Evaluation of the AHRQ Patient Safety Initiative: Framework and Approach

Donna O. Farley and James B. Battles

Objective. Describe the evaluation performed of the patient safety initiative operated by the Agency for Healthcare Research and Quality (AHRQ).

AHRQ Patient Safety Initiative. When patient safety became a national priority in 2000, Congress charged and funded AHRQ to improve health care safety. Over the next 6 years, AHRQ funded more than 300 research projects and other activities, addressing diverse patient safety issues and practices.

The Patient Safety Evaluation. AHRQ contracted with RAND in 2002 to perform a 4-year evaluation of the initiative, which was completed in 2006. This formative evaluation used the CIPP program evaluation model, which emphasizes multiple stakeholders' interests (e.g., patients, providers, funded researchers). We monitored the progress of the patient safety initiative and provided AHRQ annual feedback that assessed each year's activities, identifying issues and offering suggestions for actions by AHRQ. Given the size and complexity of the initiative, the evaluation needed to examine key individual components and synthesize results across them, and it also had to be responsive to changes in the initiative over time. We used a conceptual framework to bring together the disparate pieces to synthesize overall findings. The remaining articles in this issue describe selected results from this evaluation.

Key Words. Program evaluation, evaluation design and research, quality care-patient safety (measurement)

In January 2000, the Institute of Medicine (IOM) published the report *To Err Is Human: Building a Safer Health System*, which stimulated national efforts to improve the safety of the U.S. health care system (IOM 2000). In FY 2001, the U.S. Congress identified patient safety as a national priority and appropriated an initial \$50 million for the Agency for Healthcare Research and Quality (AHRQ) to support a patient safety initiative. AHRQ subsequently funded a range of activities, including research and demonstration projects to develop new knowledge and tools on patient safety epidemiology and practices, as well as dissemination activities to encourage adoption of effective practices by health care providers. AHRQ also funded a Patient Safety Evaluation Center

with the responsibility for evaluating the progress of the initiative and making recommendations for improvement. In September 2002, AHRQ contracted with the RAND Corporation to serve as its Patient Safety Evaluation Center. The 4-year evaluation was completed in September 2006, with a final report submitted to AHRQ.

The purpose of this supplemental issue is to discuss some key findings from the patient safety evaluation and to illustrate what was involved in performing a comprehensive program evaluation for a large, complex initiative that is evolving and maturing over time. One of the most comprehensive evaluations commissioned by an agency, AHRQ pursued the evaluation to provide feedback that AHRQ could use to strengthen the patient safety initiative over time. In this introductory paper, we describe the AHRQ patient safety initiative and discuss the framework and approach used to evaluate it. We then highlight some of the evaluation findings regarding the context and strategy of the initiative, and we introduce the subsequent papers presented in this issue, each of which addresses an assessment of a specific activity undertaken within the initiative.

WHAT IS THE AHRQ PATIENT SAFETY INITIATIVE?

AHRQ's Center for Quality Improvement and Patient Safety has had primary responsibility for overall management of the patient safety initiative, and its Center for Primary Care, Prevention, and Clinical Partnerships has had lead responsibility for awarding and managing the health IT grants. The two centers have worked together on several components of the patient safety initiative.

AHRQ established a patient safety strategy consisting of four elements: identifying threats to patient safety; identifying and evaluating effective patient safety practices; teaching, disseminating, and implementing effective patient safety practices; and maintaining vigilance (AHRQ 2003). Specific performance goals and related fiscal year targets were established by AHRQ for three of the strategy elements (all except maintaining vigilance); these goals and targets are listed in Table 1. Progress in meeting these goals was assessed as part of the evaluation (see Farley and Damberg 2008, in this issue, for results).

Address correspondence to Donna O. Farley, PhD, RAND Corporation, 4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213; e-mail: farley@rand.org. James B. Battles, PhD, Center for Quality Improvement and Patient Safety, Agency for Healthcare Research and Quality, Rockville, MD.

Table 1: AHRQ's Patient Safety Performance Goals and Fiscal Year Targets

<i>Goals and Fiscal Year Targets</i>	
<i>Identify the Threat</i>	
Performance Goal: By 2010, patient safety events reporting will be standard practice in 90 percent of hospitals nationwide.	
FY 2005	Continue reporting on patient safety events and begin to analyze the number and types
FY 2004	Pilot the system at 50 hospitals and begin reporting on patient safety adverse events
FY 2003	Develop reporting mechanism and data structure through the National Patient Safety Network
<i>Identify and Evaluate Effective Practices</i>	
Performance Goal: By 2010, double the number of patient safety practices that have sufficient evidence available and are ready for implementation. (Use the Evidence-based Practice Center [EPC] report for baseline data.)	
FY 2005	Five health care organizations/units of state/local governments will evaluate the impact of their patient safety best practices interventions
FY 2004	Six health facilities or regional initiatives to implement interventions and service models on patient safety improvements will be in place
FY 2003	Awards to be made to at least six facilities or initiatives
<i>Educate, Disseminate, and Implement to Enhance Patient Safety</i>	
Performance Goal: By 2010, successfully deploy hospital practices such that medical errors are reduced nationwide.	
FY 2005	15 additional states or major health care systems will have on-site experts in patient safety
FY 2004	10 states or major health care systems will have been trained through the Patient Safety Improvement Corps (PSIC) program; five health care organizations or units of state/local government will implement evidence-based proven safe practices
FY 2003	Establish a PSIC training program; award up to five grants to health care organizations or units of state/local government for implementing evidence-based proven safety practices
FY 2002	Conduct a planning study

Source: AHRQ Justification for FY 2005 Budget (AHRQ 2004).

AHRQ, Agency for Healthcare Research and Quality.

During the first 6 years of the initiative, AHRQ funded more than 235 patient safety projects. The evaluation focused on all patient safety grants funded through FY 2005. These consisted of six demonstration projects funded in FY 2000, 75 research and demonstration projects funded in FY 2001, 13 Challenge Grants for Patient Safety Practices funded in FY 2003, 104 Patient Safety Health Information Technology (health IT) Grants funded in FY 2004, an additional 14 health IT grants funded in FY 2005, five State and Regional Demonstrations in Health IT funded in FY 2005, and 17 Grants for

Partnerships for Implementing Patient Safety funded in 2005.¹ See Sorbero et al., 2008 (in this issue) for additional details on the funded projects.

AHRQ also funded numerous other projects to build the nation's capability for improving the safety of health care. Several have contributed to building measurement and monitoring capability, e.g., development of the Patient Safety Indicators (AHRQ 2006), and an IOM report on patient safety data standards (Aspden et al. 2004). Others have supported providers in implementing safe practices, for example, the evidence report on effective patient safety practices (Shojania et al. 2001). Some projects, such as the Hospital Survey on Patient Safety Culture and the Patient Safety Improvement Corps, have provided tools and training for strengthening the infrastructure in health care organizations to support safe practices.

AHRQ has built partnerships with many organizations to enhance patient safety practices in the field, such as the Surgical Care Improvement Project led by a partnership of health care organizations, the Hospital Quality Alliance, and the Five Million Lives Campaign run by the Institute for Healthcare Improvement. In addition, AHRQ has used its practice/research networks to fund patient safety implementation projects, including the Accelerating Change and Transforming Organizations and Networks, and the Primary Care Practice Based Research Network.

WHAT TYPE OF EVALUATION WAS NEEDED?

In charging the evaluation center to evaluate its patient safety initiative, AHRQ specified that it wanted to obtain regular feedback on performance that could be used to continually strengthen the initiative. The evaluation was to assess the progress of the full scope of the initiative's activities toward meeting AHRQ's objectives and contributing to the nation's patient safety activities. It also was to assess the overall impacts of the initiative, including patient outcomes, effects on other stakeholders, and the extent to which evidence-based safe practices were being adopted by providers.

AHRQ specified that the evaluation center should use *program evaluation* methods to evaluate the patient safety initiative. A program evaluation involves ongoing data collection and assessments over time (*longitudinal*), and regularly provides feedback to guide program improvements (*formative*). AHRQ cited several key methods that are fundamental to formative evaluations, including use of logic models to frame the evaluation, use of interview and focus group techniques to collect data, triangulation of results from

multiple stakeholders, and feedback about the findings to help strengthen the program (Crawford et al. 2005; Kochevar and Yano 2006; Stetler et al. 2006; Westbrook et al. 2007). All of these techniques were used in the evaluation of the patient safety initiative.

A program evaluation differs from a normative evaluation (which makes judgments on performance and outcomes) or a summative evaluation (which performs a retrospective assessment of the history and status of a program). Program evaluation places emphasis on documenting what happens in a program and the contextual factors that influenced what occurred. The evaluation shifts its focus in response to changes in the program over time, and is intended to influence those changes. Therefore, the randomized control designs that are desirable for other types of evaluations, in particular for studies aimed at assessing the effects of an intervention on specified outcomes, are not appropriate for the overall design of a program evaluation. Within a large program evaluation, however, numerous focused assessments are performed of specific program activities. These assessments may use a variety of sampling strategies, data collection methods, and analytic approaches, including randomized control designs, depending on the nature of the activity being assessed.

AHRQ's patient safety program staff selected the Context-Input-Process-Product (CIPP) evaluation model as the framework for the program evaluation because it was a proven effective program evaluation model in which stakeholders were central to the evaluation. The CIPP evaluation model encompasses the full spectrum of factors involved in the operation of a program (Stufflebeam et al. 1971; Stufflebeam, Madaus, and Kellaghan 2000). The core model components are represented in the CIPP acronym:

- *Context evaluation* assesses the circumstances stimulating the creation or operation of a program as a basis for defining goals and priorities and for judging the significance of outcomes.
- *Input evaluation* examines options for achieving goals and approaches for either choosing a strategy or assessing an existing strategy against alternatives, including congressional priorities and mandates as well as agency goals and strategies.
- *Process evaluation* assesses progress in implementing plans relative to the stated goals for activities and outcomes. Implementation activities are documented, and each is assessed to determine how well it is reaching target population(s), whether the activity is consistent with overall strategy, and how it is affecting stakeholders and safety outcomes.

- *Product evaluation* identifies the consequences of the program for various stakeholders, intended or otherwise, to determine the program's effectiveness and to provide information for future program modifications.

The perspectives and experiences of key stakeholders are central to the CIPP evaluation model, which is grounded in the principles of equity and fairness. When using this model, an evaluator ensures that stakeholders are involved in the evaluation and that their perspectives are identified and weighed in interpreting results. For this evaluation, stakeholders addressed included patient safety grantees, individuals and organizations involved in patient safety nationally, AHRQ staff, other federal agencies, consumer organizations, and individuals trained in the PSIC, as well as various groups potentially affected by changes in patient safety practices (e.g., patients, providers, insurers, state agencies).

This principle of stakeholder involvement was critical for evaluating the patient safety initiative (Stake 1976), to ensure that AHRQ received information about the views and concerns of stakeholder groups, who are the consumers of the products of the patient safety initiative. The ultimate success of the initiative will be influenced by the extent to which its products are usable and have value for providers, policymakers, and others. The perspectives of each of these groups need to be understood and considered in making changes to the patient safety initiative activities.

HOW THE EVALUATION WAS PERFORMED

The evaluation of the patient safety initiative posed two important challenges. First, because the patient safety initiative was a multiyear, comprehensive program, a formative evaluation design was needed, one that not only would evaluate program outcomes, but that also would provide input and recommendations that AHRQ could use to reshape the program as it progressed. Second, the evaluation needed to consider closely the experiences and perspectives of the full range of stakeholders involved, to best understand how well the different activities of the initiative were working, how they were affecting various stakeholders, and how the activities might be improved.

In such an evaluation, it is necessary to identify all the “moving parts” of the initiative and to track how those parts change each year, as earlier activities are completed and new ones are added. In doing this, we needed to identify

the key components of the initiative, which would be the focus of the evaluation. We then needed to pull these disparate parts together into a cohesive whole to tell the story of the progress of the full initiative.

Application of the CIPP Model

Although designed for educational programs, the CIPP model transferred seamlessly to evaluating the experiences and progress of the AHRQ patient safety initiative. The evaluation addressed all the elements of the CIPP model, with the focus shifting in each of the 4 evaluation years as the initiative matured, as summarized in Table 2.

In the first evaluation year (2003), we focused on the context and input aspects of the CIPP model, as well as early experiences in implementing the initiative. The context and input portions of the evaluation examined the strategic aspects of the initiative—the circumstances leading to the development of the patient safety initiative (context) and, given this context, the strategies that AHRQ considered and ultimately adopted to carry out the initiative (input).

In subsequent evaluation years, we shifted our focus to the process evaluation, while continuing to update information on context and input to assess how changes in the strategic aspects of the initiative were affecting subsequent activities. The process evaluation addressed the operational aspects of carrying out the broad mix of activities involved, with consideration of how these activities collectively contributed—or had the potential to contribute—to the goal of improving patient safety in the United States. As the specific activities changed each year, the assessments also changed. We developed a logic model to organize and guide the process evaluation, as described below.

Finally, starting in the second year of the evaluation, the initial stage of the product evaluation began by examining options for measuring the effects of the patient safety initiative on various stakeholder groups, as specified in the CIPP model. Because several years would be required before results from the early funded projects could be available to the health care community, we did not expect the initiative to have observable effects on national measures of safe practices or outcomes within the 4-year term of the evaluation. Therefore, the product evaluation took a developmental approach, to help inform and guide AHRQ's future monitoring of the effects of the initiative over time. This included estimation of baseline trends for some outcome measures, including testing of relevant data and measurement issues.

Table 2: Timeline for Reporting Results from the Longitudinal Evaluation of the National Patient Safety Initiative

	<i>Contents and Time Periods of Evaluation Reports</i>			
	<i>Report 1: History– September 2003</i>	<i>Report 2: October 2003– September 2004</i>	<i>Report 3: October 2004– September 2005</i>	<i>Report 4: October 2005– September 2006</i>
Context evaluation				
Initial assessment of context	X			
Updates on context changes		X	X	X
Input evaluation				
Assessment of goals and strategy established for the initiative	X			
Updates on changes in goals or strategy		X	X	X
Process evaluation				
Baseline documentation patient safety activities related to the initiative	X			
Assessment of contributions by AHRQ-funded patient safety projects to <i>patient safety knowledge</i> and <i>patient safety practices</i>	X	X	X	X
Assessment of other mechanisms used by AHRQ to strengthen patient safety practices		X	X	X
Assessment of dissemination of new knowledge to stakeholders in the field		X	X	X
Assessment of progress in adoption of effective patient safety practices		X	X	X
Product evaluation				
Initial identification of potential outcome measures and data sources		X		
Development of data sources when feasible			X	X
Documentation of baseline trends for selected measures			X	X
Assessment of impacts of the patient safety initiative on selected measures				X
Establishment of infrastructure for AHRQ to continue and expand monitoring impacts			X	X

To meet AHRQ's need for timely information, we generated evaluation data on an annual basis and occasionally reported results for specific activities more frequently as needed. We documented and assessed initiative activities

carried out during each year in annual evaluation reports (Farley et al. 2005; Farley et al. 2007a, b; Farley et al. 2008).

A Nested Framework for the Process Evaluation

Because of the size and complexity of the patient safety initiative, we recognized quickly that we would need to develop a second logic model within the larger CIPP framework to guide the process evaluation. Such a model should enable the evaluation to “tell the story” of the implementation of the patient safety initiative in a way that was intuitively accessible to AHRQ staff and other policymakers who would be using the evaluation results. Specifically, the model should help the evaluation:

- Track a changing mix of activities over time and assess their individual contributions to the overall initiative.
- Summarize the overall effects of the initiative as a function of the collective contributions of its multiple activities.
- Examine how AHRQ’s initiative, as a whole, contributed to the larger set of patient safety activities being undertaken by numerous organizations across the country, both as leader and partner.

The evaluation center developed a process evaluation framework (shown in Figure 1) consisting of five key system components that work together to bring about improved practices and safer health care for patients. This model can be applied to the overall U.S. health care system, as well as to any individual health organization within it.

We developed a set of evaluation questions for each of these system components. Some questions address actions by AHRQ; others address

Figure 1: The Components of an Effective Patient Safety System

actions or issues related to the larger health care system within which AHRQ's initiative operates. In each evaluation year, we identified the current activities of the patient safety initiative and assigned each activity to one of the five system components. We assessed the content and progress of each activity, and these findings helped answer the relevant evaluation questions. We used the same questions throughout the evaluation, although we updated them each year to reflect the most recent status of activities and relevant issues. Sample evaluation questions are shown below the description of each component. See the final paper in this issue (Farley and Damberg 2008) for the full list of evaluation questions used.

The framework component for monitoring progress and maintaining vigilance is identified first and placed on the left side of Figure 1, reflecting the need for early data on patient safety issues to help guide intervention choices. This function then continues to provide routine feedback regarding progress in developing knowledge and implementing practice improvements.

The top row of Figure 1 contains the two components that contribute to development of new knowledge needed to better understand patient safety epidemiology and related issues and to establish an evidence base regarding effective practices and tools.

The knowledge developed in the top two framework boxes feeds into activities within the remaining two model components (in the lower row of Figure 1) that contribute to practice implementation. The first is building the infrastructure needed to support adoption of effective safe practices, and the second is the process of diffusing use of these practices through increased adoption by health care providers.

Definitions of the system components and example questions are as follows:

Monitoring Progress and Maintaining Vigilance. Establishment and monitoring of measures to assess performance improvement progress for key patient safety processes or outcomes, while maintaining continued vigilance to ensure timely detection of and response to issues that represent patient safety risks and hazards. *Example questions:* What actions has AHRQ taken to establish a national-level patient safety data repository? To what extent are national-level data available on the performance of the health care system on patient safety measures, and how has this changed?

Knowledge of Epidemiology of Patient Safety Risks and Hazards. Identification of medical errors and causes of patient injury in health care delivery, with a focus on vulnerable populations, who are compromised in their ability to function as engaged patients during health care delivery.

Example questions: What information has been published over time about patient safety epidemiology, and how have the AHRQ-funded research projects contributed to this new information? What additional work is needed to strengthen the evidence regarding epidemiology and priorities for interventions to reduce adverse outcomes?

Development of Effective Practices and Tools. Development and field-testing of patient safety practices to identify those that are effective, appropriate, and feasible for health care organizations to implement, taking into account the level of evidence needed to assess patient safety practices.

Example questions: How are AHRQ-funded research and field tests on patient safety practices contributing new knowledge about practices for which further scientific evidence is needed? To what extent are implementation methods and tools being developed to support expanded use of tested practices by provider organizations?

Building Infrastructure for Effective Practices. Establishment of the health care structural and environmental elements needed for successful implementation of effective patient safety practices, including an organization's commitment and readiness to improve patient safety (e.g., culture, information systems, trained personnel), hazards to safety created by the organization's structure (e.g., physical configurations, procedural requirements), and effects of the macro-environment on the organization's ability to act (e.g., legal and payment issues).

Example questions: How are AHRQ and its funded patient safety projects contributing to establishment of infrastructure to support patient safety in health care organizations across the country? What additional research or development work is needed to strengthen infrastructures for patient safety practices?

Achieving Broader Adoption of Effective Practices. The adoption, implementation, and institutionalization of improved patient safety practices to achieve sustainable improvement in patient safety performance across the health care system.

Example questions: What actions has AHRQ undertaken to disseminate information and products from the patient safety grants and contracts it has funded? How are AHRQ's dissemination strategy and activities contributing to the patient safety implementation initiatives operated by other organizations?

Data Collection and Analysis Methods

As discussed above, the evaluation needed to examine widely varying types of activities within the patient safety initiative, which required use of multiple data collection and analysis methods. We describe here the general types of

methods used in each phase of the evaluation (according to the CIPP model). The following six papers in this issue provide examples of the data collection and analytic methods used in assessing specific activities.

For the *context evaluation*, the evaluation documented historical events leading up to the start of the patient safety initiative and identified external expectations and challenges for the initiative as it started and continued operation. Information for this analysis was obtained from written documents, websites, and other factual sources. In addition, individual interviews were conducted with key national stakeholders, including AHRQ staff, to understand their views on the history of patient safety and related issues, AHRQ's initiative, and progress in improving patient safety. Data from the interviews were organized and summarized by topic area, and were analyzed to identify key themes and differences in viewpoints among stakeholders. Interview results also were considered within the context of factual information obtained from other sources. Similar data collection and analysis methods, including interviews and analysis of written or electronic documents, were used for the *input evaluation*, which described and assessed the goals and strategies that AHRQ established for the patient safety initiative.

The *process evaluation* drew upon a variety of data collection methods, since so many different kinds of activities were involved. It relied extensively on individual or group interviews with stakeholders, including leads of funded projects, representatives of organizations involved in patient safety, and AHRQ staff. Data also were coded from the project proposals, which allowed us to profile projects by type of patient safety issue addressed, practices tested, health care settings, contribution to scientific evidence, and other factors (see Sorbero et al. 2008, in this issue, for details).

As described above, the *product evaluation* consisted mainly of exploratory analyses of existing measures and data, which therefore did not involve primary data collection. The evaluation center researched written materials to identify existing measures that might be used to assess outcomes using administrative data, assessed the technical basis for the outcome measures, and estimated baseline trends for some of them. Standard methods for working with administrative data were applied, including construction of variables for measures being tested, case mix adjustments, and statistical inference.

EVALUATION RESULTS COVERED IN THIS ISSUE

The purpose of this supplemental issue is to illustrate how program evaluation methods were used to evaluate the AHRQ patient safety initiative, and to high-

light some of the key evaluation methods and findings. To set the stage for this discussion, we summarize some results from the context and input evaluations and then list the remaining papers in this volume, identifying how each fits into the CIPP evaluation model and, within that, the process evaluation framework.

Highlights from the Context and Input Evaluations

Context Evaluation. At the time AHRQ's patient safety initiative began in 2000, there was a lack of recognition or acceptance within the health care system that there was a "patient safety problem." The IOM report *To Err Is Human: Building a Safer Health System* (IOM 2000) raised public awareness of patient safety issues. Soon thereafter, the U.S. Congress made patient safety a national policy priority and designated AHRQ as the lead federal agency.

The visibility of patient safety as a policy and political issue, coupled with high Congressional expectations for achieving safer health care, had several implications for AHRQ, which the context evaluation identified. First, AHRQ had a Congressional mandate to provide leadership in effecting change in patient safety practices. Second, AHRQ needed to balance this new mandate for catalyzing change with its traditional research role, necessitating tradeoffs in priorities. Third, the small level of AHRQ funding, relative to the size of the patient safety problem, required strategic choices by AHRQ to achieve an impact within these resource constraints. Fourth, AHRQ was under pressure to demonstrate progress in improving practices and reducing patient harm. Finally, to achieve synergy and consistent standards of practice, AHRQ needed to encourage coordination among the many diverse patient safety activities being undertaken by multiple public and private organizations.

Input Evaluation. AHRQ's strategy for the patient safety initiative evolved over the course of the evaluation period. For example, new priorities included health IT in FY 2004, and most recently, safety in ambulatory care settings.

Each year, the input evaluation identified several strategic issues that AHRQ was encouraged to address. For example, AHRQ was encouraged to involve providers and consumers actively throughout the development of safety practices and tools, to ensure their usefulness to these end users. AHRQ was also encouraged to collaborate with field-based collaborators in disseminating products and tools, and to support health care providers in adopting safety practices.

Topics Covered in the Remaining Papers in This Issue

The next six papers in this issue address analyses performed within the process and product evaluations of the CIPP model. The analyses presented are those

that examine activities central to the patient safety initiative and also exemplify a variety of methodological approaches. Each article explains how that evaluation component contributes to the overall evaluation, demonstrates the specific methods used to gather and analyze the information needed for that component, and reports findings from those analyses. The assessments are listed according to the CIPP and process evaluation frameworks in which they are placed, as follows:

Process Evaluation papers—

- Assessment of Contributions to Patient Safety Knowledge by the AHRQ-Funded Patient Safety Projects (Sorbero et al.) (knowledge of epidemiology, safe practice development).
- Experiences of AHRQ-Funded Projects That Implemented Safe Practices (Taylor et al.) (safe practice development).
- Adopting Information Technology to Drive Improvements in Patient Safety: Lessons from the AHRQ Health IT Grantees (Damberg et al.) (safe practice development).
- Training a Patient Safety Work Force: The Patient Safety Improvement Corps (Teleki et al.) (building infrastructure).
- The Growth of National Partnerships to Support Patient Safety Practice Adoption (Mendel et al.) (building infrastructure).

Product Evaluation paper—entitled *Patient Safety Outcomes in the United States: Trends and Challenges in Measurement* (Greenberg et al.)—discusses some of the exploratory analyses performed in the product evaluation.

The final article presents a synthesis of the collective results of the evaluation to assess the overall status and progress of the initiative as of 2006 (Farley and Damberg). It reports findings across all four elements of the CIPP model, with a strong focus on process evaluation results, and it discusses implications for future AHRQ activities, as well as limitations of the evaluation.

CONCLUSION

As the patient safety initiative matured from 2001 through 2006, AHRQ gradually shifted its focus—starting with development of knowledge through research, then moving to projects that were testing practices suggested by research to be effective, followed by emphasis on disseminating information

and products for health care providers as the end users. For 4 years, the patient safety evaluation provided AHRQ with a comprehensive assessment of its evolving patient safety initiative, with annual feedback on progress and opportunities to further strengthen future strategies and activities. The evaluation evolved along with the initiative, highlighting the importance of being flexible in responding to program changes while maintaining methodological rigor in examining each activity and synthesizing evaluation results.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: We acknowledge with thanks the participation of the many individuals we involved in interviews and other data collection activities of this evaluation, including the leads of AHRQ-funded grants and contracts, AHRQ staff, and many other stakeholders. Their thoughtful feedback provided valuable information and insights regarding patient safety issues and activities across the United States, which enriched the evaluation. Karen Ricci, Nancy Pollock, Jake Dembosky, and Lily Bradley have our gratitude for the management and research support they provided during the 4 years of the evaluation. We also thank the anonymous reviewers whose feedback helped us to strengthen this paper, and Kristin Leuschner who helped us to revise an earlier version of the paper.

This work was supported by contract No. 290-02-0010 from the AHRQ, U.S. Department of Health and Human Services.

Disclaimers: The research described in this manuscript was an evaluation project funded under contract with the AHRQ. Pursuant to that contract, AHRQ had the right to review and comment on this manuscript before its publication. The information and opinions expressed herein reflect solely the position of the authors. Nothing herein should be construed to indicate AHRQ support or endorsement of its contents.

Disclosures: None.

NOTE

1. Six groups of projects were funded in FY 2001—Clinical Informatics, Centers of Excellence, Developmental Centers, Dissemination and Education, Reporting Demonstrations, and Working Conditions. Three groups of health IT projects were funded in FY 2004—planning grants, implementation grants, and grants to evaluate the value of health IT systems.

REFERENCES

- Agency for Healthcare Research and Quality. 2003. *AHRQ's Patient Safety Initiative: Building Foundations, Reducing Risk. An Interim Report to the United States Senate Committee on Appropriations*. Rockville, MD: AHRQ.
- Agency for Healthcare Research and Quality. 2004. *Fiscal Year 2005 Justification of Estimates for Appropriations Committees*. Rockville, MD: Department of Health and Human Services, AHRQ.
- Agency for Healthcare Research and Quality Patient Safety Indicators Overview. 2006. *AHRQ Quality Indicators* [accessed on September 1, 2006]. Rockville, MD: AHRQ. Available at http://www.qualityindicators.ahrq.gov/psi_overview.htm.
- Aspden, P., J. M. Corrigan, J. Wolcott, and S. M. Erikson (eds.) 2004. *Patient Safety: Achieving a New Standard of Care*. Washington, DC: National Academies Press.
- Crawford, M. A., L. L. Woodby, T. V. Russell, and R. A. Windsor. 2005. "Using Formative Evaluation to Improve a Smoking Cessation Intervention for Pregnant Women." *Health Communication* 17 (3): 265–81.
- Damberg, C. L., M. S. Ridgely, R. Shaw, R. S. Meili, M. E. S. Sorbero, L. A. Bradley, and D. O. Farley. 2008. "Adopting Information Technology to Drive Improvements in Patient Safety: Lessons from the AHRQ Health Information Technology Grantees." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00928.x
- Farley, D., S. C. Morton, C. Damberg, S. Ridgely, A. Fremont, M. Greenberg, M. E. S. Sorbero, S. Teleki, P. Mendel, and R. Kaganoff-Stern. 2007a. *Assessment of the AHRQ Patient Safety Initiative: Moving from Research to Practice. Evaluation Report II*. RAND No. TR-463-AHRQ. Santa Monica, CA: RAND Corporation.
- Farley, D. F., S. C. Morton, C. Damberg, A. Fremont, S. Berry, M. Greenberg, M. E. S. Sorbero, S. Teleki, K. Ricci, and N. Pollock. 2005. *Assessment of the National Patient Safety Initiative: Context and Baseline. Evaluation Report I*, RAND No. TR-203-AHRQ. Santa Monica, CA: RAND Corporation.
- Farley, D. O., C. L. Damberg, M. S. Ridgely, M. E. S. Sorbero, M. D. Greenberg, A. M. Haviland, R. C. Meili, S. S. Teleki, L. A. Bradley, J. W. Dembosky, A. Fremont, T. K. Nuckols, R. N. Shaw, S. L. Taylor, and H. Yu. 2007b. *Assessment of the AHRQ Patient Safety Initiative: Focus on Implementation and Dissemination. Evaluation Report III*, RAND No. TR-508-AHRQ. Santa Monica, CA: RAND Corporation.
- Farley, D. O., and C. L. Damberg. 2008. "Evaluation of the AHRQ Patient Safety Initiative: Synthesis of Findings." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00939.x
- Farley, D. O., C. L. Damberg, M. S. Ridgely, M. E. S. Sorbero, M. D. Greenberg, A. M. Haviland, S. S. Teleki, P. Mendel, L. A. Bradley, J. W. Dembosky, A. Fremont, T. K. Nuckols, R. N. Shaw, S. Straus, S. L. Taylor, H. Yu, and S. Tharp-Taylor. 2008. *Assessment of the National Patient Safety Initiative: Focus on Implementation and Dissemination. Final Report, Evaluation Report IV*, RAND No. TR-563-AHRQ. Santa Monica, CA: RAND Corporation.

- Greenberg, M. D., A. M. Haviland, H. Yu, and D. O. Farley. 2008. "Safety Outcomes in the United States: Trends and Challenges in Measurement." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00926.x
- Institute of Medicine. 2000. *To Err Is Human: Building a Safer Health System*. Edited by L. T. Kohn, J. M. Corrigan, and M. S. Donaldson. Washington, DC: National Academy Press.
- Kochevar, L. K., and E. M. Yano. 2006. "Understanding Health Care Organization Needs and Context. Beyond Performance Gaps." *Journal of General Internal Medicine* 21 (suppl 2): S25-9.
- Mendel, P., C. L. Damberg, M. E. S. Sorbero, D. M. Varda, and D. O. Farley. 2008. "The Growth of Partnerships to Support Patient Safety Practice Adoption." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00932.x
- Shojania, K. G., B. W. Duncan, K. M. McDonald, and R. M. Wachter. 2001. *Making Health Care Safer: A Critical Analysis of Patient Safety Practices. Evidence Report/Technology Assessment No. 43. AHRQ Publication No. 01-E058*. Prepared by the University of California at San Francisco-Stanford Evidence-Based Practice Center.
- Sorbero, M. E. S., K. A. Ricci, S. Lovejoy, A. M. Haviland, L. Smith, L. A. Bradley, L. Hiatt, and D. O. Farley. 2008. "Assessment of Contributions to Patient Safety Knowledge by the AHRQ-Funded Patient Safety Projects." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00930.x
- Stake, R. 1976. *Evaluating Educational Programs: The Needs and Responses*. Urbana, IL: OECD.
- Stetler, C. B., M. W. Legro, C. M. Wallace, C. Bowman, M. Guihan, H. Hagedorn, B. Kimmel, N. D. Sharp, and J. L. Smith. 2006. "The Role of Formative Evaluation in Implementation Research and the QUERI Experience." *Journal of General Internal Medicine* 21 (suppl 2): S1-8.
- Stufflebeam, D., W. J. Gephart, E. G. Guba, R. L. Hammond, H. O. Merriman, and M. M. Provus. 1971. *Educational Evaluation and Decision Making*. Itasca, IL: F. E. Peacock Publishers Inc.
- Stufflebeam, D. L., G. F. Madaus, and T. Kellaghan. 2000. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Norwell, MA: Kluwer Academic Publishers.
- Taylor, S. L., M. S. Ridgely, M. D. Greenberg, M. E. S. Sorbero, S. S. Teleki, C. L. Damberg, and D. O. Farley. 2008. "Experiences of AHRQ-Funded Projects That Implemented Practices for Safer Patient Care." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00929.x
- Teleki, S. S., C. L. Damberg, M. E. S. Sorbero, R. N. Shaw, L. A. Bradley, D. D. Quigley, A. M. Fremont, and D. O. Farley. 2008. "Training a Patient Safety Work Force: The Patient Safety Improvement Corps." *Health Services Research*, DOI: 10.1111/j.1475-6773.2008.00927.x
- Westbrook, J. I., J. Braithwaite, A. Georgiou, A. Ampt, N. Creswick, E. Coiera, and R. Iedema. 2007. "Multimethod Evaluation of Information and Communication Technologies in Health in the Context of Wicked Problems and Socio-technical Theory." *Journal of the American Medical Informatics Association* 14 (6): 746-55.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.