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SAFETY CULTURE

Promising Practices for Improving Hospital Patient Safety Culture

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Background: Patient safety culture has a positive influence on the effectiveness of patient safety and quality improvement interventions. A study was conducted to gain knowledge about promising best practices used by hospitals to improve patient safety culture hospitalwide.

Methods: Agency for Healthcare Research and Quality (AHRQ) Surveys on Patient Safety Culture™ (SOPS) Hospital Survey longitudinal results from 536 hospitals that submitted data to the Hospital SOPS database from 2007 to 2014 were analyzed. Composite-level and aggregate improvement was measured, resulting in the identification of "top-improving," large hospitals (400 + beds). Semistructured interviews were conducted with one to three interviewees (for example, Vice President of Clinical Quality, Patient Safety Officer, Chief Medical Officer) from six top-improving hospitals. The transcripts of the interviews were analyzed to identify common themes and best practices among the hospitals.

Results: The mean change in the all-composite percent positive culture score was a 1.7 percentage point increase. The six hospitals interviewed had an average increase of 8.6 percentage points (range, 6.5–10.6) in their culture score. The three most common practices for improving culture as described by the hospital quality leaders from the six hospitals were (1) goal setting and strong action planning for quality improvement, (2) implementation of well-known patient safety initiatives and programs, and (3) rigorous survey administration methods.

Conclusion: Among six large hospitals that improved their hospitalwide culture score, the common best practices were the implementation of routine culture measurement with a wide dissemination of results, strong action planning for improvement that includes leadership support and involvement from all staff levels, and multifaceted patient safety programs and education.

A strong culture of safety, as described by the National Patient Safety Foundation in 2015, is "one in which health care professionals and leaders are held accountable for unprofessional conduct yet not punished for human mistakes; errors are identified and mitigated before they harm patients; and strong feedback loops enable frontline staff to learn from previous errors and alter care processes to prevent recurrences."[1(p. 11)] Patient safety culture is often viewed as a contextual factor that shapes staff behaviors, perceptions, attitudes, and commitment that may influence the process of care and patient safety intervention effectiveness.[2–6] Although there is little evidence of a direct causative effect of patient safety culture on patient outcomes,[7–9] studies have found favorable associations between patient safety culture, patient outcomes, and patient experience with hospital care.[10–15] However, evidence is limited on the effectiveness of strategies to improve patient safety culture within an organization.[16] Achieving the desired level of culture and sustaining that level can be challenging for hospitals. Furthermore, larger hospitals often face more difficult challenges in improving patient safety culture and in implementing successful patient safety initiatives than smaller hospitals because they may have more hierarchy, less cohesiveness, less flexibility, more handoffs between residents, and more bureaucracy.[17–19]

In this study, we (1) quantified the Agency for Healthcare Research and Quality (AHRQ) Surveys on Patient Safety Culture™ (SOPS) Hospital Survey improvement across several years and (2) gained insight into how large hospitals with 400 or more licensed beds were able to improve patient safety culture. We used a data-driven approach to identify six large hospitals in the Hospital SOPS (HSOPS) database that had improved their overall culture score, and we interviewed their patient safety leaders to understand the potential best or "promising" practices that might have contributed to their improvement.

METHODS

Data Source

Our data source was survey result data voluntarily submitted to the HSOPS database during 2012 or 2014 ($N = 1,381$ hospitals). We excluded 845 hospitals on the basis of the following criteria: non-acute care hospitals (62); hospitals that submitted only once to the database (736); hospitals with an inconsistent bed size category across time (2); and hospitals that did not have results for all 12 of the survey's composites (45).

Our final sample for the longitudinal analysis consisted of 536 hospitals from all regions of the United States; the

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Table 1. Descriptive Statistics of Hospitals in Longitudinal Analysis (*N* = 536)

	Frequency or Mean
Hospital bed size	
< 100 beds	36.0%
100–199 beds	22.8%
200–299 beds	17.5%
300–399 beds	8.8%
400+ beds	14.9%
Number of submissions to AHRQ database	
Two	48.0%
Three	20.0%
Four	20.0%
Five	8.2%
Six	3.9%
United States Region	
Mid Atlantic	2.6%
New England	8.4%
South Atlantic	17.0%
East North Central	31.7%
East South Central	10.6%
West North Central	8.4%
West South Central	9.9%
Mountain	4.7%
Pacific	6.7%
Time between first and last surveys (in months)	43.0
Baseline ACPP	62.5%
Baseline no. of survey takers	426
Last submission no. of survey takers	707
Change in no. of survey takers	66.0%
Response rate (baseline)	50.6%
Response rate (last submission)	56.0%

ACPP, all-composite percent positive score on the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture.

survey characteristics are shown in Table 1. The average survey response rate was 50.6% at baseline and 56.0% at follow-up. The average time between first and last submission was 43 months (3 years, 7 months).

Patient Safety Culture Measure

HSOPS measures staff perceptions of patient safety culture. The responses of 42 survey questions are grouped into 12 dimensions or composite measures. Nine composites are considered unit-level composites because the questions instruct the survey taker to "Think about your hospital work area/unit": (1) communication openness, (2) feedback and communication about error, (3) frequency of events reported, (4) nonpunitive response to error, (5) organizational learning—continuous improvement (6) overall perceptions of patient safety, (7) staffing, (8) supervisor/manager expectations and actions promoting patient safety, and (9) teamwork within units. The hospital-level composites are (1) handoffs and transitions, (2) teamwork across units, and (3) management support for patient safety. More details about the survey items and the composites can be found on AHRQ's website.[20]

Quantitative Analysis

For each composite, we calculated the hospital's percent positive score—the percentage of positive responses ("Agree," "Strongly Agree") to positively worded items (for example, "People support one another in this unit") or negative responses ("disagree," "Strongly Disagree") to negatively worded items (for example, "We have patient safety problems in this unit"). The all-composite percent positive score, to which we refer here as "ACPP" or "culture score," is the mean of the 12 composites' percent positive score. The change in ACPP was calculated from the hospital's first submission to the database (baseline) to its last submission in the 2007–2014 period.

Identification of "Top-Improving" Hospitals

To identify "top-improving" large hospitals, we selected the 80 hospitals in the final sample of 536 hospitals that had 400+ beds. Next, we sorted those 80 hospitals by descending ACPP change to identify the 25 with the best improvement. For the purposes of ranking hospital culture improvement, we chose to use ACPP after verifying that the ACPP at last submission was highly correlated with each unit-level and hospital-level composite's percent positive score at last submission.

We then closely reviewed each of the 25 hospitals' HSOPS results for the 2007–2014 period. We removed hospitals that did not have consistent improvement. For example, if a hospital had a decrease in its score at any point in comparison to its baseline score, we excluded it as a top improver. We also removed hospitals that had a large shift in staff or unit distribution among total respondents from baseline to last submission. For example, we excluded 1 hospital because the physician representation more than doubled from baseline to last submission.

Of the 9 remaining large hospitals, 6 accepted our request that we interview the "key individuals in their hospital responsible for patient safety culture"—as long as we did not identify the hospitals or interviewees in publication.

Semistructured Interviews

In Fall 2014 we conducted semistructured interviews with the patient safety leaders of each of the six hospitals to learn how they drove patient safety culture improvement. Westat's Institutional Review Board approved the recruitment materials and interview protocol (Sidebar 1). One hospital had three interviewees, one hospital had two interviewees, and one hospital had one interviewee. The interviewee job titles were Chief Nurse Executive, Director of Quality Management, Patient Safety Officer, Vice President of Clinical

Sidebar 1. Protocol for Interviewing Hospital Quality Leaders: Main Questions

A. Survey Use and Database Submission Questions
1. What influenced your hospital's decision to continue using the AHRQ Hospital Survey on Patient Safety Culture?
2. We would like to review the submissions we received from your hospital for the AHRQ Hospital Survey on Patient Safety Culture. Are you aware of all these submissions? Which submissions are you aware of?
3. What has been your role in the hospital survey processes over the years?
4. Thinking about each of the [X] times the survey was administered in your hospital, can you tell us which types of staff and work areas were asked to take the survey?
5. How did you decide the timing to re-survey hospital staff?

B. General Methods for Improvement
1. Your hospital has improved over the past [X] submissions. Can you think of possible reasons why your hospital's patient safety culture scores have improved over these years?
2. Has your hospital done anything over this time period that might have positively influenced patient safety culture?

C. Survey Administration Process
1. Can you describe any changes in the survey administration process over time?

D. Survey Results and Planning for Quality and Patient Safety Improvement
1. When you get your hospital safety culture results, what happens next?
2. Can you describe how your survey results are used?
3. How did you measure your success in patient safety culture using the AHRQ Hospital Survey?
4. How does your hospital use the Hospital Survey on Patient Safety Culture Comparative Database Report and other survey materials that are available on the AHRQ Web site?
5. Can you describe how your hospital develops and implements a plan for an improvement initiative? Is a team put together? Which staff provide input or feedback in to the plan?

E. Barriers to Patient Safety Improvement
1. What were your biggest barriers to implementing initiatives in your hospital to improve patient safety culture?

AHRQ, Agency for Healthcare Research and Quality.

Quality, Chief Medical Officer, Quality Improvement Coordinator, Director of System Accreditation, and Patient Safety Coordinator. With the exception of one hospital interviewee with two years in current position, the hospitals' interviewees had been in their current positions from 6 to 12 years.

Data Collection

The recorded interviews were transcribed, summarized, and coded into Microsoft OneNote (Microsoft Corp., Redmond, Washington), which allowed for the quantification of mentioned terms and subject matter. A thematic analysis of the OneNote data was performed independently by the two authors and an additional researcher. The coding and grouping by the researchers were compared and reconciled, where needed, and the information was further grouped into common subthemes and major themes.

RESULTS

Change in ACPP

Among the 536 hospitals, the unadjusted mean change in the ACPP was a 1.7 percentage point increase (range, 17.3 percentage point decrease to 20.1 percentage point increase). One hundred ninety eight (36.9%) of the hospitals had a decrease in ACPP (mean, -3.5%), and 338 hospitals (63.1%) had an increase (mean, +4.8%). Larger hospitals, on average, had lower culture scores than smaller hospitals, consistent with the trend section of the AHRQ database report.[21] Although the increase in ACPP varied across hospital bed size category, these percentage point changes were not significantly different (Table 2). The non-identifying characteristics of the six hospitals can be found in Table 3.

Figure 1 shows, by composite, the change in percent positive score (left-most dark part of bar), the baseline score, and the final score as represented by the each bar's total value. The survey composite with the most improvement was frequency of event reporting, and the composite with the least improvement was communication openness. More details about the composite-level correlations and an analysis of culture survey characteristics can be found in Appendix 1 (available in online article).

Common Themes among the Six Top-Improving Hospitals

The thematic analysis of the safety leaders' interview responses identified 9 major themes (Table 4) and 23 subthemes. We now describe the 9 major themes.

1. Action Planning. Action planning is a key aspect of the quality improvement (QI) cycle. Action planning steps to improve patient safety can include analyzing culture survey results, widely disseminating those results, targeting patient safety areas for improvement, and setting goals.[22] All the interviewees mentioned the importance of action planning and the need to acquire leadership support during the planning. They spoke about forming an interdisciplinary action planning team and/or including frontline staff in action planning as a way to address different perspectives and to increase accountability among all staff. After analyzing the culture

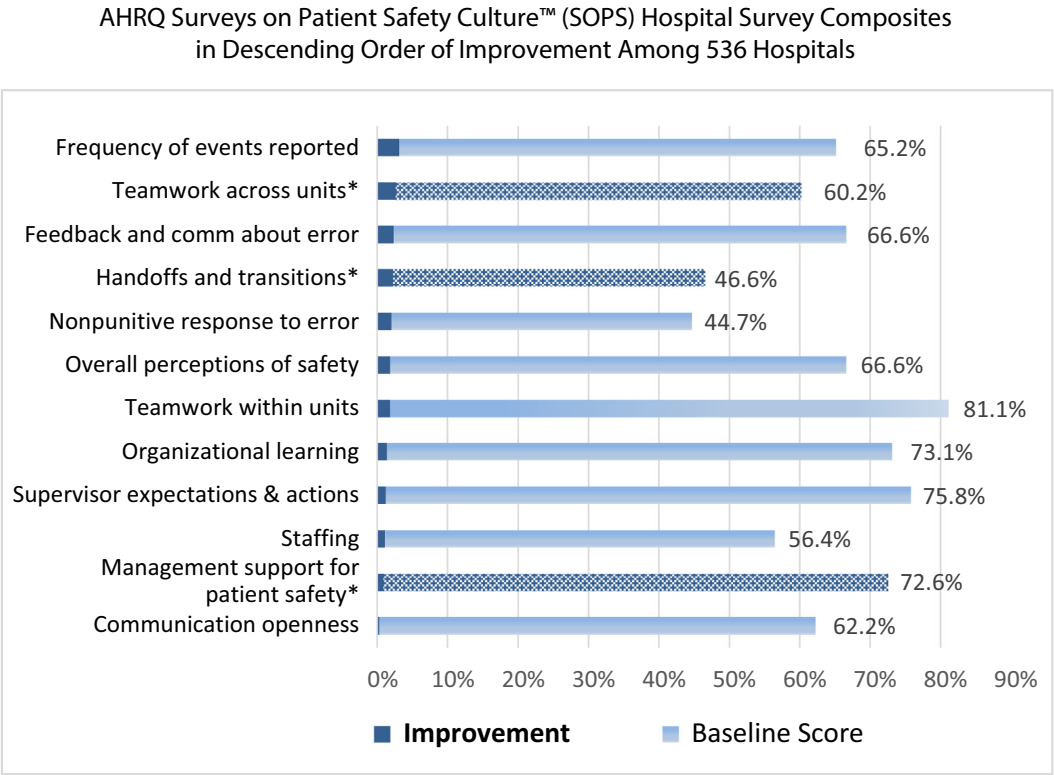
Table 2. Mean Change in All-Composite Percent Positive Score by Hospital Bed Size

Bed Size Category	Range in No. of Baseline Survey Takers	Mean No. of Submissions	Baseline ACPP Score (%)	Last ACPP Score (%)	Mean Percentage Point Change (95% CI)
< 100 beds (*n* = 193)	13–587	3.0	65.58	67.22	1.6 (0.8–2.5)
100–199 beds (*n* = 122)	24–1,697	2.9	62.74	64.15	1.4 (0.4–2.4)
200–299 beds (*n* = 94)	47–1,684	3.0	60.04	62.13	2.1 (1.2–3.0)
300–399 beds (*n* = 47)	22–2,216	2.9	60.91	62.52	1.6 (0.2–3.0)
400 + beds (*n* = 80)	67–4,092	3.2	58.68	60.75	2.1 (0.1–3.2)
ALL (*N* = 536)	13–4,092	3.0	62.52	64.25	1.7 (1.3–2.2)

ACPP, all-composite percent positive score on the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture; CI, confidence interval.

Table 3. Characteristics of the Six Top-Improving Large Hospitals Interviewed

Percentage Point Increase in All-Composite Percent Positive Score	Bed Size Category	No. of Survey Submissions	Months Between First and Last Survey	Composite with Most Improvement (Percentage Point Increase)
10.63%	600–699	3	4 years, 5 months	Overall perception of safety (13.2)
9.93%	500–599	5	5 years, 7 months	Staffing (20.5)
9.78%	700–799	4	6 years, 11 months	Overall perception of safety (14.6)
7.30%	400–499	5	8 years, 1 month	Frequency of events reported (14.0)
7.18%	800–899	4	5 years, 3 months	Nonpunitive response to error (12.1)
6.46%	700–799	5	7 years, 1 month	Nonpunitive response to error (12.1)



* Hospital-level composite.

Figure 1: The total length of each composite's bar shows the average composite score at last submission. Within each bar, the darker part shows the percentage-point increase from the baseline score and the remaining lighter part shows the score at baseline. For example, on average, the composite "Overall perceptions of Safety" increased 1.8% from baseline (the baseline score was 64.8% and the last submission score was 66.6%).

Table 4. Emerging Themes Among Six Large Hospitals with Improvement in AHRQ Hospital Survey on Patient Safety Culture

Theme/Theme Description	No. of Mentions
Action Planning Process for improving patient safety culture that includes analyzing the survey results, widely disseminating the results, targeting patient safety areas for improvement, and setting goals.	25
Implementing Improvement Initiatives and Programs Hospitals reported implementing CUSP, Just Culture, Leadership WalkRounds, TeamSTEPPS®, Ticket to Ride, and other training, education, and programs.	25
Rigorous Survey Administration Methods The methods of how hospitals determined the timing and promotion of the survey, how they administered the survey, whether they monitored response rates, and if they targeted specific units or staff positions.	22
Leadership Support and Hospital Focus on Organizational Patient Safety Culture Senior leadership understands the relevance of attaining a strong culture of patient safety and supports continued improvement efforts. The culture of the hospital reflects a shift to more transparency and accountability.	13
Quality Improvement Interdisciplinary QI teams and committees engage frontline staff in the development of patient safety improvement strategies.	12
Importance of Assessing Patient Safety Culture A culture survey with supporting material for analysis and feedback is an important measurement tool for patient safety.	11
Consistent Patient Safety Manager over Time Stability of personnel who focus on patient safety culture	7
Importance of Middle Management Role in Patient Safety Culture Improvement Managers provide patient safety feedback to frontline staff and assist with improvement initiatives and setting goals.	6
Event Reporting: Ease, Promotion, and Root Cause Analysis Feedback Error reporting systems are a means to track improvement in reducing near misses and medical errors.	4

CUSP, Comprehensive Unit-based Safety Program; QI, quality improvement.

score, the findings are shared with hospital leadership and used to set new targets for the next year. As one interviewee stated:

> We reviewed the results together with the administrative team and came back with a proposal based on the findings. They supported what was put in an action plan, and then they are even taking it to a higher level [by supporting the rollout of the action plan across the entire organization].

Several interviewees said that survey results should be analyzed and shared at the department, unit, and/or staff level, as follows:

> We give graphs of things that managers can display the way they would like to within their department. The managers are expected to share the results.
>
> We share them [our results] in [the] directors meeting and also with a meeting that involves medical staff and board members. . . then the directors take them back to their units and they share the information with their staff.

> We highlight the results in our newsletter, which goes out electronically to every employee, as well as paper copies lying around all over all our organization.

2. Implementing Improvement Initiatives and Programs. All six hospitals mentioned the use of patient safety rounds (sometimes, as Patient Safety Leadership WalkRounds,™ [WalkRounds]), during which leaders ask questions during rounds to learn about each department's QI goals and progress, discuss priorities, and assess staffing needs.[23] Information collected during WalkRounds is often shared with the hospital's board on quality.[24,25] Interviewees said the following about WalkRounds:

> The vice presidents of the hospital are responsible for certain units and certain departments, and so they worked out a schedule where they would actually round in different units other than their own. . . They ask staff questions about how their unit was functioning as a team; ask questions about teamwork; if they had any ideas to improve patient safety; if they saw anything they thought was problematic.

> We round monthly. . . we go to the different units. We spend time with them . . . talking with them. They are very forthcoming with information about some of the issues and concerns they have on their unit.

Four hospitals used TeamSTEPPS® (Team Strategies and Tools to Enhance Performance and Patient Safety), an evidence-based team training program to enhance teamwork, communication, and problem solving that has shown to improve hospital patient safety culture and teamwork attitudes.[26–28] TeamSTEPPS offers a comprehensive set of ready-to-use materials and a training curriculum.[29] One hospital interviewee said the following:

> . . . because of our size, we have lots of expertise as far as our educational department and people that could be master trainers.

> We decided to move to the TeamSTEPPS model and we've been doing that since 2008.

Four hospitals mentioned the Just Culture program, which teaches hospital leadership to address safety concerns by offering a strategy so that employees are not punished for decisions taken in good faith. The Just Culture Algorithm™ is a structured approach that encourages hospitals to look at system factors instead of individual blame yet teaches an organization how to detect and manage disruptive and unprofessional behavior that puts patients at risk.[30] Interviewees at two of the hospitals stated the following:

> We also used for several years now a Just Culture Algorithm. . . Staff find going through the algorithms to be very helpful, they don't feel like they're being blamed for something, really looking at some of those root causes of those events occurring rather than saying the caregiver made a mistake.

> Each manager has the Just Culture Algorithm posted in their office so that it is visible to all staff.

Two hospitals were part of the Comprehensive Unit-based Safety Program (CUSP), which is used to train physicians, nurses, and other clinicians to reduce hospital-acquired infections by working together while learning clinical best practices and the science of safety.[31] CUSP, which also focuses on creating a culture of safety by improving teamwork and communication and by investigating and correcting errors or defects, has been found to improve patient safety culture in ICUs.[32] Two hospitals mentioned Ticket to Ride, an initiative that focuses on standardization of hospital handoffs during intra-hospital transport, such as the transfer of a patient from the emergency department to the ICU, and attempts to mitigate the risks that could happen during transitions of care.[33]

3. Rigorous Survey Administration Methods. The administration of the survey is an initiative in and of itself. To obtain a high response rate and good representation of all staff, safety leaders must communicate the importance of the survey, promote participation, set deadlines, and monitor completion status, as the following responses suggest:

> We set our goal at 80% [response rate] of the employees we administer to do the survey. [We] keep setting our goal higher, and talking about it at the leadership level with all the management groups, anywhere we can get the information out.

> It's expected of the managers that they get the surveys filled out.

Some hospitals customize the name of the department categories on the survey to make the results easier to analyze. Interviewees also described methods to target specific units or staff positions that often have low response rates, and methods for administration that have streamlined their administration process systemwide:

> We administer the survey at a system level, so the individual hospitals really don't need to do anything. . . We send out an electronic version of the survey. [A message] comes out from our patient safety officer to all the caregivers [that] we're going to survey. We do a lot of preparation ahead of time to communicate that the survey is coming.

4. Leadership Support and Hospital Focus on Organizational Culture. Each hospital mentioned the importance of having leadership that is committed to making patient safety an organizational focus. Interviewees said that their leadership provides continuous support for patient safety improvement efforts and initiatives:

> I think [our CEO] was very influential, certainly in helping me promote patient safety and talk about patient safety.

> Leadership recommends that we focus at least one of our action plans into the nonpunitive area, so that's one of the things we need to focus on in the unit. And then from there, let the units decide where they need to focus their energies as far as an action plan.

> [The CEO] has influence over other senior leaders, and he's respected. And that trickles down to mid-level.

Hospitals mentioned the importance of promoting patient safety through a culture of transparency, a focus on patient-centered care, and incentives for strong patient safety culture. This theme includes mentions about organizational learning culture, striving for excellence, and increased physician, staff, and management accountability that went beyond patient safety:

> Part of the culture is that culture of do no harm, culture of great experience, the culture of the quest for excellence and in everything we do and every patient we have from the cleaning ladies on up. And I think what you're seeing is an evolution of that culture that we're trying to grow here.

> We have dramatically changed in the past ten years. And going from what we all called a traditional closed opaque type of culture to one that is much more transparent, collegial, teamwork focused, conducts fantastic root cause analyses and then shares those lessons learned.

5. Quality Improvement. Each hospital had skilled teams for QI. Interviewees said that their QI teams and committees were interdisciplinary and engaged frontline staff in developing patient safety improvement strategies. Interviewees said the following about continuous QI and the sharing of best practices across all hospital departments and units:

> People feel like they work in an organization that is trying to continuously improve and spending the resources to help staff do that and understand it.

> There's a lot of sharing of information, and again, when there is an incident at any of our hospitals, that information [is] shared across all. . . There's a lot of shared learning.

6. Importance of Assessing Patient Safety Culture. HSOPS provides an analysis tool, user's guide, feedback report template, national benchmark statistics, and other resources.[20] The hospitals use the survey results to identify culture composites that need improvement and to compare composite scores and percentiles across hospitals nationally, as indicated by the following responses:

> We wanted to continue to put emphasis on the importance of the culture of safety throughout the organization by using a measurement [tool], the survey, and providing that data back to our caregivers, so that they could identify opportunities for improvement and show progression over the years to reflect some of the work and interventions we're putting in place.

> The printed material provided with the survey are great for giving us a framework, because sometimes when I stumble I go back to that manual and I say, oh yeah, I better do that this year and I'm going to try this.

7. Consistent Patient Safety Manager over Time. The respondents from four of the hospitals had been doing this patient safety work in their hospital for 7 to 12 years at the time of the interviews. These interviewees were consistently involved in survey planning, administration, dissemination of results, and action planning. Their long tenure was seen as an important driver of culture change over time, as reflected in this response:

> I am sure that having one consistent person staying on a consistent course has helped the hospital stay focused on the components of patient safety culture.

8. Importance of Middle Management in Patient Safety Culture Improvement. Middle managers act as strong liaisons between leadership and frontline staff for developing and promoting hospital goals. For example, action plans are shared with middle managers for their feedback on time lines and expectations. Hospital leaders listen to middle management to understand unit-specific needs, problems, and successes, as indicated in these responses:

> Managers are expected to sit in focus groups and look at the information [survey results] with us and develop some individual plans for different groups of employees.

> What we did different this year, is we invited them [unit managers] to attend . . . some of our nurse managers did speak up about the different things they're doing to improve their scores.

9. Event Reporting: Ease, Promotion, and Root Cause Analysis Feedback. The reporting of safety events can be facilitated through a well-developed error reporting system that is easy to use and can track improvement in reducing both errors and near misses. Hospital leaders can promote reporting by providing sufficient feedback and engaging those who take the time to report errors. One interviewee stated the following:

> We have a little tip card that all employees wear with their ID badge that has our emergency numbers on it, our emergency codes, our fire response, our fire extinguisher response, information about our safety data sheet, the safety hotline, the sentinel event pager, as well as how to report.

DISCUSSION

Using a generalizable sample of 536 acute care hospitals with data submitted to the HSOPS database, we found little improvement in the all-composite percent positive score between 2007 and 2014 when the data were aggregated across hospitals. However, the six large top-improving hospitals that showed consistent improvement in their HSOPS results for the 2007–2014 period experienced increases in their ACPP ranging from 6.5 to 10.6 percentage points. The responses of the patient safety leaders at these six hospitals in our interviews suggest that these hospitals' improvement in culture scores did not happen by chance. The hospitals were engaged in practices consistent with the literature on ways to improve culture.[16,24–26,34] As apparent in the interview excerpts, the themes we found were not mutually exclusive and had overlapping features. For example, the hospitals said that the implementation of improvement initiatives and programs was successful because they have leaders who continuously promote a culture of safety and support concurrent initiatives.

We heard most often about the importance of action planning for improvement. Action planning guides managers and staff in developing QI time lines and deliverables, determining resources needed, choosing process and outcome measures, and setting realistic goals. These hospitals strived to motivate and engage staff by including all levels of staff in action planning. Studies have found that creating a supportive environment and improving engagement, with a focus on both staff and patient safety, can improve trust between management and nurses, improve patient safety culture, and reduce staff turnover problems.[35–39]

The interviewees mentioned that WalkRounds is an effective hospital program for improving patient safety. For example, Schwendimann et al. found that hospital units with ≥ 60% of workers exposed to WalkRounds had a significantly better safety climate and greater patient safety risk reduction compared with those units with < 60% exposed.[24] Our findings also support previous research showing that staff teamwork and communication can improve patient safety culture.[4,27]

The survey composites that saw the most improvement were frequency of events reported, teamwork across hospital units, and feedback and communication about error. We heard from the interviewees that strong communication and feedback of safety issues improves staff engagement. However, the communication openness composite improved the least. This composite measures the extent to which staff will speak up if they see something that may harm a patient. Low scores on this composite and the nonpunitive response to error composite suggest that staff do not feel free to question the actions

or decisions of those with more authority and may fear that their mistakes will be held against them. We find it commendable that the nonpunitive response to error composite was the most improved composite among two of the six hospitals interviewed.

We do not know if the hospitals interviewed in this study will be able to sustain their improved patient safety culture scores. When asked about sustainability, interviewees described the importance of personal accountability for patient-centered care and continuous integration of patient safety culture in training. Their responses indicated that the forces for sustainability include consistency in culture measurement, commitment to data-driven feedback, vision of all-staff accountability for patient safety, leaders who foster a cycle of trust, hospital administration that supports staff when they identify and report a patient safety event, use of multidisciplinary teams for quality and patient safety continuous improvement, and financial pressures from insurers to reduce harm events.

In 2015 The Joint Commission added a "Patient Safety Systems" chapter to its *Comprehensive Accreditation Manual for Hospitals*, which outlines the steps that should be taken to maintain a culture of safety and quality throughout the hospital.[40] Beyond the practices described in this article, newer approaches include staff burnout prevention,[41] Lean management,[42] efforts to improve staff psychological safety,[35] increased patient engagement in safety efforts, and inclusion of culture scores in leadership's goals and evaluations.

Limitations

Studies have found that patient safety culture and the effectiveness of interventions can vary across units within a hospital.[43–45] A limitation to our study is that we did not compare unit-level initiatives with hospital-level initiatives, and thus we are unable to determine which units in the hospitals improved (or did not improve) and which initiatives had the greatest impact in culture improvement. More specifically, our interviewees knew that they were invited to participate in our study because they were top improvers in an all-composite, hospitalwide score. Therefore, when they responded to our questions, they discussed work that had been done at both the unit and hospital levels. We did not ask how many staff or how many units participated in each initiative. Nor did we attempt to determine if the hospitals that deployed more initiatives had greater improvements in scores. Nevertheless, we believe that our findings are valid for assessing hospitalwide culture improvement because (1) the majority of the best practices that emerged from the interviews involve hospital-level vision and leadership and (2) similar to previously reported AHRQ HSOPS psychometrics,[46] mean composite intercorrelations within our sample were strong at the hospital level (Appendix 1, Table 3). Finally, our qualitative analysis is limited by not having either a comparison group of hospitals that did not improve or a comparison group of small hospitals.

CONCLUSION

Our interviews with patient safety leaders at six large "top-improving" hospitals with consistent improvement in their patient safety culture suggest that the hospitals' performance may reflect engagement of all levels of staff in goal setting and action planning, implementation of multifaceted initiatives and programs, and consistent measurement and evaluation of the hospital's culture. More research on how to improve organizational patient safety culture is needed.

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ONLINE-ONLY CONTENT

See the online version of this article for Appendix 1. Correlation Analysis of Composite-Level Culture Scores, Change in Scores, and Survey Characteristics.

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