives (as illustrated in Exhibit 1):

- Collect data on and catalog the universe of current, active, and recurring patient safety education and training programs.
- Characterize these programs by salient factors (e.g., sponsor, targeted/eligible audience, program objectives, delivery method, duration, content, cost).
- Provide an easy-to-use, searchable database of the catalog that can be used internally by AHRQ and may be imported into the AHRQ Patient Safety Network (PSNet), without modification, for access by users of that site.
- Provide analysis, conclusions, and recommendations based on observations/findings and potential future patient safety education and training that may be supported by AHRQ.

## **Exhibit 1. Primary Tasks for Conducting an Environmental Scan of Patient Safety Education/Training Programs**



Throughout the contract period, AIR prepared several reports documenting the methodological plan and data collection procedures employed during each phase of the project. These deliverables include the following:

- *Methodology and Inclusion/Exclusion Criteria*,<sup>1</sup> which presented the methodological plan for conducting the environmental scan and specified the criteria used to

determine whether programs identified through the scan process would be included in the final catalog.

- *Standard Taxonomy for the Environmental Scan*,<sup>2</sup> which detailed the framework of features used to categorize patient safety education and training programs that ultimately serves as the basis for the catalog search engine.
- *Standard Template for Data Abstraction*,<sup>3</sup> which detailed the data fields used for abstracting information about programs identified during the environmental scan phase of this project.
- *Qualitative Analysis of Consumer Perspectives of Patient Safety Education and Training Programs*,<sup>4</sup> which reported the results of an informal exploration of consumer perspectives on the advantages and disadvantages of different characteristics of patient safety education and training programs.

This report highlights information presented in the previous deliverables, details the final results of the environmental scan and data abstraction phases, and describes the features of the searchable catalog. The report is divided into the following chapters:

- Environmental Scan.
- Electronic Searchable Catalog.
- Qualitative Analysis of Consumer Perspectives.
- Results and Next Steps.

# Chapter 1. Environmental Scan

The environmental scan, as proposed in the deliverable, *Methodology and Inclusion/Exclusion Criteria*,<sup>1</sup> served as the foundation for the electronic searchable catalog and, as such, required an inclusive and methodologically rigorous approach. During the environmental scan, AIR identified patient safety programs, using publicly available sources. The purpose of this step was to identify a comprehensive set of programs that met predetermined inclusion criteria and collect similar information about each of the programs to enable a standardized presentation in an electronic catalog. The environmental scan consisted of the following four primary steps:

- Define patient safety.
- Identify sources of information.
- Determine inclusion.
- Track results.

## Define Patient Safety

As a preliminary step in the refinement of the environmental scan methodology, we conducted a literature review to identify various definitions of patient safety from reputable sources, including books, scholarly journals, Federal Government agency reports, and organizational resources. Exhibit 2 provides the most relevant definitions with their associated references.

**Exhibit 2. Relevant Definitions of Patient Safety**

Definition of Patient Safety	Reference
Freedom from accidental or preventable injuries produced by medical care.	Agency for Healthcare Research and Quality (AHRQ, via <a href="http://www.psnet.ahrq.gov/glossary.aspx">http://www.psnet.ahrq.gov/glossary.aspx</a> )
The prevention of health care errors and elimination or mitigation of patient injury caused by health care errors.	National Patient Safety Foundation
Freedom from accidental injury; ensuring patient safety involves the establishment of operational systems and processes that minimize the likelihood of errors and maximize the likelihood of intercepting errors when they occur.	Kohn LT, Corrigan JM, Donaldson MS. <i>To err is human: building a safer health system</i> . Advance copy. Washington, DC: National Academy Press. 1999. # 0-309-06837-1.
The avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from the processes of health care. These events include "errors," "deviations," and "accidents." Safety emerges from the interaction of the components of the system; it does not reside in a person, device, or department. Improving safety depends on learning how safety emerges from the interactions of the components. Patient safety is a subset of health care quality.	Cooper JB, Gaba DM, Liang B, et al. National Patient Safety Foundation agenda for research and development in patient safety. <i>Medscape Gen Med</i> . 2000; 2: [14 p.].

Definition of Patient Safety	Reference
Actions undertaken by individuals and organizations to protect health care recipients from being harmed by the effects of health care services.	Spath PL. <i>Patient safety improvement guidebook</i> . Forest Grove, OR: Brown-Spath & Associates. 2000. # 1-929955-07-3.
The prevention of harm to patients. Patient safety efforts aim to reduce errors of commission or omission.	Disease Management Association of America (DMAA, via <a href="http://www.psqh.com/marapr05/disease.html">http://www.psqh.com/marapr05/disease.html</a> )

Based upon our findings and the primary objectives of this effort, we developed a meta-definition of patient safety, combining the most meaningful components of the available definitions. Through coordination with AHRQ project officers, AIR refined this meta-definition to establish the final definition below:

*Patient safety is the prevention and amelioration of adverse outcomes or injuries stemming from the process of health care, as well as initiatives aimed towards improving patient safety processes and outcomes.*

This definition of patient safety was used to steer all scanning activities and serves as the primary basis for inclusion in the catalog.

## Identify Sources of Information

We targeted two types of information sources during the environmental scan process: (1) peer-reviewed literature; and (2) Internet and grey literature for prior, new, and existing patient safety efforts. The literature search began with defining a set of uniform keyword search terms (see Appendix A for a list of the terms used during this search).

### **Peer-Reviewed Literature**

Using the list of keyword terms, the team searched medical and social science peer-reviewed literature, including both descriptive qualitative and quantitative studies, using PubMed, PsycInfo, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and other databases, as shown in Exhibit 3. In addition, we scanned conference programs for relevant proceedings, such as the Institute for Healthcare Improvement and the National Patient Safety Foundation national meetings. The scope of the search was limited to patient safety education and training resources developed domestically and focusing, in whole or large part, on critical patient safety topics and issues. The searches were limited to English-language articles with abstracts published since 1999.



**Exhibit 3. Databases to be Used in the Environmental Scan**

Databases for Scanning	
PsycInfo	PubMed
CINAHL	MEDLINE
Health Business	MedlinePlus
Health Services Research Projects in Progress (HSRProj)	National Library of Medicine (NLM) Gateway
Public Affairs Information Service (PAIS) International	Dissertation Abstract

The peer-reviewed literature search yielded critical information about best practices for evaluating and implementing patient safety education and training. When reviewing journal articles, we identified a program anonymity trend. That is, the peer-reviewed literature tended to focus on different approaches to patient safety education and training or evaluation of programs; rarely, however, did this body of literature name actual programs. In many cases, we extended our searches by seeking information about the authors and developing additional search terms for the environmental scan. For this reason, the main focus of the environmental scan was on the Internet and grey literature.

### ***Internet and Grey Literature***

As with peer-reviewed literature, we used the pre-identified set of uniform keyword search terms that were keyed in a variety of search engines listed in Exhibit 4 to search the Internet.

**Exhibit 4. Search Engines Used in the Environmental Scan**

Search Engines for Scanning	
Google	Search Medica
Yahoo! Search	Healia
Bing	WebCrawler
Ask.com	Dogpile
About.com	Cuil

We began the search by scanning Web-based sources to identify prior patient safety education efforts that might serve as a foundation for current initiatives (e.g., Health Resources and Services Administration-funded research initiatives). Additionally, we identified grey literature, unpublished literature, and Internet sources that describe current and existing education and training programs.

To scan the grey literature, we explored the results from a variety of search engines, including Google, Yahoo, Bing, and others to ensure that some challenges associated with Internet

searches (e.g., search engine optimization and differing search algorithms) were accounted for as much as possible. It quickly became clear that some search engines only provided aggregated results from the more popular search engines (i.e., Google and Bing). For this reason, we limited the environmental scan to Google and Bing. It should be noted that although Google and Bing results yielded a high degree of overlap, we used both search engines to ensure no programs were missed.

## Determine Inclusion

Once a program was identified, we then applied a set of inclusion criteria to ensure only relevant programs would be fully abstracted and documented in the final catalog. AIR, in collaboration with AHRQ, identified the following inclusion criteria.

- **Is the core content of the training program truly patient safety oriented?** Given the purpose of this project, all programs to be included in the catalog must have a patient safety orientation. This criterion was intended to eliminate programs that did not fall within the patient safety spectrum, such as Customer Focus Inc.'s *Patient Satisfaction Skills Training Program*, which focused primarily on improving patient satisfaction and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. Inclusion was determined using the meta-definition of patient safety provided earlier in this chapter.
- **Is the program based on core instructional objectives?** A good educational or training program should be founded on a set of core instructional objectives. Objectives can be learning, program-based, or skill-oriented and do not necessarily have to be measured or assessed. A program that does not specify any instructional objectives may be an indicator of a less structured program. An example of a program that was excluded from the catalog is the *Putting Humor to Work to Improve Patient Outcomes* training program offered by Creative Training Solutions because no explicit instructional objectives were provided.
- **Is the target audience health care professionals, patients and families, or another stakeholder group?** The program should have a clearly defined target audience. This requirement is less strict than the others, but in essence, we wanted to ensure that included programs addressed a specific health care-related target audience or multiple health care-related audiences. This criterion was intended to eliminate programs that do not have a clearly defined health care target audience, such as the National Association of Safety Professionals' *Safety Manager/Training Certification Course*, which does not focus on health care professionals or any of the health care stakeholder groups, but rather on safety managers in general.
- **Is the education or training program currently being offered in the United States?** The program must be offered or publicly available in the United States. As a general rule, programs more than 5 years old were excluded, as were programs not currently offered or available in the United States, to ensure that the resulting catalog provides information about programs available for current use by stakeholder groups. Included programs could be dormant (with no active training occurring, but could be arranged), and the source material did not have to be U.S.-based, the program just had to be available for implementation within the United States. An example of a program

that was not included is the Universitair Medisch Centrum (UMC) *Utrecht Patient Safety Training Program* in the Netherlands, which was a 2-day course offered in 2006 but only available and accessible to medical residents at UMC Utrecht.

- **Is the training program designed for another industry and merely applied to quality improvement and patient safety?** Finally, the program must not have been simply applied to the health care setting but must have been specifically tailored for this setting. Training programs designed for another industry that can be applied to quality improvement and patient safety were only included if efforts were made to adapt the program to the needs and characteristics of the health care setting. The intent was to eliminate a broad spectrum of programs that could, in theory, be applied to health care but that have not been contextualized or adapted in any way, such as DuPont/Coastal's *PeopleSafety Training*, which has not been tailored specifically to the health care setting.

To ensure the above criteria were applied properly, researchers conducted a pilot test using five patient safety training programs. Researchers individually applied the criteria for five identified programs. Once this exercise was completed, the researchers discussed the application of the criteria and assessed the extent of inter-rater agreement. To ensure that the inclusion criteria would be applied consistently, AIR conducted a frame-of-reference training with all researchers to ensure a shared mental model of appropriate criteria application. In cases where a researcher had questions about the application of the inclusion criteria, a second researcher was asked to evaluate and discuss the inclusion criteria with respect to the particular program. In cases where consensus among researchers could not be reached, a third researcher (the Project Director or Principal Investigator) was asked to assess whether the program merited inclusion. Additionally, scanners held weekly meetings to discuss difficulty with scanning and ensure proper application of inclusion criteria.

## Results of Environmental Scan

The environmental scan yielded a total of 821 potential patient safety programs. The team tended to err on the side of inclusion for programs with limited information available at the time of the scan because each program would be reviewed more thoroughly during data abstraction.

## Track Results

AIR developed a Microsoft Excel worksheet to document possible patient safety education and training. Information was documented on the keyword used, the database/search engine used, the program sponsor, the program name, the Web address of the potential education/training opportunity, the link in which the program was originally identified, and a preliminary evaluation of the program against the identified inclusion criteria, as described in the next section.



## Chapter 2. Electronic Searchable Catalog

In this chapter, we detail the development of a standardized taxonomy, which served as the basis for the query tool in the searchable database of patient safety education and training programs, the development of the template for abstracting information about included programs, and finally the searchable catalog itself. For the full reports, please refer to the previous deliverables, *Standardized Taxonomy for Environmental Scan2* and *Standardized Template for Data Abstraction*.<sup>3</sup>

### Standardized Taxonomy

Initially, AIR developed a taxonomy of features to categorize patient safety education and training programs. The taxonomy was designed to serve as the platform for the search engine for the resulting catalog. We began by conducting a thorough review of the programs stemming from the environmental scan phase of this project with the aim of yielding a list of the most common, salient characteristics of these patient safety education and training programs. Next, AIR's project team discussed each of these characteristics and identified additional information that could be critical for inclusion in the taxonomy. We next grouped the resulting list of characteristics into categories to form the basis of the resulting taxonomy. The resulting taxonomy was refined through collaboration with AHRQ.

#### **AIR Taxonomy Categories**

AIR grouped common program characteristics into five main categories, as follows:

- Content.
- Instructional strategy.
- Mode of delivery.
- Instructional model.
- Available evaluation measures.

#### **Content**

Information about program content was identified as particularly important for end users of the database, who likely will want to search for programs that cover specific aspects of patient safety training, such as:

- *Communication*—techniques for encouraging effective team communication.
- *Disease-specific focus*—programs that focus on patient safety for a specific condition (e.g., diabetes or cancer).
- *Driving change*—techniques for managing organizational change.
- *Health Care Failure Mode and Effects Analysis (HFMEA)*—a five-step process that uses an interdisciplinary team to proactively evaluate a health care process.
- *Human factors*—techniques for mitigating how environmental, organizational, and job factors, as well as human and individual characteristics, influence work behavior in a way that negatively affects health and safety.
- *Just culture*—techniques for facilitating an organizational culture that promotes accountability and medical error reporting.

- *Risk assessment*—techniques for evaluating whether or not an organization is putting its patients at risk.
- *Root cause analysis*—techniques for identifying sources of problems or incidents.
- *Specific patient care issues*—programs that focus on one specific area of patient safety, such as fall prevention, medication safety, or surgical infection.
- *Teamwork*—techniques for encouraging effective collaboration between staff members.
- *Triage questions*—techniques to categorize patients based on their needs or benefit from treatment.

## **Instructional Strategy**

Instructional strategy refers to the types of methods used to train program participants. These methods include, but may not be limited to:

- *Information*—the provision of materials containing patient safety concepts.
- *Demonstration*—displaying or showing patient safety concepts to participants.
- *Practice*—exercises or assignments that allow participants to practice using training concepts either within the classroom environment or on the job.
- *Feedback*—evaluative or corrective information provided to participants as they practice using patient safety concepts.

## **Mode of Delivery**

Mode of delivery refers to the primary method or medium in which the program is conducted. These methods include:

- *Classroom instruction*—participants gather in a classroom setting where they are taught patient safety concepts in person by a trainer.
- *Self-directed study*—the program does not have a trainer and instead relies on the participant reviewing provided materials at his/her own pace and initiative.
- *Web-based training*—the program is facilitated by a trainer over the Internet via Web conferencing software or via video, DVD, or CD-ROM.

## **Instructional Model**

Programs were also grouped based on the model used to disseminate training information to each participant's organization. These models include the following:

- *External training*—participants are taught outside their facility by a trainer or team of trainers from an external organization.
- *Internal training*—training is conducted by the health care facility for its own staff.
- *Academic training*—training is offered as part of a degree-seeking or certificate-granting program for health care professionals.

## Available Evaluation Measures

Some programs identified via the environmental scan included measures for evaluating the overall effectiveness of the training program. These measures typically followed the Kirkpatrick model of training evaluation<sup>5</sup> and include:

- *Level 1 Participant Reaction to Training*—the most basic level, measures participant reactions to the training. Results usually illustrate how much the participants liked the training (i.e., affective reactions).
- *Level 2 Participant Learning*—evaluates the extent to which learning has occurred as a result of training. More specifically, it can measure changes in trainee attitudes, improvements in knowledge, or increases in skill as a result of the training program.
- *Level 3 Transfer of Training to the Job*—measures if and/or how concepts taught in the program are put into practice by participants and the extent to which behavior (i.e., job performance) has changed as a result of the training.
- *Level 4 Training Impact*—measures the program’s overall impact on patient safety at the participating organization, including outcomes such as improved patient safety, improved processes and/or interventions, and improved communications.

## Coordination with PSNet

AHRQ is currently considering the merits of having the catalog reside on or be incorporated with the existing PSNet. As a result, we examined the taxonomy for the PSNet search engine against the structure developed for the catalog and coordinated with the PSNet developers to ensure consistency between the two databases. AHRQ facilitated two telephone meetings with PSNet developers from the University of California, San Francisco and Silverchair Information Systems ([www.silverchair.com](http://www.silverchair.com)). The taxonomy used for PSNet includes the following categories:

- *Setting of care*—the location where the case took place or the facility in which the error occurred.
- *Target audience*—the audience to whom the publication is directed or is most likely to read the publication.
- *Clinical area*—the medical specialty related to the article, including in which field the case/error took place.
- *Safety target*—the type of concern/issue presented in the case; which area of safety was breached by the error.
- *Error types*—classification of error(s) in order to identify root cause(s) and offer solution(s).
- *Approach to improving safety*—solutions to the problems.
- *Origin/sponsor*—author location trumps publication source, location trumps funding source.

Due to the similarities between the two taxonomies, we combined the common elements. However, the direct application of the PSNet taxonomy was limited by its primary application to publications, as opposed to the focus of this project on education and training programs. Despite the fundamental differences inherent in the purposes underlying the two taxonomies, AIR combined the relevant elements of both to enable the possibility that the searchable database may

be combined in the future with PSNet should the need arise. The following categories were used in the final version of the taxonomy:

- Mode of delivery (as specified in the AIR taxonomy).
- Instructional strategy (as specified in the AIR taxonomy).
- Available evaluation measures (as specified in the AIR taxonomy).
- Program sponsor (PSNet's *Origin or Sponsor* category options with an additional optional write-in field for the name of specific sponsors).
- Clinical area (as specified in the PSNet taxonomy).
- Content area (PSNet's *Safety Target* and *Approaches to Improving Safety* category options, integrating unique content options from AIR's *Content* category).

## Standardized Database Template for Data Abstraction

Next, AIR developed a template for abstracting information for programs identified during the environmental scan phase of this project into the database. In this section, we provide information on how we developed the standardized templates and categories, the definitions of each data field, and the templates used to populate the searchable Microsoft Access database.

### **Template Development**

AIR conducted a comprehensive review of existing patient safety program catalogs, which fostered our team's collective knowledge regarding the available and relevant information at our disposal. Through this process, we identified a series of elemental questions for each piece of the framework included in the final database template. The framework (as detailed in *Methodology and Inclusion/Exclusion Criteria*) consists of seven categories of information:

- Inclusion criteria.
- Background information.
- Pre-training.
- Content.
- Design and delivery.
- Implementation.
- Post-training.

### **Data Fields by Category**

During the data abstraction phase, AIR collected and categorized elements of each patient safety education and training program. The database template included the list of inclusion criteria (as a double check during abstraction to ensure that included programs are still relevant), as well as programmatic features categorized into each of the seven major categories (see Exhibit 5). To facilitate data abstraction, AIR drafted a set of pointed questions to determine pertinent program information for abstraction, including the data fields defined in the standardized taxonomy.

#### **Exhibit 5. Data Abstraction Template by Category**



Category	Data Field	Questions
Inclusion Criteria	Patient Safety Oriented	Is the core content of the training program truly patient safety oriented?
	Instructional Objectives	Is the program based on core instructional objectives?
	Target Audience	Is the target audience health care professionals, health care students (medical school, nursing school, EMT, etc), patients and families, or another stakeholder group?
	Current in the United States	Is the education or training program currently being offered in the United States?
	Adapted for Health Care	Is the training program designed for another industry and merely being applied to quality improvement and patient safety?
Background	Sponsor Type	Is the program sponsored by a private company, nonprofit organization, the Federal Government, an academic institution, or jointly sponsored?
	Origin/Sponsor	What is the name of the program's sponsor?
	URL	What is the Web address for the program?
	Reach	Does the program have nationwide, statewide, community-wide, school-wide or institution-wide applications?
Pre-Training	Prerequisites	Does the program have prerequisites for participation?
		What are the prerequisites for participation (e.g., reading, coursework)?
Content	Evidentiary Basis	Is the program evidence-based?
		What evidence forms the basis of the program?
	Content Areas	What are the program content areas (e.g., teamwork, root cause analysis)?
	Program Objectives/Description	What are the program's objectives or how is the program described?
	Learning Objectives (by module)	What are the objectives of each module?
	AHRQ Tools and Resources	What AHRQ patient safety tools and resources are used in the program?
	Organizational Needs Assessment	Does the program include an organizational needs assessment?
		What kind of organizational needs assessment is included (e.g., survey, external, internal)?
	Cultural Readiness Assessment	Does the program include a cultural readiness assessment?
		What kind of cultural readiness assessment is included (survey, external, internal)?

Category	Data Field	Questions
	In-service Delivery Option	Does the program include an in-service delivery option?
	Clinical Area	Which medical specialty does the program target?
Design and Delivery	Training Delivered By	What is the title/organization of the person who delivers the training?
	Mode of Delivery	How is the program delivered (e.g., in-person, via Web)?
	Instructional Strategy	What educational approaches are used to train participants (information, demonstration, practice, feedback)?
	Instructional Model	Is the training delivered internally, externally, or in an academic setting?
	Target Audience	Who are the participants by job title?
	Setting of Care	What type of organization is the program geared towards?
Implementation	Travel Requirement	Is travel required for participation in the program?
	Length of Program	How long does the program take to complete?
	Continuing Education Credits	Does the program provide credits for completion?
		How many CE credits/hours are awarded after completion of the program?
		What credentials are awarded (e.g., CE credits, degrees)?
		What is the accrediting body for the credentials?
	Certification	Does the program provide a certification?
		What kind of certification does the program provide?
	Per Person Cost	How much does the program cost per person?
	Approaches to Implementation	What are the approaches to implementation? (e.g., dosing, targeted implementation)?
Post-Training	Evaluative Methods	Does the vendor provide evaluation services?
		On which of Kirkpatrick's levels of evaluation can the program be evaluated?
	Followup Components	What followup methods are used to sustain change?

Category	Data Field	Questions
	Incentives and Reinforcement	What methods are used to reinforce and reward positive teamwork behaviors, team progress, and sustained change?

## Database Development

Using the standardized template, AIR's database development team created a Microsoft Access database with two functional components: (1) data entry and (2) search engine.

### *Data Entry*

The data entry process was designed to minimize error in abstraction through a series of drop-down menus, checkboxes, and write-in data fields. Abstraction itself refers to the method of extracting the details of each program that are either readily available or identifiable through additional inquiries.

We abstracted information identified through our comprehensive environmental scan of patient safety education programs into the Access database. The data entry fields were grouped into five data entry tabs based on the categories in the abstraction template: (1) inclusion criteria/background/pre-training, (2) content, (3) design and delivery, (4) implementation, and (5) post-training. A screen shot of each data entry screen is presented in Appendix B.

Data abstraction was a multi-step process, beginning with the data abstraction team reviewing all potential programs captured during the environmental scan against the inclusion criteria. Each team member evaluated programs he or she did not review initially during the environmental scan phase. This was done as a quality control measure to ensure that all programs were reviewed by multiple researchers.

Programs that met the inclusion criteria were abstracted into the Access database. All programs that were not patient safety oriented and those not currently available in the United States were marked for exclusion. Programs that appeared to be patient safety oriented but lacked enough information for abstraction, as well as programs that raised additional questions, were flagged for a subsequent round of reviews by another member of the data abstraction team. Researchers met to discuss whether a program should be excluded from the database, was ready for abstraction, or whether the program's sponsor should be contacted for more information. In cases where consensus among researchers could not be reached, another researcher (the Project Director or the Principal Investigator) was asked to assess whether the abstraction had been conducted correctly.

Many programs did not have detailed objectives and only presented brief descriptions of the program. Even when objectives were provided, they were often vaguely worded. In these cases, the team included the programs if sufficient information about relevant content was identified. When we were unable to identify content areas or objectives, we contacted program sponsors for more information. The final decision was to exclude any program from the catalog if: (1) the

program lacked identifiable content areas or objectives and (2) the vendor either did not respond to our inquiries for more information or the vendors' responses did not provide sufficient information about the program for abstraction as deemed by the project team.

As part of our quality control efforts, members of the abstraction team validated the abstracted records prepared by their team members. This process consisted of: (1) evaluating each program against the inclusion and exclusion criteria; (2) ensuring that all searchable fields, especially *Content Areas*, were properly captured; (3) a final review of each taxonomical category; (4) a final review for grammar and punctuation; and (5) a check of the program sponsor's Web site for any additional patient safety education and training programs. Weekly meetings were held for researchers to cross-reference their findings and to assess the extent of inter-rater agreement. This served as frame-of-reference training for all researchers to develop a shared mental model of appropriate abstraction protocol.

As evident from the final database, our ability to populate the fields was dependent on the amount of information available at the primary information source (in most cases, the Internet). Thus, in cases where available information was limited, we were not able to populate all of the fields.

### **Query Tool**

AIR also developed a query tool to allow the end user to search for programs based on the data fields and characteristics outlined in the abstraction template. AIR, in collaboration with AHRQ, identified the following data fields to serve as the foundation for the query tool:

- Program name.
- Program sponsor.
- Mode of delivery.
- Instructional strategy.
- Available evaluation measures.
- Content area.

These categories were selected because they were deemed to be the most relevant to the end user and yielded the richest information. That is, some categories, although important and of value to the end user, did not contain information that demonstrated any variability across programs. This was most often due to the limited or insufficient information available during data abstraction. All information abstracted into the database is presented in the final query result.

### **Features of the Query Tool**

The query tool has several different features, including write-in fields, checkboxes, and a nested search feature with "and/or" decision rules. Screen shots of the search screen are presented in Appendix C. Exhibit 6 outlines the decision rules, underlying the multiple selection feature of the query tool.

To reduce the possibility of error and facilitate use of the query tool, there are only two write-in search fields, *Program Name* and *Other Sponsor*. *Other Sponsor* was created as a write-in field

to compensate for the design of the PSNet taxonomy, which was intended to capture the location and/or publisher of a publication. All other fields are designed with checkboxes, allowing a user to see the possible options for the search field rather than having to guess possible search terms.

The *Program Sponsor* and *Content Area* fields have a nested search feature. That is, if a user selects a high-level option, its corresponding lower-level options will automatically be included in the search. For example, if Error Analysis is selected, then Failure Mode and Effects Analysis, Narrative/Storytelling, and Root Cause Analysis will also be selected because they are specific examples of Error Analysis. When a user selects multiple options in the *Program Sponsor* search field, programs meeting any of the criteria will be displayed in the query results. This rule also holds true for *Content Area* and *Mode of Delivery*.

When multiple options are selected in either *Instructional Strategy* or *Available Evaluation Measures* fields, all criteria must be met for a program to be included in the query results. For example, if Information and Demonstration are selected as instructional strategies, only programs that used both strategies will be displayed in the query results. Using one or the other is not sufficient for inclusion. When a user selects options across multiple search fields, the individual criteria within *each* search field must be met in order for a program to be included in the query results.

#### Exhibit 6. Decision Rules for Multiple Selection Feature of the Query Tool

Field Name	Example of Field Options	Multiple Select Results
Program Name	[Write-In]	Not Applicable
Program Sponsor	Up to 19 options including Other and: <ul style="list-style-type: none"> <li>• Department of Health and Human Services <ul style="list-style-type: none"> <li>○ Agency for Healthcare Research and Quality</li> <li>○ Centers for Disease Control and Prevention</li> <li>○ Centers for Medicare &amp; Medicaid Services</li> <li>○ Food and Drug Administration</li> </ul> </li> </ul>	If a main heading is selected, the subheadings below will also be searched. Programs meeting any of the criteria will be displayed in the results.
Other Program Sponsor	[Write-In]	Not Applicable
Mode of Delivery	<ul style="list-style-type: none"> <li>• Classroom Instruction</li> <li>• Web-based training</li> <li>• Self-directed Study</li> </ul>	Programs meeting any of the criteria will be displayed in the results.
Instructional Strategy	<ul style="list-style-type: none"> <li>• Information</li> <li>• Demonstration</li> <li>• Practice</li> <li>• Feedback</li> </ul>	All criteria must be met for a program to be included in the query results.
Available Evaluation Measures	<ul style="list-style-type: none"> <li>• Level 1 Participant Reaction to Training</li> <li>• Level 2 Participant Learning</li> <li>• Level 3 Transfer of Training</li> <li>• Level 4 Training Impact</li> </ul>	All criteria must be met for a program to be included in the query results.

Field Name	Example of Field Options	Multiple Select Results
Content Area	Up to 140 options including: <ul style="list-style-type: none"> <li>• Error Analysis               <ul style="list-style-type: none"> <li>○ Failure Mode and Effects Analysis</li> <li>○ Narrative/Storytelling</li> <li>○ Root Cause Analysis</li> </ul> </li> </ul>	If a main heading is selected, the subheadings below will also be searched. Programs meeting any of the criteria will be displayed in the results.

## Query Results

Once a user executes a search, the results are displayed as a series of reports, one for each program that matches the search criteria. Each report displays only the information that was available for that program. Fields that could not be populated during data abstraction will not display. Examples of a query result are presented in Appendix D.

## Results from Data Abstraction

The resulting catalog contains 333 programs. As noted previously, the abstraction phase started with 821 possible programs identified during the environmental scan. Through the course of abstraction and further review, the number of possible patient safety programs increased to 950. We contacted the vendors of 142 programs for more information, of which 15 programs were abstracted and included in the database. Unfortunately, the vendors of 20 programs responded with insufficient information to abstract, and vendors for the remaining 107 programs did not respond to our request for more information. Ultimately, 627 possible programs were excluded from the database.

The number of programs ultimately represented in the catalog reflects the varying state of patient safety education and training programs during the time the environmental scan and data abstraction phases were conducted. For example, AIR identified a number of Quality Improvement Organizations (QIOs) as possible sources of information about training programs during the environmental scan phase. However, at the time that data abstraction was conducted, very few QIOs had any training programs available. Upon contacting these organizations, we learned that the QIOs were in a transition period between the 9<sup>th</sup> Scope of Work (SOW) and 10<sup>th</sup> SOW. As a result, if the environmental scan and abstraction occurred at a different time in the 3-year SOW cycle, there would likely have been many more programs from these organizations included in the catalog. The QIOs that responded anticipated they would have new training opportunities in place by mid-2012.

In addition to QIOs that were identified as possible sources of information about patient safety programs, there were a number of other possible entries from the environmental scan that were not included in the final catalog for a variety of reasons. As noted previously, during the environmental scan, we chose to err on the side of inclusion so as not to unnecessarily limit the scope of the final catalog. However, upon further review, many potential programs identified during the environmental scan were ultimately excluded from the catalog because they did not meet the inclusion criteria as well as initially thought, likely due to the fact that these programs were only tangentially, not specifically, related to patient safety.

In some cases, program materials were identified during the environmental scan for further investigation; however, upon attempted abstraction, it became clear that the materials were stand-alone presentations that were not associated with an available training program or educational opportunity. In these cases, the record was excluded from the catalog.

### **Summary of Database Contents**

AIR conducted frequency analyses on several key data fields included in the catalog. The results of these analyses are presented in Exhibits 7 through 12 for *Content Area*, *Setting of Care*, *Clinical Area*, *Mode of Delivery*, *Instructional Strategy*, and *Instructional Model*, respectively. Due to the nested nature of the taxonomy and the number of categories and subcategories available for *Content Area* and *Clinical Area*, we aggregated these data fields at the highest level. More detailed frequency tables for *Content Area* and *Clinical Area* are available in Appendix E.

### **Content Area**

The *Content Area* data field specifies subject areas targeted during training. Of the 142 options specified within the content area data field, only 103 options were actually used during data abstraction. Exhibit 7 presents the number of programs that include instructional material in each of the 26 top-level content area categories in descending order of frequency. Please note that the Education and Training category and its subcategories were excluded from the database because this information was captured in the *Mode of Delivery*, *Target Audience*, and *Implementation* data fields of the abstraction template.

**Exhibit 7. Content Area Frequencies**

<b>Content Area Categories</b>	<b>Frequency</b>
Error Reporting and Analysis	206
Quality Improvement Strategies	186
Communication Improvement	179
Culture of Safety	151
Medication Safety	126
Risk Analysis	114
Teamwork	112
Human Factors Engineering	109
Technological Approaches	73
Legal and Policy Approaches	57
Driving Change	56
Logistical Approaches	56
Specific Patient Care Issues	52
Medical Complications	26
Surgical Complications	25
Psychological and Social Complications	21
Diagnostic Errors	18
Identification Errors	18

Content Area Categories	Frequency
Nonsurgical Procedural Complications	15
Fatigue and Sleep Deprivation	13
Specialization of Care	10
Device-related Complications	6
Discontinuities, Gaps, and Hand-Off Problems	4
Transfusion Complications	4
Triage Questions	2
Education and Training	0

Some notable content areas that were not found during data abstraction include Postoperative Surgical Complications and Preoperative Complication under the top-level category of Surgical Complications. Additionally, fewer results than may be expected were found for Device-Related Complications and Technological Approaches, given the increased focus recently on health care information technology and the overall reliance on technology by the general public.

### Setting of Care

The *Setting of Care* data field specifies the type of health care setting to which programs may be targeted. Unfortunately, many programs did not specify a target setting of care, and the category of Hospitals was coded as the default setting of care. Exhibit 8 presents the number of programs targeting particular settings of care.

**Exhibit 8. Setting of Care Frequencies**

Taxonomy ID	Setting of Care	Frequency
102	Hospitals	319
103	-- General Hospitals	65
104	---- Intensive Care Units	4
105	---- Emergency Departments	23
106	---- Operating Room	17
107	---- Labor and Delivery	0
109	-- Children's Hospitals	19
110	-- Specialty Hospitals	2
112	Ambulatory Care	36
113	-- Home Care	3
114	-- Ambulatory Clinic or Office	3
115	-- Outpatient Pharmacy	9
108	Psychiatric Facilities	14
111	Residential Facilities	26



116	Outpatient Surgery	14
117	Patient Transport	3

As can be seen in Exhibit 8, setting of care was not typically specified in detail, which we suspect is due to a reluctance to limit consumer use of the programs. That is, these programs may be valuable to many different settings because of the generalizability of the knowledge and skills required to improve patient safety across settings.

## Clinical Area

The *Clinical Area* data field captures the targeted specialty or specialties for which the programs were designed. As with *Setting of Care*, many programs did not specify a target clinical area. In these cases, the top-level category of Medicine was coded as the default clinical area. Exhibit 9 presents the number of programs targeting each of the six top-level clinical area categories in descending order of frequency. Again, the lack of specification of a clinical area may be due to the generalizability of the material across clinical specialties.

**Exhibit 9. Clinical Area Frequencies**

Clinical Area Category	Frequency
Medicine	323
Nursing	45
Pharmacy	34
Allied Health Services	8
Dentistry	1
Complementary and Alternative Medicine	0

## Mode of Delivery

The *Mode of Delivery* data field allows for multiple options to be selected, including self-directed study, Web-based training, and classroom instruction. Although each program specifies at least one mode of delivery, multiple options may be selected. Exhibit 10 presents the number of programs specifying each of these options. As evident in the exhibit, self-directed study and Web-based training were the most common ways patient safety instruction is available for delivery.

**Exhibit 10. Mode of Delivery Frequencies**

Mode of Delivery Options	Frequency
Self-directed Study	251
Web-based Training	211
Classroom Instruction	148

## Instructional Strategy

Similar to *Mode of Delivery*, the *Instructional Strategy* data field, which specifies the educational approaches used to train participants, allows for multiple options to be selected, including information, demonstration, practice, and feedback. That is, programs typically included more than one approach to presenting and learning material. Exhibit 11 presents the number of programs specifying each of these instructional strategy options.

**Exhibit 11. Instructional Strategy Frequencies**

Instructional Strategy Options	Frequency
Information	333
Demonstration	126
Practice	103
Feedback	56

Notably, only 56 programs indicated that they provide feedback. However, it may be more likely that this small number is due to a lack of sufficient information available on the Internet than to programs not including this approach. Programs that include opportunities to practice a new skill typically also provide feedback to reinforce behaviors.

## Instructional Model

Finally, the *Instructional Model* data field provides information about how a program may be conducted—internally (i.e., training that can be conducted within one’s organization), externally (i.e., training offered outside one’s organization), and through an academic institution (i.e., a program offered by an academic institution and typically involving a degree or certification). Exhibit 12 presents the number of programs specifying each of these options.

**Exhibit 12. Instructional Model Frequencies**

Instructional Model Options	Frequency
External Training	278
Academic Education	50
Internal Training	11

One possible explanation for the low number of programs specifying the internal training model may be due to insufficient information being available about the extent to which external training programs can be offered for internal use by health care organizations.

## Issues Encountered During Data Abstraction

AIR encountered a number of issues during data abstraction, including timing of scanning and abstracting, programs not publicly available, other exclusion factors, and lack of available information.

## Timing of Project Phases

As noted previously, the timing of the two phases of this project limited the number of programs that were included in the final catalog. It is likely that new programs were created or made available on the Internet subsequent to our completion of the environmental scan phase and were not identified during the data abstraction phase. Likewise, some programs identified during the environmental scan were no longer available at the time of abstraction, thus ultimately making it necessary to exclude them from the catalog. Additionally, this suggests the possibility that programs that were abstracted early in the process may no longer be active or available but have been included in the catalog.

## Programs Not Publicly Available

An important criterion for catalog inclusion is that the program is available to the general public. As a result, some programs identified during the environmental scan phase were later excluded from the catalog because they were not in fact available to the public. For example, one medical school program, *Masters in Patient Safety Leadership*, was excluded because these classes are only available to currently enrolled students and are not publicly available. In addition, certain medical school programs, residencies, and fellowships identified during the environmental scan were not included because they lacked a patient-safety orientation. Patient safety was most often a curricular component or theme of a specific module in these instances. Hospital-specific training initiatives also did not meet the publicly available inclusion criterion standard, as they are only available to individuals affiliated with the specific hospital where they were being used.

## Other Exclusion Factors

Annual conferences were identified in the environmental scan but ultimately excluded because the content changes each year and lacks instructional objectives. Research journal articles with continuing medical education credits were excluded as well if they were not attached to an actual program of instruction. Although AIR identified a number of health literacy programs during the environmental scan, most of these programs were ultimately excluded from the catalog because many of these programs were primarily focused on health literacy and lacked a patient safety orientation. Programs designed to improve patient safety through increased health literacy, however, were included.

## Lack of Information

As discussed previously, the Internet did not provide all of the information we planned to capture during abstraction. The following fields were commonly left blank during data abstraction:

- *AHRQ Tools and Resources.* Programs did not typically provide information regarding AHRQ tools and resources, although AHRQ was often cited in their reference lists.
- *Program Focus.* It was often difficult to determine whether the program focus was on master trainers or participants; rather, programs appeared to be tailored towards both groups or simply did not specify this information.
- *Approaches to Implementation and Recommendations for Roll-out/Implementation.* Programs rarely specified recommendations for effective implementation, information which may be available upon inquiry but may not be a standard marketing feature of programs.

- *Clinical Area and Setting of Care.* Another difficulty in collecting data came in applying the PSNet taxonomy. These particular fields yield valuable information when applied to publications such as books and articles but are less useful when applied to patient safety educational opportunities and training programs.

## Chapter 3. Qualitative Analysis of Consumer Perspectives

### Description

In addition to the environmental scan and the development of the searchable catalog of programs, AIR investigated consumer perspectives on the advantages and disadvantages of different characteristics of patient safety education and training programs. For this effort, AIR leveraged contacts at nine health organizations with whom AIR and/or AHRQ has partnered over the years on various projects. In accordance with the exploratory nature of this investigation, the sample was limited to key organizational contacts. Exhibit 13 provides a list of key contacts by organization.

**Exhibit 13. Key Contacts by Partner Health Organization**

Organization	Key Contact
Sisters of Saint Mary Health	Andrew Kosseff, MD
Duke Health Systems	Laura Maynard, MDiv
Mayo Clinic	Lori Scanlan-Hanson, RN, MS
University of Central Florida	Bethany Ballinger, MD
Shady Grove Hospital	Tony Slonim, MD, DrPH
University of Minnesota	Karyn Baum, MD, MEd
Carilion Clinic	Charlotte Hubbard, RN
University of North Carolina	Celeste Mayer, RN, PhD
Maryland Patient Safety Commission	Inga Adams-Pizarro, MHS and C. Patrick Chaulk, MD, MPH

AIR initially designed the interviews with contacts at the partner health organizations to help direct the environmental scan and data abstraction process. However, the interviews also afforded the opportunity to gather input on the interviewees' perspectives on patient safety education and training programs as consumers of these programs. Although there was no formal interview protocol, AIR presented a few topics to consider prior to the interview to stimulate thinking about patient safety programs.

- What patient safety education and training programs are in place at your organization?
- Which patient safety education and training programs are you most familiar with?
- Which of the programs have been most successful and why?

Partner health organization contacts were invited to speak freely about patient safety programs at their organization and their views on these programs in general. Each interview lasted approximately 30 minutes.

## Themes from the Qualitative Analysis

AIR conducted a qualitative analysis of the interview notes to identify key themes emerging across the interviews. It is important to reiterate that the purpose of these interviews was to help direct the environmental scan and design of the searchable database. The input from these interviews highlighted several interesting issues that AHRQ may want to consider before developing, implementing, or marketing new patient safety programs or products. Further, the interviews were not conducted as part of a rigorous evaluation of consumer perspectives and, therefore, simply reflect input from organizations with which AIR and AHRQ have previously worked. Due to the small sample size and informal nature, the results are not generalizable and may not be representative of all patient safety program consumers.

Six key themes emerged from the nine interviews as follows (in order of issues discussed most frequently): (1) customization, (2) self-build, (3) cost, (4) perceived effectiveness, (5) evaluation and measurement, and (6) “Patient Safety 101.” In this section, we present an overview of these themes.

- **Customization, Self-Build, and Cost.** Interviewees identified a need to adapt patient safety programs to specific organizational needs. This may mean tying new programs into larger organizational structures and curricula or modifying programs to suit trainee level of expertise. Without the ability to customize programs, organizations may feel compelled to create their own patient safety education and training programs. There is a perception among some that this may be more cost effective than buying an off-the-shelf program. In other cases, an organization may find the perfect patient safety program but not be able to use it because of prohibitive cost. Due to misconceptions about the cost and adaptability of programs, there are many well designed, customizable, comprehensive, reasonably priced programs not being used by consumers.
- **Perceived Effectiveness and Evaluation and Measurement.** An organization’s decision to use a specific patient safety program can be very subjective, and programs are often judged by their perceived effectiveness. One reason organizations rely on perceived effectiveness is that no repository currently exists to capture objective information about programs and their impact. Evaluation and measurement of patient safety education and training programs may be weak or hard to find, particularly at the higher levels of evolution (Kirkpatrick levels 3 and 4).
- **Patient Safety 101.** Interviewees generally agreed that all health care organizations ought to provide some introductory patient safety class or training for their staff. However, the nature and form of such a class is likely to vary significantly by organization, and no standards exist as to what information needs to be taught based on the target audience. Thus, there is no standardized introduction to patient safety.

## Chapter 4. Results and Next Steps

Throughout this project, AIR has encountered various issues that may be of interest to AHRQ. In this chapter, we highlight some of the themes resulting from each phase of the project, as well as possible next steps in maintaining and enhancing the catalog over time.

### Summary of Themes

This project comprised three major steps: (1) environmental scan, (2) data abstraction and development of an electronic searchable catalog, and (3) qualitative analysis of consumer perspectives. At each point in this process, AIR identified a number of issues that influenced the resulting catalog of patient safety education and training programs, many of which have already been mentioned in this report.

#### ***Themes from the Environmental Scan***

A series of themes emerged from the environmental scan, as follows:

- Peer-reviewed literature did not yield names of specific programs.
- Different search engines led to multiple links to the same programs.
- A significant number of program sponsors did not provide sufficient information, which, in some instances, made it difficult to determine what was actually a patient safety program or a hospital initiative without a core patient safety component.
- The environmental scan yielded many links to articles, documents, and programs that were either outdated or not publicly available.

#### ***Themes from Data Abstraction and Catalog Development***

Themes emerging from the data abstraction phase include the following:

- Many programs were not included in the final catalog due to the brevity of the information available on the Internet.
- Many programs were ultimately excluded from the catalog when their sponsors did not respond to subsequent inquiries to learn more about their programs.
- The majority of programs included in the catalog did not specify information regarding several data fields (e.g., *AHRQ Tools & Resources Used*, *Program Focus*, and *Approaches to Implementation or Recommendations for Roll-out/Implementation*).
- A number of QIOs were excluded because they were not providing training at the time of data abstraction.

#### ***Themes from Consumer Interviews***

As highlighted in the previous chapter, the interviews yielded several general themes regarding consumer perspectives of patient safety education and training programs. Included in these themes are:

- The perception (or misperception) that off-the-shelf programs cannot be customized to meet organizational needs and that they are more expensive than developing or delivering programs internally.
- Programs rarely indicate whether program evaluation measures or studies had been conducted.
- Assess needs of catalog users to identify ways the catalog can better support these needs—i.e., determine the types of information users would need for optimal use of the database.

## **Next Steps**

Based on the lessons learned throughout this project, AIR recommends that AHRQ consider some important follow-on activities at the close of this contract. Namely, we suggest that AHRQ consider how to maintain the catalog to ensure it contains current information about available patient safety programs, as well as some additional studies to improve and extend the resources AHRQ provides its constituents.

### ***Catalog Maintenance***

The final catalog consists of 333 patient safety education and training programs, currently available in the United States. It should be noted, however, that this catalog captures only a snapshot of what is available. Obviously, new programs are continually being developed, old ones retired, and others revised and improved. In order to capture the ever-changing landscape of educational and training opportunities in the patient safety realm, AIR recommends that AHRQ consider a maintenance plan for this catalog.

In particular, AHRQ should consider a plan for periodically monitoring the Internet for new programs, revisions to programs already included in the catalog, retiring programs no longer available, and adding new programs to the catalog. At a minimum, AHRQ should consider updating the catalog on an annual basis to reflect these potential changes. AIR assumes that in the event that the catalog is maintained on the PSNet, the PSNet webmaster will field questions, concerns, and consumer suggestions regarding the catalog and will, therefore, be prepared to document any issues or comments that arise. One area of possible concern may be vendors seeking explanations as to why their programs were excluded from the catalog.

### ***Further Investigation***

As we discovered through our interviews with consumers, there are many misconceptions regarding training and educational opportunities that exist for the patient safety audience. AIR recommends that AHRQ consider some of the following research studies to better identify the needs and issues of its constituency:

- Study catalog usage data to assess what streams of patient safety training are of greatest interest (this approach can serve as a proxy for interest and drive some policy decisions).
- Study reasons why users access the catalog (e.g., are they coming to it because they have had a patient safety problem in their organization?).



- Assess needs of catalog users to identify ways the catalog can better support these needs.
- Examine the way users implement a program identified in the catalog.
- Conduct usability testing of the catalog to evaluate and improve ease of use based on findings.
- Examine the costs associated with building a program internally versus the comparative costs associated with purchasing an off-the-shelf program and customizing it as necessary.
- Develop additional metrics to demonstrate program effectiveness beyond the traditional patient safety outcome measures, due to the fact that these outcomes are often low-base-rate events (i.e., because these events rarely occur, demonstrating that a program helped to reduce their occurrence even further may not be a fair measure of program effectiveness).
- Assess patient safety audiences to identify needs for training and/or other patient safety initiatives.
- Develop a Patient Safety Education Accreditation program by leveraging information obtained through the suggested studies and the elements of effective, quality patient safety programs such as the Patient Safety Improvement Corps program.

## References

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<sup>1</sup> *Environmental Scan of Patient Safety Education and Training Programs: Methodology and Inclusion/Exclusion Criteria* (AHRQ Contract No. HHS290200600019i, Task Order #10, PRISM No. HHS229032004T); May 7, 2010. Washington, DC: American Institutes for Research.

<sup>2</sup> *Environmental Scan of Patient Safety Education and Training Programs: Standardized Taxonomy for Environmental Scan* (AHRQ Contract No. HHS290200600019i, Task Order #10, PRISM No. HHS229032004T); November 5, 2010. Washington, DC: American Institutes for Research.

<sup>3</sup> *Environmental Scan of Patient Safety Education and Training Programs: Standardized Template for Data Abstraction* (AHRQ Contract No. HHS290200600019i, Task Order #10, PRISM No. HHS229032004T); August 6, 2010. Washington, DC: American Institutes for Research.

<sup>4</sup> *Environmental Scan of Patient Safety Education and Training Programs: Qualitative Analysis of Consumer Perspectives of Patient Safety Education and Training Programs* (AHRQ Contract No. HHS290200600019i, Task Order #10, PRISM No. HHS229032004T); August 5, 2011. Washington, DC: American Institutes for Research.

<sup>5</sup> Kirkpatrick, DL, Kirkpatrick JD. *Evaluating training programs: The four levels*. (3<sup>rd</sup> Ed.). San Francisco, CA: Berrett-Koehler Publishers; 2006.



## Appendix A. Key Search Terms for Environmental Scan

Key Search Terms
Continuing Education Patient Safety
Education Training
Eliminate Medical Error
Health Care Error Training
Health Care Quality Improvement
Health Literacy Training
Healthcare Error Training
Healthcare Quality Improvement
Iatrogenesis
Iatrogenesis Reduction
Improve Health Outcomes
Improve Patient Safety
Improved Health Outcomes
Improved Patient Safety
Increase Patient Safety
Increased Patient Safety
Learn Patient Safety
Medical Negligence
Patient Health
Patient Health Assessment Education
Patient Health Care Training
Patient Health Education
Patient Health Education Training
Patient Healthcare
Clinical Malpractice
Patient Medical Error Training
Patient Protection Education Training
Patient Protection Training
Patient Safety
Patient Safety and Medical Error
Patient Safety and Quality Improvement
Patient Safety and Quality Improvement Education

Key Search Terms
Patient Safety Assessment
Patient Safety Best Practices
Patient Safety CEUs
Patient Safety Class
Patient Safety Course
Patient Safety Curriculum
Patient Safety Education
Patient Safety Education Program
Patient Safety Education Training
Patient Safety Goals
Patient Safety Initiatives
Patient Safety Issues
Patient Safety Management
Patient Safety Negligence
Patient Safety Organization
Patient Safety Plan
Patient Safety Program
Patient Safety Preparation
Patient Safety Procedures
Patient Safety Process
Patient Safety Quality
Patient Safety Standards
Patient Safety Tools
Patient Safety Training
Patient Safety Training Program
Patient Safety Research
Preventing Patient Harm
Quality and Patient Safety
Reduce Medical Error
Reducing Medical Error
Reducing Patient Injuries
Safer Patients
Teach Patient Safety
Root Cause Analysis (RCA)

Key Search Terms
'10 Patient Safety Tips for Hospitals'
'20 Tips to Help Prevent Medical Errors in Children'
'20 Tips to Help Prevent Medical Errors: Patient Fact Sheet'
'30 Safe Practices for 'Better Health Care: Fact Sheet'
'Advances in Patient Safety: From Research to Implementation'
'AHRQ' Patient Safety Initiative: Building Foundations, Reducing Risk: Interim Reports and Publications to the Senate Committee on Appropriations'
'Be Prepared for Medical Appointments'
'Becoming a High Reliability Organization: Operational Advice for Hospital Leaders'
'Check Your Medicines: Tips for Taking Medicines Safely'
'Closing the Quality Gap: Prevention of Healthcare-Associated Infections'
'Five Steps to Safer Health Care'
'High Reliability Organization (HRO) Strategy'
'Hospital Survey on Patient Safety (HSOPS) Comparative Database Reports and Publications'
'How to Create a Pill Card'
'Implementing Reduced Work Hours to Improve Patient Safety'
'Improving Hospital Discharge Through Medication Reconciliation and Education'
'Improving Medication Adherence'
'Improving Medication Safety in Clinics for Patients 55 and Older'
'Improving Patient Flow in the ED'
'Improving Patient Safety Through Enhanced Provider Communication'
'Improving Warfarin Management'
'Interactive Venous Thromboembolism Safety Toolkit for Providers and Patients'
'Is Our Pharmacy Meeting Patients' Needs?'
'Making Health Care Safer: A Critical Analysis of Patient Safety Practices: Summary, Evidence Reports and Publications'
'Mistake-Proofing the Design of Health Care Processes'
'Multidisciplinary Training for Medication Reconciliation'
'Overcoming Barriers to Error Reports and Publications in Small, Rural Hospitals'
'Patient Safety E-newsletter'
'Patient Safety Improvement Corps Training DVD'
'Patient Safety Organizations: Web Site'
'Patient Safety Research Highlights: Program Brief'
'Problems and Prevention: Chest Tube Insertion (DVD)'
'Reducing Central Line Bloodstream Infections and Ventilator-Associated Pneumonia'

Key Search Terms
'Reducing Discrepancies in Medication Orders'
'Reducing Medical Errors in Health Care: Fact Sheet'
'Strategies to Improve Communication Between Pharmacy Staff and Patients'
'Testing the Re-engineered Hospital Discharge'
'The Effect of Health Care Working Conditions on Patient Safety'
'The Emergency Department (ED) Pharmacist as a Safety Measure'
'Toolkit for Redesign in Health Care: Final Reports and Publications'
'Transforming Hospitals: Designing for Safety and Quality'
'Ways You Can Help Your Family Prevent Medical Errors!'
'AHRQ Hospital Survey on Patient Safety Culture'
'AHRQ Patient Safety Indicators'
'AHRQ Patient Safety Indicators (PSIs)'
'AHRQ Patient Safety Network (AHRQ PSNet)'
'AHRQ Web M and M'
'Analysis of Patient Safety Data'
'Business Case for Patient Safety'
'Cause and Effect Diagramming'
'Designing for Safety'
'Evaluation of Patient Safety Programs'
'Failure Mode and Effects Analysis (HFMEA)'
'Healthcare Failure Modes and Effects Analysis (HFMEA)'
'Heuristic (Expert) Evaluation Technique'
'High Alert Medications'
'High Reliability Organizations (HROs)'
'HSOPS'
'Human Factors Engineering'
'Human Factors Engineering and Patient Safety'
'Introduction to Patient Safety'
'Just Culture'
'Leading Change'
'Medical and Legal Issues'
'Mistake-Proofing: The Design of Healthcare Processes'
'Patient Safety Assessment Tool (PSAT)'
'Patient Safety Culture Surveys/Tools'

Key Search Terms
'Probabilistic Risk Assessment' (PRA)
Quality Improvement Organization
'RCA Process and Methods'
'Reporting of Adverse Events'
'Root Causes: Five Rules of Causation'
'Safety Assessment Code' (SAC) Matrix
State Health Department
'TeamSTEPPS™ Master Trainer Workshop'
Tools to Assess the Business Case for Patient Safety
Tools to Evaluate Patient Safety Programs
Tools to Identify High-Alert Medications
'Usability Testing Technique'
VA's Safety Assessment Code (SAC)
Basic Patient Safety Manager Course
Continuing Education and Patient Safety
Culture Measurement, Feedback, and Intervention
Employ Evidence-based Practice
Health Care Team Coordination
Identification and Mitigation of Risks and Hazards
Interdisciplinary Teams and Patient Safety
Interpersonal and Communication Skills
Leadership Structures and Systems
Lean Six Sigma
Medical Knowledge and Patient Safety
Medication Error Reporting
Mock Tracers
Patient Safety Manager Certification Program
Patient Safety Standards
Patient-Centered Care
Performance Improvement and Patient Safety
Plan-Do-Check-Act (PDCA)
Practice-Based Learning and Improvement
Quality Management
Risk Identification and Mitigation and Patient Safety

Key Search Terms
Safety Culture
Six Sigma
System-Based Practice
Systems Approach to Patient Safety
TapRoot
Teamwork Training and Skill Building
Utilize Informatics and Patient Safety
Walkrounds



## Appendix B. Data Entry Screens

Inclusion Criteria / Background / Pre-Training

Content

Design and Delivery

Implementation

Post-Training

### Inclusion Criteria

Go To Next Page

Patient Safety Oriented:

Instructional Objectives:

Target Audience:

Current In US:

Adapted For Healthcare:

### Background

Sponsor Type:



**Origin/Sponsor:**

<div></div> <div></div>	<div>▼</div> <div></div>
-------------------------	-------------------------------------------------------------------------------------------------------------

If Other (726), specify:

If Other (726), specify\_2:

If Other (726), specify\_3:

If Other (726), specify\_4:

If Other (726), specify\_5:

If Other (726), specify\_6:

URL:

Reach:  ▼

## Pre-Training

Pre-requisites:

Pre-Requisites?:



Go To Next Page

Inclusion Criteria / Background / Pre-Training

Content

Design and Delivery

Implementation

Post-Training

## Content

Go To Previous Page

Go To Next Page

Evidence Based?:

Evidence:

Content Areas:

Program Description/Program Objectives:

Learning Objectives:

AHRQ Tools and Resources Used:

Organizational Needs Assessment?:

Type of Assessment Organization:

Cultural Readiness Assessment?:

Type of Assessment Cultural:

In-Service Delivery Option?:

**Content:**

**Clinical Area:**

Go To Previous Page





Go To Next Page

## Design and Delivery

[Go To Previous Page](#)[Go To Next Page](#)

Training Delivered By:

Mode of Delivery:

<input type="text"/>	▼		
<input type="text"/>	▼		
<input type="text"/>	▼		

Instructional Strategy:

<input type="text"/>	▼	
<input type="text"/>	▼	

Instructional Model:

<input type="text"/>	▼	
<input type="text"/>	▼	




Program Focus:

Culturally Appropriate?:








Languages:

☐ English☐ Spanish☐ Chinese☐ Other (please specify):

Target Audience:

	▼	
	▼	
	▼	
	▼	
	▼	
	▼	

Setting of Care:

	▼	
	▼	
	▼	
	▼	
	▼	
	▼	
	▼	

[Go To Previous Page](#) [Go To Next Page](#)



**Implementation**[Go To Previous Page](#)[Go To Next Page](#)**Travel Required:****Notes:****Length of Program**Hours: Weeks: Days: Months: ☐

Information Not Available

☐

Multiple Length Formats

Text Entry

Notes:

Credit Hours?:

Number of Hours:

Type of Credit:

Credentialing Body:

Certification?:

Notes:

Per Person Cost:

**Approaches to Implementation:**

▼



**Recommendations for Roll-out/Implementation:**

▼



If Other, specify:

[Go To Previous Page](#)

[Go To Next Page](#)

## Post-Training

Go To Previous Page

Save Record

Add New Record

Vendor-Provided Evaluation:

### Available Evaluation Measures



### Method of Follow-up:



If Other, specify:

**Incentives and Reinforcement:**

▼



If Other, specify:



Add New Record

Go To Previous Page

Save Record



## Appendix C. Query Screen



Agency for Healthcare Research and Quality  
Advancing Excellence in Health Care  
www.ahrq.gov

### Patient Safety Education and Training Catalog

The Patient Safety Education and Training Catalog contains publicly available information on patient safety programs, as documented during a 2010-2011 Web-based environmental scan.

To search the catalog, select all relevant search features below, and click "Search / Print Report" to display records that match your search criteria. To modify your search criteria or conduct a new search, you must first close the "Program Report" tab.

NOTE: Microsoft Access macros must be enabled for the search function to work.

[Clear All](#)

[Search / Print Report](#)

---

**Program Name:**

---

**Program Sponsor:**

☐ State Governments and Agencies

☐ United States Federal Government

☐ Department of Defense (DOD)

☐ Department of Health and Human Services (HHS)

☐ Agency for Healthcare Research and Quality (AHRQ)

☐ Centers for Medicare & Medicaid Services (CMS)

☐ Department of Veterans Affairs (VA)

☐ Other

Search for another sponsor:

---

**Mode of Delivery:** ☐ Classroom Instruction ☐ Web-based Training ☐ Self-directed Study

---

**Instructional Strategy:** ☐ Information ☐ Demonstration ☐ Practice ☐ Feedback

---

**Available Evaluation Measures:**

☐ Level 1 Participant Reaction to Training

☐ Level 2 Participant Learning

☐ Level 3 Transfer of Training to the Job

☐ Level 4 Training Impact

---

## Content Area:

### ☐ Device-related Complications

- ☐ Infusion Pumps
- ☐ Restraints

### ☐ Diagnostic Errors

- ☐ Diagnostic Test Interpretation Error
- ☐ Radiograph Interpretation Error

### ☐ Discontinuities, Gaps, and Hand-Off Problems

### ☐ Fatigue and Sleep Deprivation

### ☐ Identification Errors

- ☐ Wrong Patient
- ☐ Wrong-Site Surgery

### ☐ Medical Complications

- ☐ Delirium
- ☐ Nosocomial Infections
- ☐ Patient Falls
- ☐ Pressure Ulcers

### ☐ Communication Improvement

#### ☐ Communication between Providers

- ☐ Read Back Protocols
- ☐ Structured Hand-offs
- ☐ SBAR
- ☐ Medication Reconciliation

#### ☐ Provider-Patient Communication

- ☐ Health Literacy Improvement
- ☐ Informed Consent

### ☐ Culture of Safety

- ☐ Learning Organization
- ☐ Red Rules
- ☐ Institutional Patient Safety Plan
- ☐ Just Culture

### ☐ Error Reporting and Analysis

- ☐ Error Analysis

### ☐ Logistical Approaches

- ☐ Duty Hour Limitation
- ☐ Laboratory Result Tracking Improvement
- ☐ Scheduling Changes

### ☐ Quality Improvement Strategies

- ☐ Audit and Feedback
- ☐ Benchmarking
- ☐ Continuous Quality Improvement
- ☐ Critical Pathways
- ☐ Patient Self-Management
- ☐ Practice Guidelines
- ☐ Six Sigma

### ☐ Specialization of Care

- ☐ Clinical Pharmacist Involvement
- ☐ Intensivists and Other ICU Strategies
- ☐ Specialized Teams



- ☐ Medication Safety
  - ☐ Medication Errors/Preventable Adverse Drug Events
    - ☐ Administration Errors
    - ☐ Dispensing Errors
    - ☐ Monitoring Errors and Failures
    - ☐ Ordering/Prescribing Errors
    - ☐ Transcription Errors
  - ☐ Side Effects/Adverse Drug Reactions
  - ☐ Specific to High-Risk Drugs
    - ☐ Anticoagulants
    - ☐ Look-Alike, Sound-Alike Drugs
- ☐ Nonsurgical Procedural Complications
  - ☐ Bedside Procedures
  - ☐ Cardiology
- ☐ Surgical Complications
  - ☐ Intraoperative Complications
    - ☐ Wrong-Site Surgery
  - ☐ Postoperative Surgical Complications
    - ☐ Surgical Site Infections
- ☐ Transfusion Complications
- ☐ Psychological and Social Complications
  - ☐ Privacy Violations

- ☐ Failure Mode Effects Analysis
  - ☐ Narrative/Storytelling
  - ☐ Root Cause Analysis
  - ☐ Patient Safety Indicators
- ☐ Error Reporting
  - ☐ Governmental Reporting
  - ☐ Institutional Reporting
  - ☐ Never Events
  - ☐ Patient Complaints
  - ☐ Patient Disclosure
- ☐ Human Factors Engineering
  - ☐ Checklists
- ☐ Driving Change
- ☐ Risk Analysis
- ☐ Legal and Policy Approaches
  - ☐ Credentialing, Licensure, and Discipline
  - ☐ Incentives
    - ☐ Financial
    - ☐ Public Reporting
  - ☐ Malpractice Litigation
  - ☐ Regulation
  - ☐ Role of the Media

- ☐ Rapid-Response Teams
- ☐ Teamwork
  - ☐ Teamwork Training
- ☐ Technologic Approaches
  - ☐ Automatic drug dispensers
  - ☐ Bar Coding and Radiofrequency ID Tagging
  - ☐ Clinical Information Systems
    - ☐ Computerized Decision Support
    - ☐ Computerized Provider Order Entry (CPOE)
    - ☐ Electronic Health Records
  - ☐ Computer-Assisted Therapy
  - ☐ Computerized Adverse Event Detection
- ☐ Triage Questions
- ☐ Specific Patient Care Issues



## Appendix D. Sample Query Results

### Safety Rounds in Ambulatory and Inpatient Settings

#### Background

Sponsor Type:	Private
Origin/Sponsor:	Other; American Academy of Pediatrics
Reach:	International

#### Pre-Training

Prerequisites	Information not available
---------------	---------------------------

#### Content

Evidence-Based:	Yes
Content Areas:	Communication improvement; read-back protocols; human factors engineering; quality

improvement

Clinical Area:

Program Description/  
Program Objectives:

strategies; specific patient care issue; communication between providers  
Medicine; primary care; pediatrics; general pediatrics; critical care; hospital medicine  
After this Webinar, participants will be able to:  
1) Describe the process and explain the rationale for senior leader-driven safety rounds in ambulatory and inpatient settings  
2) List the types of safety issues identified on safety rounds, and distinguish similarities and differences between safety issues in ambulatory and inpatient settings  
3) Select and apply at least one strategy to ensure issues identified on safety rounds are efficiently and effectively discussed with all appropriate individuals and that improvements are implemented

Organizational Needs Assessment:  
Cultural Readiness Assessment:  
In-Service Delivery Option:

No  
No  
No

#### Design and Delivery

Training Delivered by:  
Program Focus:  
Mode of Delivery:  
Instructional Strategy:  
Instructional Model:  
Target Audience:

Multiple people of differing backgrounds  
Both participants and master trainers  
Web-based training  
Information  
External training  
Health care providers, physicians, allied health professionals, nurses, health care executives and administrators, risk managers, health care students, quality and safety professionals  
Hospitals, general hospitals, children's hospitals

Setting of Care:

#### Implementation

Length of Program:

Hours: \_\_\_\_ Days: \_\_\_\_ Weeks: \_\_\_\_ Months: \_\_\_\_  
Information not available

Credit Hours:

No

Certification:

No

Per-Person cost:

Information not available

#### Post-training

Vendor-Provided Evaluation:

Information not available

# **The Human Factor: The Impact of Work Hours, Sleep Deprivation, and Burnout on Patient Safety**

## **Background**

Sponsor Type:	Private
Origin/Sponsor:	Other; American Academy of Pediatrics
Reach:	International

## **Pre-Training**

Pre-requisites:	Information not available
-----------------	---------------------------

## **Content**

Evidence-Based:	Yes
Content Areas:	Driving change; fatigue and sleep deprivation; logistical approaches, duty hour limitation; scheduling changes; specific patient care issue

Clinical Area:	Medicine, hospital medicine, pediatrics
----------------	-----------------------------------------

Program Description/	By the end of this Webinar, participants will be able to: 1) Describe the current state of the science on the effects of sleep deprivation and long work hours on physician alertness and performance, patient safety, and physician safety 2) Discuss the prevalence of physician burnout and depression and their effects on patient safety 3) Identify efforts to improve physician working conditions and mental health as a means of improving safety
----------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Organizational Needs Assessment:	No
----------------------------------	----

Cultural Readiness Assessment:	No
--------------------------------	----

In-Service Delivery Option:	No
-----------------------------	----

## **Design and Delivery**

Training Delivered by:	Multiple people of differing backgrounds
Program Focus:	Both participants and master trainers
Mode of Delivery:	Web-based training
Instructional Strategy:	Information
Instructional Model:	External training
Target Audience:	Health care providers, allied health professionals, physicians, nurses, health care executives and administrators, risk managers, health care students, quality and safety professionals
Setting of Care:	Hospitals, general hospitals, children's hospitals

## **Implementation**

Length of Program:	Hours: ____ Days: ____ Weeks: ____ Months: ____ Information not available
--------------------	------------------------------------------------------------------------------

Credit Hours:	No
---------------	----

Certification:	No
----------------	----

Per-Person cost:	Information not available
------------------	---------------------------

## **Post-training**

Vendor-Provided Evaluation:	Information not available
-----------------------------	---------------------------

## Appendix E. Frequency Analyses for Content Area and Clinical Area

### Content Area

Taxonomy ID	Content Area	Frequency
403	Device-related Complications	6
404	-- Indwelling Tubes and Catheters	0
405	-- Infusion Pumps	1
406	-- Prostheses and Implants	0
451	-- Restraints	6
407	Diagnostic Errors	18
408	-- Clinical Misdiagnosis	0
410	-- Diagnostic Test Interpretation Error	2
409	-- Radiograph Interpretation Error	1
412	Discontinuities, Gaps, and Hand-Off Problems	4
452	-- Missed or Critical Lab Results	0
413	Fatigue and Sleep Deprivation	13
411	Identification Errors	18
443	-- Wrong Patient	7
444	-- Wrong-Site Surgery	12
426	Medical Complications	26
429	-- Delirium	2
427	-- Nosocomial Infections	3
450	-- Patient Falls	11
428	-- Pressure Ulcers	5
430	-- Venous Thrombosis and Thromboembolism	0
414	Medication Safety	126
416	-- Medication Errors/Preventable Adverse Drug Events	96
420	---- Administration Errors	14
419	---- Dispensing Errors	11
448	---- Monitoring Errors and Failures	23
417	---- Ordering/Prescribing Errors	6
418	---- Transcription Errors	5
415	-- Side Effects/Adverse Drug Reactions	17

<b>Taxonomy ID</b>	<b>Content Area</b>	<b>Frequency</b>
421	-- Specific to High-Risk Drugs	18
422	---- Anticoagulants	3
424	---- Chemotherapeutic Agents	0
423	---- Insulin	0
425	---- Look-Alike, Sound-Alike Drugs	9
449	---- Opiates/Narcotics	0
431	Nonsurgical Procedural Complications	15
432	-- Bedside Procedures	1
433	-- Cardiology	2
434	-- Gastroenterology	0
435	-- Interventional Radiology	0
436	-- Pulmonary Complications	0
445	Psychological and Social Complications	21
446	-- Privacy Violations	2
437	Surgical Complications	25
439	-- Intraoperative Complications	12
440	---- Retained Surgical Instruments and Sponges	0
447	---- Wrong-Site Surgery	12
441	-- Postoperative Surgical Complications	9
453	---- Surgical Site Infections	9
438	-- Preoperative Complications	0
442	Transfusion Complications	4
630	Communication Improvement	179
631	-- Communication between Providers	30
632	---- Read Back Protocols	3
633	---- Structured Hand-offs	10
680	---- SBAR	7
681	---- Medication Reconciliation	2
634	-- Provider-Patient Communication	57
636	---- Health Literacy Improvement	31
635	---- Informed Consent	11
656	Culture of Safety	151
657	-- Learning Organization	36
682	-- Red Rules	1

<b>Taxonomy ID</b>	<b>Content Area</b>	<b>Frequency</b>
686	-- Institutional Patient Safety Plan	53
689	-- Just Culture	18
668	Education and Training	0
671	-- Continuing Education	0
672	---- Conferences and Workshops	0
673	---- Educational Outreach/Academic Detailing	0
674	-- Online Education	0
677	-- Patient Education	0
670	-- Residents and Fellows	0
675	-- Simulators	0
669	-- Students	0
676	-- Teamwork Training	0
619	Error Reporting and Analysis	206
625	-- Error Analysis	185
627	---- Failure Mode Effects Analysis	34
628	---- Morbidity and Mortality Conferences	0
629	---- Narrative/Storytelling	27
626	---- Root Cause Analysis	73
688	---- Patient Safety Indicators	3
620	-- Error Reporting	91
621	---- Governmental Reporting	1
622	---- Institutional Reporting	2
690	---- Never Events	12
623	---- Nongovernmental Reporting	0
685	---- Patient Complaints	2
624	---- Patient Disclosure	3
637	Human Factors Engineering	109
641	-- Checklists	22
638	-- Forcing Functions	0
640	-- Medical Alarm Design	0
639	-- Medical Device Design	0
611	Legal and Policy Approaches	57
612	-- Credentialing, Licensure, and Discipline	5
613	-- Incentives	11

<b>Taxonomy ID</b>	<b>Content Area</b>	<b>Frequency</b>
614	---- Financial	3
615	---- Public Reporting	8
617	-- Malpractice Litigation	3
616	-- Regulation	33
618	-- Role of the Media	3
651	Logistical Approaches	56
655	-- Duty Hour Limitation	4
652	-- Laboratory Result Tracking Improvement	2
653	-- Nurse Staffing Ratios	0
654	-- Scheduling Changes	3
603	Quality Improvement Strategies	186
604	-- Audit and Feedback	1
605	-- Benchmarking	12
606	-- Continuous Quality Improvement	87
607	-- Critical Pathways	5
610	-- Patient Self-Management	3
608	-- Practice Guidelines	14
609	-- Reminders	0
683	-- Six Sigma	12
645	Specialization of Care	10
650	-- Clinical Pharmacist Involvement	3
648	-- Hospitalists	0
647	-- Intensivists and Other ICU Strategies	1
646	-- Specialized Teams	2
684	---- Unit-Based Safety Team	0
687	---- Rapid-Response Teams	2
649	-- Volume-Based Referral	0
643	Teamwork	112
644	-- Teamwork Training	71
658	Technologic Approaches	73
659	-- Automatic drug dispensers	4
660	-- Bar Coding and Radiofrequency ID Tagging	8
678	-- Clinical Information Systems	25
663	---- Computerized Decision Support	2



<b>Taxonomy ID</b>	<b>Content Area</b>	<b>Frequency</b>
662	---- Computerized Provider Order Entry (CPOE)	3
679	---- Electronic Health Records	13
664	-- Computer-Assisted Therapy	2
666	---- Computer- or Robotic-Assisted Surgery	0
665	---- Computer-Assisted Radiotherapy	0
661	-- Computerized Adverse Event Detection	6
667	-- Telemedicine	0
691	Driving Change	56
692	Risk Analysis	114
693	Triage Questions	2
694	Specific Patient Care Issues	52

## Clinical Area

Taxonomy ID	Clinical Area	Frequency
303	Allied Health Services	8
304	-- Nutrition/Dietetics	0
305	-- Physical and Occupational Therapy	0
306	Complementary and Alternative Medicine	0
307	Dentistry	1
308	Medicine	323
309	-- Anesthesiology	0
310	-- Critical Care	3
311	-- Dermatology	0
312	-- Emergency Medicine	16
313	-- Family Medicine	5
314	-- Gynecology	0
315	-- Hospital Medicine	31
316	-- Internal Medicine	24
317	---- Allergy & Immunology	1
318	---- Cardiology	2
319	---- Emergency Medicine	16
320	---- Endocrinology	0
321	---- Gastroenterology	0
322	---- General Internal Medicine	0
323	---- Geriatrics	0
324	---- Hematology	2
372	---- Infectious Diseases	3
325	---- Medical Oncology	0
326	---- Nephrology	0
327	---- Pulmonology	0
328	---- Rheumatology	0
330	-- Mental Health Care (Psychiatry & Clinical Psychology)	3
331	-- Neurology	1
332	-- Obstetrics	0
333	-- Ophthalmology	0
334	-- Pathology & Laboratory Medicine	1

<b>Taxonomy ID</b>	<b>Clinical Area</b>	<b>Frequency</b>
335	-- Pediatrics	22
341	---- General Pediatrics	8
344	---- Neonatology and Intensive Care	0
336	---- Pediatric Allergy & Immunology	1
337	---- Pediatric Cardiology	0
338	---- Pediatric Emergency Medicine	2
339	---- Pediatric Endocrinology	0
340	---- Pediatric Gastroenterology	0
342	---- Pediatric Hematology	2
343	---- Pediatric Medical Oncology	0
345	---- Pediatric Nephrology	0
346	---- Pediatric Pulmonology	0
347	---- Pediatric Rheumatology	0
348	-- Physical Medicine and Rehabilitation	0
314	-- Primary Care	13
349	-- Public Health	28
350	-- Radiology	3
351	-- Surgery	37
352	---- Cardiothoracic Surgery	0
353	---- General Surgery	1
354	---- Neurosurgery	0
356	---- Orthopedic Surgery	1
355	---- Otolaryngology	0
357	---- Pediatric Surgery	1
358	---- Plastic Surgery	0
359	---- Surgical Oncology	0
360	---- Urology	0
371	---- Vascular Surgery	0
361	Nursing	45
364	-- Anesthesia Nursing	2
363	-- Critical Care Nursing	2
366	-- Emergency Nursing	2
367	-- Home Nursing	1
362	-- Medical/Surgical/Psychiatric Nursing	0

<b>Taxonomy ID</b>	<b>Clinical Area</b>	<b>Frequency</b>
365	-- Obstetrical Nursing	0
368	Pharmacy	34
370	-- Community Pharmacy	0
369	-- Hospital Pharmacy	1