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Nurses' And Patients' Appraisals Show Patient Safety In Hospitals Remains A Concern

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Abstract

The Institute of Medicine concluded in *To Err Is Human* in 1999 that transformation of nurse work environments was needed to reduce patient harm. We studied 535 hospitals in four large states at two points in time between 2005 and 2016 to determine the extent to which their work environments improved, and whether positive changes were associated with greater progress in patient safety. Survey data from thousands of nurses and patients showed that patient safety remains a serious concern. Only 21 percent of study hospitals showed sizable improvements (of more than 10 percent) in work environment scores, while 7 percent had worse scores. For hospitals in which clinical care environments improved, patients and nurses reported improvements in patient safety indicators. These included increases in percentages of patients rating their hospital favorably (a change of 11 percent) and stating that they would definitely recommend the hospital (8 percent) and in percentages of nurses reporting excellent quality of care (15 percent) and giving the hospital a favorable grade on patient safety (15 percent). Where work environments deteriorated, fewer nurses (–19 percent) gave a favorable grade on patient safety. Failure to improve hospital work environments may be hampering progress on patient safety.

Almost two decades have passed since the Institute of Medicine (IOM) published its landmark 1999 report, *To Err Is Human*, which documented the immense toll of medical errors and called for a national commitment to reduce patient harm.[1] Evidence suggests that progress has been made, but the pace of improvement has been slow and uneven, and much remains to be achieved.[2–4] Going forward, are there targeted investments that offer the potential to increase the pace of improvement in patient safety?

Among the IOM's reports identifying promising evidence-based strategies for improving patient safety was its 2003 *Keeping Patients Safe*: *Transforming the Work Environment of Nurses*.[5] The report reviewed many studies showing that nurse staffing adequacy and work environments supporting nurses' performance of patient surveillance and timely intervention were associated with better patient outcomes and concluded that improving care environments was foundational to reducing patient harm. It made eight key recommendations to improve care environments: creating governing boards that focus on safety, leadership and evidence-based management structures and processes, effective nursing leadership, adequate nurse staffing, organizational support for ongoing learning and decision support, mechanisms that promote interprofessional collaboration, work design that promotes safety, and an organizational culture that continuously strengthens patient safety. Empirical survey-based measures have been developed to assess progress on these recommendations, including the Practice Environment Scale of the Nursing Work Index[6] and the Hospital Survey on Patient Safety Culture of the Agency for Healthcare Research and Quality (AHRQ).[7]

Evidence suggests that progress has been made in identifying and evaluating specific clinical safety interventions to reduce harm, including bundled procedures to prevent blood stream infectionsassociatedwithcentrallines,[8]surgical checklists,[9] hand hygiene,[10] and rapid-response teams.[11] These interventions have been demonstrated to reduce patient harm under controlled conditions, but they might not always have their intended effects in usual care—at least in part because clinicians continue to face challenging work environments that interfere with their ability to implement safety interventions consistently. Time-and-motion studies estimate that the average hospital nurse is interrupted in midtask once an hour because of operational failures such as staff shortages and broken or missing equipment or supplies.[12] Interventions designed to prevent errors and improve safety (for example, checklists and bundled procedures) need a high level of reliability, which requires an enabling work environment.[13]

In this article we explore the extent to which hospital work environments improved between 2005 and 2016 in a panel of hospitals in four large states, and whether hospitals with improved work environments also had improved indicators of patient safety more than hospitals with no change or a negative change in their work environments. The results could shed light on how to achieve greater progress in making patients safe.

Study Data And Methods

STUDY SAMPLE

Ours was a study of 535 hospitals in four large states at two points in time between 2005 and 2016. The study hospitals included almost all nonfederal general acute hospitals with more than a hundred beds in California, Florida, New Jersey, and Pennsylvania. These hospitals accounted for over 90 percent of annual hospital discharges in the four states and over 20 percent of all acute care hospitals nationally, and they discharged over 25 percent of the patients in the country. We used surveys of nurses and patients aggregated to the individual hospital level to obtain information on work environments and measures of care quality and safety. To measure changes in work environments and quality and safety metrics over the ten-year period, each hospital, represented at both points in time, served as its own control, in the sense that each hospital's own findings in the baseline study serve as a comparison to its own findings observed a decade later.

NURSE AND PATIENT SURVEYS

The data analyzed here are from large-scale surveys of registered nurses (RNs) and patients aggregated to the hospital level. The nurse reports are from RNs in a panel of 535 hospitals in the four states at two points in time. The patient reports are from two large-scale surveys of patients in 494 (92 percent) of the 535 hospitals. The RN surveys in California, New Jersey, and Pennsylvania were done concurrently in 2005–06, while the RN survey in Florida was done in 2007–08. The baseline patient survey was conducted in 2007–08, when patient experience surveys in hospitals were made mandatory by Medicare. Both RN and patient surveys were replicated in 2015–16.

Nurse surveys were mailed to the homes of RNs who were randomly sampled from state licensure lists. Responding nurses indicated the name of their employing hospital, which enabled us to link the respondents to specific hospitals. This design avoided potential bias at the hospital level, since voluntary participation would likely be higher in hospitals with the best work environments. Our design yielded a comprehensive database on almost all hospitals with 100 or more beds in the four states. To assess whether this strategy produced an unbiased sample of RNs who provided information on work environments, we undertook resurveys of nonrespondents to both RN surveys. Using extensive recontact, monetary incentives, and a shorter version of the original questionnaire, we were able to obtain responses from 91 percent of the nonrespondents to the baseline surveys in 2005–08 and 87 percent of the nonrespondents to the 2015–16 survey. Nurse nonresponse was related to factors other than nurses' reports on their work environments or on the quality of care and patient safety.[14] There were a total of 53,699 RN responses across the two survey years with an average of 62 RNs per hospital in 2005–08 and 39 RNsperhospitalin2015–16.Detailsofthenurse survey are presented elsewhere.[15]

For 494 of the 535 hospitals, data from patient surveys were available from the annual Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys undertaken in 2007–08 and 2015. An estimated 805,881 patient responses are included across the two survey years.

MEASURES AND METHODS

Below, we first provide information from 2015–16 from RNs and patients in the study hospitals. We show the percentages of RNs who reported that the quality of patient care was less than excellent, rated their hospital 8 or less on a 10-point scale, would not definitely recommend their hospital, and gave unfavorable grades (C, D, or F) to their hospital on patient safety and infection prevention. We also show the percentages of RNs who responded to five items from the AHRQ Patient Safety Culture tool.[7] And we show the percentages of nurses who spend a large part of their time on work-arounds to solve operational failures and on nonnursing tasks and who are dissatisfied with their jobs and score high on burnout.

We then show the percentages of patients who rated their hospitals unfavorably and would not definitely recommend them, as well as the percentages who reported that nurses did not always communicate well with them, that they did not always receive help quickly from hospital staff, that staff did not always explain medications before giving them, and that their pain was not always well controlled.

We used an aggregate hospital-level measure of the nurse work environment—a composite scale that differs from the single-item measure of the work environment used in exhibit 1—to describe the changes in work environment between the 2005–08 baseline and the more recent surveys and the extent to which changes were or were not in line with the IOM's recommendations to decrease patient harm.[5] In both survey years, the nurse work environment in each hospital was measured using the Practice Environment Scale of the Nursing Work Index, an internationally validated measure endorsed by the National Quality Forum.[6] The scale measures modifiable organizational behaviors in five subscales indicating managerial support for nursing; nurses' participation in hospital affairs; doctor-nurse relations; promotion of care quality, including investments in workforce education; and staffing and resource adequacy. The questions within the subscales and the AHRQ Hospital Survey on Patient Safety Culture correspond to six of the eight key IOM recommendations for transforming work environments: patient safety as a top priority of management, adequacy of nurse staffing, effective nurse leadership, interprofessional collaboration, an organizational culture and work design that promote safety, and organizational support for ongoing staff learning.

We measured the hospital practice environment by averaging the responses (scored on a scale of 1 to 4) across all RNs in each hospital to the items in the five subscales. We then classified hospitals according to whether over the study period their average work environment score worsened (declined by 10 percent or more), remained the same (changed by less than 10 percent in either direction), or improved (increased by 10 percent or more). For simplicity in describing work environments in exhibit 1 only, we used a single-item measure of the nurse work environment, with four categories: excellent, good, fair, and poor.

ANALYSIS

For nine of the twelve items (excluding the single-item measure of the work environment) included on the baseline nurse survey as well as in the 2015–16 survey, and for all of the

items which patients were asked about in both 2007–8 and 2015, we estimated how nurses' and patients' reports on the quality of care and patient safety had changed over time and whether these changes were related to changes in the clinical work environment. We took the differences between the two periods in the percentages of nurses and patients who gave favorable responses to the different indicators and averaged them—first across all hospitals and then across three groups of hospitals by whether work environments had worsened, remained the same, or improved. We estimated the magnitude of the different changes and used analysis-of variance tests and Scheffé's tests to determine whether the differences across the three groups of hospitals were significant.

LIMITATIONS

Our study had several limitations. First, we used nurses' and patients' reports to estimate quality of care and patient safety rather than objective measures from independent sources. However, previous research has demonstrated that nurses' reports on hospital care are highly associated with independent patient outcomes, including mortality.[16]

Second, our study design produced detailed information on work environments, patient safety, and quality of care in a broad and representative sample of hospitals at two points in time in four large states. While the hospitals in these states differ in some respects from hospitals in other states, this restricted sample is interesting in its own right, inasmuch as these hospitals account for 25 percent of all hospital discharges nationally. Data for 2017 from the Current Population Survey indicate that hospital RNs in these four states are similar to hospital RNs nationally on characteristics such as age (sample mean: 43.7 years and 42.6 years, respectively) and education (70 percent with at least a bachelor of science degree in nursing and 68 percent, respectively), although they differ in percentages of RNs who are union members. The shares are 18 percent nationally, 48 percent in California, 38 percent in New Jersey, 20 percent in Pennsylvania, and 8 percent in Florida. In a longitudinal study such as this one, however, the question is whether hospitals change their work environments over time, with each hospital serving as its own control. Nonetheless, caution is warranted in generalizing the findings from four states to the nation as whole.

Study Results

SAFETY AND QUALITY IN 2015–16

Sixty percent of the RNs surveyed reported that the quality of care in their hospitals was less than excellent; 68 percent rated their hospital 8 or less on a 10-point scale, where 10 was excellent; and 55 percent would not definitely recommend their hospital to a family member or friend in need of care (exhibit 1). Nearly 30 percent of the RNs graded their hospitals unfavorably on patient safety and infection prevention. Half of the RNs agreed that "staff feel like their mistakes are held against them," while roughly four in ten agreed that "important information is lost during shift changes" and that "things fall between the cracks." More than one-third of the RNs reported that "staff do not feel free to question authority," and roughly one in five said that the actions of management showed that patient safety is not a top priority. Eighty-one percent of RNs rated their work environments less than excellent. Twenty-seven percent reported that a large part of their last shift had been

spent on workarounds to solve operational failures such as broken or missing equipment and supplies, and 31 percent reported spending a large part of their last shift on nonnursing tasks. Nearly seven in ten nurses were less than very satisfied with their job, and 31 percent scored high on the Maslach Burnout Inventory.

Thirty-two percent of patients gave their hospital an unfavorable rating, and 30 percent would not definitely recommend their hospital to family and friends in need of care (exhibit 2). Slightly less than one in four patients indicated that nurses did not always communicate well with them, while nearly 40 percent said that they did not always receive help quickly from hospital staff and that staff did not always explain medicines before giving them. More than 30 percent of patients who required medication for pain indicated that their pain was not always well controlled.

CHANGES IN SAFETY AND QUALITY OVER TIME

Clinical work environments in most hospitals did not improve between 2005 and 2016: Only 21 percent of the hospitals showed sizable improvements (of more than 10 percent) in their work environment scores, while the work environment remained essentially the same in 71 percent of the hospitals and worsened (by more than 10 percent) in 7 percent (exhibit 3).

We calculated changes over time in the percentages of nurses (exhibit 3) or patients (exhibit 4) who responded favorably to the different items, so that positive changes reflect changes in quality and safety for the better, while negative changes reflect changes for the worse. When all hospitals were considered together, the average changes were modest—in single digits. However, these changes mask large differences across hospitals when they were grouped according to the change in their clinical work environment. Hospitals in which the work environment.

Hospitals in which the work environment remained largely the same showed little change in the average percentage of nurses reporting excellent quality of patient care, grading patient safety favorably (A or B), staff feeling free to question authority, and revealing a low level of burnout and a mix of favorable and unfavorable changes, most of them small, on the remaining indicators. By comparison, hospitals in which the work environment worsened exhibited unfavorable and often sizable changes in the average percentage of nurses reporting on safety indicators, including, for example, a decrease in the share of nurses who graded patient safety favorably (–19 percent) and a decrease in the share of those who agreed that the actions of management showed that patient safety is a top priority (–25 percent). Hospitals in which the work environment improved showed large increases in the average percentage of nurses reporting excellent quality of care (15 percent), giving high patient safety grades (15 percent), and indicating that they were satisfied with their jobs (16 percent) and not burned out (12 percent), with increases in all but two of the other safety indicators as well. On all nine of these indicators, the differences in the changes between the three groups of hospitals were significant.

The average share of patients across all Hospitals who responded favorably increased for all six items shown in exhibit 4 by 4–8 percent, and changes were positive, albeit often small, even in hospitals in which the work environment worsened. These patient reports, like the

nurse reports, indicate that the greatest changes occurred in the hospitals whose work environment improved. The favorable change in those hospitals was often at least twice as large as in hospitals whose work environment got worse.

Discussion

Survey data from thousands of nurses and patients in four states suggest that patient safety and quality of care remain problems, and that a blame-free safety culture where staff feel empowered to question authority has not been fully achieved. In spite of the IOM recommendations to improve nurses' clinical work environments to keep patients safe,[5] in 2015–16 a third of nurses in the study hospitals rated the work environment in their hospital as only fair or poor. Moreover, seven in ten of the hospitals showed no substantively or statistically significant improvements in their clinical work environment since 2003, when the IOM called for transforming nurse work environments.[5] And nearly one in ten of the hospitals showed marked deterioration in their clinical work environments over the period, despite the intense national focus on improving patient safety. Nurse burnout, a safety hazard, was high, with almost a third of bedside RNs scoring high on the Maslach Burnout Inventory. Burnout is a problem not only among nurses but also increasingly among physicians, and thus it poses a growing risk to patient safety.[17]

There is encouraging news. Both patients and nurses reported favorable changes in quality and safety and patient experiences in the 21 percent of hospitals that witnessed marked improvements in their clinical work environments. Improving these environments through organization and culture change is a comparatively low-cost intervention to improve the quality of care and patient safety, as it primarily involves creating a culture of openness, mutual trust, and respect between management and clinicians; increasing the engagement of clinicians in hospital decision making; and sustaining a learning organization.

Our findings confirm that nurses spend substantial time troubleshooting recurring operational problems, interrupting care and creating patient safety hazards. RNs are an expensive and scarce resource to use in this manner, when their greatest value is in direct patient care. The findings suggest that more attention by hospital management is needed to redesign work flows to permanently solve persistent operational failures that take nurses away from direct patient care.

Poor work environments make complete adherence to evidence-based safety interventions difficult and may help explain the gap between knowledge and practice in the prevention of patient harm. For example, most US hospitals now have rapid-response teams (a safety intervention), but patient survival from in-hospital cardiac arrest still varies substantially by hospital—in part because of differences in nurse staffing and the quality of clinical care environments.[18] The effectiveness of care bundles in preventing central-line bloodstream infections is significantly associated with nurse staffing, perhaps because evidence-based procedures must be achieved at close to 95 percent reliability to prevent infections.[8]

US health care policy over the past decade has increasingly adopted regulatory incentives such as pay-for-reporting and pay-for-performance (for example, the Medicare Hospital

Value-Based Purchasing Program). Under these policies, which have had mixed results, hospitals are rewarded for good outcomes and for performing appropriate clinical care.[19] A shift in policy could increase these programs' emphasis on transforming the environments in which care is delivered and more explicitly include indicators of work environment quality. The Centers for Medicare and Medicaid Services (CMS) could require hospitalstoreportRNstaffinglevelsforthepublictoviewontheHospitalComparewebsite.This was one of the recommendations of the *Keeping Patients Safe* report.[5] The Joint Commission[20] and the National Quality Forum[21] have endorsed public reporting of nurse staffing, and five states haveimplementedsuchpolicies.[22]Similaraction could be taken around direct measures of the work environment that include indicators of nursing leadership effectiveness, good nurse-physician relationships, and adequacy of nurse staffing. The National Quality Forum endorses the hospital-level measure of the Practice Environment Scale of the Nursing Work Index—the same measure used in this study. More than two thousand US hospitals already participate in the National Database of Nursing Quality Indicators, which includes the scale as an option.[23] Similar to adverse-event and quality reporting systems, reporting on work environments would facilitate monitoring, benchmarking, and quality improvement activities, while also acting as an important signal that the clinical work environment is a national priority.

A core principle of the safety culture is being open about errors and learning from them. *To Err Is Human*[1] recommended policy actions to encourage the reporting of errors and hazardous conditions and recommended that organizations implement mechanisms for learning from error. Although many states have implemented adverse-event reporting systems, and most hospitals have institutional reporting mechanisms, the impact of these systems has been mixed.[24] Incident reporting in hospitals is largely dependent on nurses to come forward and make reports.[25] Our findings suggest that many nurses do not feel free to report errors. Thus, paying more attention to developing a blame-free culture and improving work environments to enhance nurses' trust in management could improve adverse-event reporting, which is key to institutional learning about the prevention of patient harm.

There are also organizational interventions that could be leveraged to improve the work environment. One example given by the IOM is Magnet hospital recognition, as recommended by its Future of Nursing initiative.[26] Magnet recognition is a form of voluntary accreditation that offers a blueprint for improving work environments along the same domains that were outlined as important in *Keeping Patients Safe*.[5] Evidence suggests that hospitals that become Magnet hospitals experience improvements in care environments and safety and reductions in patient harm.[27] The Magnet program creates an active network so that hospital and nursing leaders can share and transmit best practices and strategies to achieve a good work environment that is conducive to patient safety. Fewer than 10 percent of US hospitals were Magnet hospitals as of July 2017.[28] Offering greater opportunities for the public to be able to identify these hospitals—for example, through Hospital Compare—could be an incentive for more hospitals to take on the challenges of meeting Magnet work environment standards.

Conclusion

Our findings confirm that patient safety remains a serious concern. Failure to substantially improve clinical work environments in most hospitals, as recommended by the IOM, may be hampering progress toward improving patient safety.

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NOTES

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Poor work environments make complete adherence to evidence-based safety interventions difficult.

There are organizational interventions that could be leveraged to improve the work environment.

EXHIBIT 1

Hospital nurses' reports on quality of care, patient safety, and work environment indicators, 2015–16

Indicator	Percent of nurses
GLOBAL MEASURES	
Quality of patient care less than excellent	60.4
Unfavorable rating of their hospital (8 or less on a 10-point scale)[a]	67.8
Would not definitely recommend their hospital[a]	54.9
Unfavorable grade on patient safety	29.6
Unfavorable grade on infection prevention[a]	28.9
CULTURE OF PATIENT SAFETY INDICATORS	
Staff feel like mistakes are held against them	50.1
Important information is lost during shift changes	37.3
Things fall between the cracks	41.9
Staff do not feel free to question authority	36.9
Patient safety is not a top priority of management	21.5
WORK ENVIRONMENT INDICATORS AND RELATED MEASURES	
Work environment less than excellent[b]	80.7
Large part of shift spent on work-arounds[a]	27.1
Large part of shift spent on nonnursing tasks[a]	30.7
Less than very satisfied with job	69.4
High score on Maslach Burnout Inventory	30.8

SOURCE Authors' analysis of data for 2015–16 from the RN4CAST-US Nurse Survey.

NOTES Percentages are based on the responses of 12,919–13,457 staff registered nurses (RNs) in 535 hospitals, after small numbers of missing responses were deleted. Unfavorable grades of hospitals were C, D, or F.

[a]Item included in the 2015–16 survey but not the 2005–08 survey.

[b]Single-item measure of the work environment, where nurses were asked to rate that environment on a four-point scale (1 being poor and 4 being excellent).

EXHIBIT 2

Hospital patients' reports on their hospital experience, 2015

Indicator	Percent of patients
Unfavorable rating of their hospital (8 or less on a 10-point scale)	31.8
Would not definitely recommend their hospital	30.2
Nurses did not always communicate well with them	23.8
Did not always receive help quickly from hospital staff	38.2
Staff did not always explain medicines before giving them	38.8
Pain was not always well controlled	31.4

SOURCE Authors' analysis of data for 2015 from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

NOTE Percentages are based on the responses of 659,691 patients in 494 of the 535 hospitals in the 2015 RN4CAST-US Nurse Survey whose patients were surveyed as part of the HCAHPS survey.

EXHIBIT 3

Changes in hospital nurses' reports on patient safety, by type of change in the clinical work environment in hospitals from 2005 to 2016

	Change in percent of nurses			
		Hospitals in which the clinical work environment:		
Indicator	All hospitals (*N*= 535)	Worsened (*n*= 39)	Remained the same (*n*= 381)	Improved (*n*= 115)
GLOBAL MEASURES				
Quality of patient care is excellent	4	−16	2[a]	15[b,c]
Favorable grade on patient safety (A or B)	2	−19	0[a]	15[b,c]
CULTURE OF PATIENT SAFETY INDICATORS				
Staff do not feel like mistakes are held against them	−9	−26	−10[a]	0[b,c]
Important information is not lost during shift changes	−8	−19	−9[a]	0[b,c]
Things do not fall between the cracks	−7	−20	−8[a]	1[b,c]
Staff feel free to question authority	3	−15	1[a]	13[b,c]
Patient safety is a top priority of management	−4	−25	−6[a]	7[b,c]
RELATED MEASURES				
Job satisfaction	7	−8	6[a]	16[b,c]
Low score on Maslach Burnout Inventory	3	−9	1[a]	12[b,c]

SOURCE Authors' analysis of data for 2015–16 from the RN4CAST-US Nurse Survey.

NOTES Hospital nurses were staff registered nurses (RNs) in 535 hospitals; see the exhibit 1 notes. The threshold for significance is 0.05.

[a]Significant difference between the change in hospitals whose work environments remained the same and that in hospitals whose environments worsened.

[b]Significant difference between the change in hospitals whose work environments improved and that in hospitals whose environments worsened.

[c]Significant difference between the change in hospitals whose work environments improved and that in hospitals whose environments remained the same.

EXHIBIT 4

Changes in patient reports on their hospital experience, by type of change in the clinical work environment in hospitals from 2005 to 2016

	Change in percent of patients			
		Hospitals in which the clinical work environment:		
Indicator	**All hospitals (*N*= 494)**	**Worsened (*n*= 37)**	**Remained the same (*n*= 355)**	**Improved (*n*= 102)**
Favorable rating of their hospital (9 or 10 on a 10-point scale)	8	6	8	11[b,c]
Would definitely recommend their hospital	5	2	5[a]	8[b,c]
Nurses always communicated well with them	7	6	7	9[b,c]
Always received help quickly from hospital staff	7	4	7[a]	9[b,c]
Staff always explained medicines before giving them	7	4	7[a]	8[b]
Pain was always well controlled	4	3	4	5[b,c]

SOURCE Authors' analysis of data for 2015 from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

NOTE The threshold for significance is 0.05.

[a]Significant difference between the change in hospitals whose work environments remained the same and that in hospitals whose environments worsened.

[b]Significant difference between the change in hospitals whose work environments improved and that in hospitals whose environments worsened.

[c]Significant difference between the change in hospitals whose work environments improved and that in hospitals whose environments remained the same.