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## Nursing: A Key To Patient Satisfaction

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### Abstract

Patient satisfaction is receiving greater attention as a result of the rise in pay-for-performance (P4P) and the public release of data from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. This paper examines the relationship between nursing and patient satisfaction across 430 hospitals. The nurse work environment was significantly related to all HCAHPS patient satisfaction measures. Additionally, patient-to-nurse workloads were significantly associated with patients' ratings and recommendation of the hospital to others, and with their satisfaction with the receipt of discharge information. Improving nurses' work environments, including nurse staffing, may improve the patient experience and quality of care.

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The institute of medicine's landmark report, *Crossing the Quality Chasm*, highlighted patient-centered care as one of six priority areas for improvement in the U.S. health care system.<sup>1</sup> Recent Medicare payment reforms include financial incentives to hospitals that report patient satisfaction data using a common instrument; these reforms will move toward providing incentives based on patient satisfaction results. Patient satisfaction is also a core part of the Centers for Medicare and Medicaid Services (CMS) reporting requirements for hospitals to qualify for full payment as of the fiscal year 2008 inpatient prospective payment system (IPPS) update.<sup>2</sup> To avoid a 2 percent reduction in payment, hospitals must participate in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. The HCAHPS survey was also endorsed by the National Quality Forum in May 2005.<sup>3</sup> The incorporation of the HCAHPS survey into the IPPS, pay-for-performance (P4P) plans, and quality-monitoring systems has ensured that measuring and reporting patient satisfaction is an important part of value-based health care. Hospitals now have a financial incentive to improve their quality of care to increase patient satisfaction. There is also increased public accountability, as these outcomes were made public for consumers and payers in early 2008.

Patients' reports of satisfaction are higher in hospitals where nurses practice in better work environments or with more favorable patient-to-nurse ratios.

Patient satisfaction has been associated in the research literature with a variety of nursing factors, but until recent payment incentives, many hospitals have not taken note. Studies have linked patient satisfaction with nurse-staffing levels, higher proportions of registered nurse (RN) skill-mix, nurses' work environment, and RN-physician collaboration.<sup>4</sup> This study is the first to examine the contribution of nurses' work environments to patient satisfaction using national HCAHPS data. The results provide evidence to guide institutions in prioritizing interventions that could greatly improve patient satisfaction.

## Study Data And Methods

### Data sources and samples

This study used cross-sectional data from three sources—the national CAHPS survey, a four-state nurse survey of hospital quality, and the American Hospital Association (AHA) Annual Survey—to evaluate the relationship between the nurse work environment and patient satisfaction.

**Hospitals**—The study included all acute care hospitals in California, Pennsylvania, New Jersey, and Florida that (1) reported HCAHPS data to the CMS for the first public release period (October 2006–June 2007); (2) had structural characteristics reported in the 2005 AHA Annual Survey; and (3) had nurses who responded to the University of Pennsylvania Multi-State Nursing Outcomes Study. Some 430 hospitals met these criteria.

Responses from individual nurses were aggregated to create hospital-level measures of the nurse work environment and hospital-level patient-to-nurse workloads. The number of staff-nurse respondents across the study hospitals averaged 49 (range: 10–282). The nurse work environment was measured using three of the five subscales of the Practice Environment Scale of the Nursing Work Index (PESNWI), an instrument recommended by the National Quality Forum as one of fifteen nurse-sensitive indicators of health care quality.<sup>5</sup> The PES-NWI subscales used to measure the nurse work environment include items related to nursing leadership, nursing standards for high-quality patient care, and nurse-physician relationships. The two excluded subscales, which focus on resource adequacy and participation in hospital affairs, were highly correlated to directly measured nurse staffing and were therefore omitted from the PES-NWI measure we used in these analyses. Nurses who completed the PES-NWI indicated their level of agreement (using a four-point scale) that certain organizational features were present in their jobs. The three subscales were calculated for each hospital as the mean of the items comprising the subscales. The psychometric properties of the three subscales of the PES-NWI are satisfactory.<sup>6</sup> As in past work, the medians of the three subscales across all study hospitals were used to classify hospitals as having “better” (three subscales above the median), “mixed” (one or two subscales above the median) or “poor” (no subscales above the median) nurse work environments, and nurse staffing was measured by calculating the mean number of patients cared for by all RNs in each hospital on their last shift.<sup>7</sup>

Additional hospital characteristics were obtained from the 2005 AHA Annual Survey, including size, teaching status, ownership, and core-based statistical area (CBSA)—a census-based classification of the surrounding population density. These control variables were chosen because preliminary reports suggested that HCAHPS scores differ by these characteristics.<sup>8</sup>

**Nurses**—Nurse survey data were collected in 2006–07 from large random samples of RNs obtained from licensure lists in California (40 percent), Pennsylvania (40 percent), New Jersey (50 percent), and Florida (30 percent). Sampling nurses to obtain information about hospitals greatly diminishes response bias at the hospital level, which is the greatest potential threat to validity in studies of hospital performance involving primary data collection. It also provides data about nurses’ work environments, in addition to staffing levels—a primary advantage of these data over using other administrative data sources, such as the AHA Annual Survey.

A two-stage sampling design was used. More than 98,000 nurses responded to the mailed survey in the first stage (36 percent response rate).<sup>9</sup> Nonresponders were mailed reminder postcards and duplicate surveys following a modified Dillman approach.<sup>10</sup> To obtain external validity for the first sampling stage, a random sample of nonresponders (650 each in Pennsylvania and California) was drawn. Nurses in the second sample received a shortened survey, telephone reminders, and a monetary incentive to encourage their responses. The

second sample's response rate was 91 percent. A few differences were noted in some nonresponders' demographic characteristics when compared with the first sample; however, there was no evidence of response bias in the hospital measures of interest.<sup>11</sup> The survey included questions about the hospital, workload, demographics, and work environment (the Nursing Work Index—Revised).<sup>12</sup> The final sample included responses from 20,984 staff nurses who provided direct patient care in the 430 acute care hospitals included in this study.

**Patients**—The HCAHPS survey is the first national, standardized database of patients' hospital experiences in short-term, acute care hospitals. The data are publicly available on the Hospital Compare Web site sponsored by the CMS and the Hospital Quality Alliance (HQA).<sup>13</sup> The twenty-seven-item survey is reported as a set of ten measures (six summary measures, two single items, and two global ratings) related to communication with nurses and doctors, responsiveness of hospital staff, pain management, communication about medicines, discharge information, cleanliness and quietness of the hospital environment, overall rating of the hospital, and willingness to recommend the hospital to friends and family. Before being publicly reported, individual patients' responses are aggregated and risk adjusted for patient mix and mode of administration.<sup>14</sup> The reported response rate for each hospital was used as a control variable in this study. The mean response rate across hospitals in this sample was 34 percent. Data from the reporting period of October 2006–June 2007 were used for this study, to correspond as closely as possible with the timing of the nurse survey.

### Data analyses

The distributions of nurse staffing, work environments, other hospital characteristics, and each HCAHPS measure were examined for the full sample, as well as for the subsamples of hospitals in each nurse-work-environment category. Ordinary least squares (OLS) regression models were used to estimate the effect of the nurse work environment on each HCAHPS outcome, before and after adjusting for unmeasured differences across the four states using dummy variables, as well as for hospital characteristics (size, teaching status, ownership, and CBSA) and response rate.

### Study Results

Exhibit 1 displays the hospital characteristics of the full sample, as well as by the quality of the nurse work environment. When hospital characteristics were examined by quality of work environment, some significant differences were noted. For example, nurses who worked in poor environments cared for an average of 5.3 patients, while nurses in the better environments had an average workload of 4.6 patients.

Exhibit 2 contains the distributions of the HCAHPS outcomes in the full sample, as well as by quality of nurse work environment. Patient satisfaction had significant positive associations with the quality of the work environment for nine of the ten measures. The most notable difference involved the percentage of patients who would definitely recommend the hospital. On this global measure, there was a ten-percentage-point difference in the mean percentage of patients who would definitely recommend the hospital between those cared for in hospitals with better nurse work environments (69.9 percent) than those cared for in hospitals with poor environments (59.6 percent).

Exhibit 3 displays estimates of the unadjusted and adjusted joint effects of nurse work environment and patient-to-nurse staffing ratios on HCAHPS outcomes from linear regression models. The nurse work environment had significant effects on all ten HCAHPS measures in both sets of models. Nurse staffing was statistically significant ( $p < 0.05$ ) on five outcomes in the unadjusted and three outcomes in the adjusted models.

The most notable effects of the nurse work environment and nurse staffing were on the global ratings of the percentage of patients who would definitely recommend the hospital. The estimate of 4.08 implies that the percentage of patients who would definitely recommend the hospital was more than 8 percentage points higher in better care environments as compared to poor and more than 4 percentage points higher in better nurse work environments as compared to mixed. The effect of nurse staffing above and beyond the effect of the quality of the overall nurse work environment demonstrated that for each additional patient per nurse, the percentage of patients who would definitely recommend the hospital decreased by 1.44 percent. Given that the standard deviation of this global measure was 9.8 percent, hospitals that improved their nurse work environments from poor to better and reduced nurses' workloads by one patient would be expected to move, in terms of the percentage of patients who would definitely recommend their hospital, from the sixteenth percentile to the fiftieth (or from the fiftieth percentile to the eighty-fourth) in this distribution of hospitals.

Some relationships were less theoretically clear and may indicate the presence of unmeasured variables. For example, unadjusted models showed a relationship ( $p < 0.01$ ) between the percentage of patients who reported that doctors always communicated well in better care environments as compared to poor; however, this relationship became insignificant in adjusted models.

## Discussion

This the first study to explore in detail the relationship between hospital nurses' work environments, staffing levels, and the new HCAHPS patient satisfaction measures. Examination of the HCAHPS measures in our sample suggests that most hospitals need improvement in areas that are important to patients. As has been reported by others, one-third of patients would not recommend their hospital to friends or family members.<sup>15</sup> The quality of the nurse work environment, unmeasured in a previous report of the effects of nursing on HCAHPS measures, was found to be associated with all ten measures of patient satisfaction and strongly related to whether patients would definitely recommend the hospital.<sup>16</sup> Additionally, we showed that patient-to-nurse ratios in hospitals affect patient satisfaction, especially the measures for high rating, definite recommendation, and satisfaction with receiving discharge information.

The poor nurse work environments and staffing levels associated with patient dissatisfaction in this study have been linked previously to nurse turnover.<sup>17</sup> Additionally, better hospital nurse work environments have been linked empirically with higher job satisfaction and lower nurse burnout, and to lower risk-adjusted mortality and failure-to-rescue rates.<sup>18</sup> Our new findings supply additional evidence suggesting that improving nurse work environments in hospitals could result in improved patient outcomes, including better patient experiences.

## Study limitations

A limitation of the research is the cross-sectional design, which does not inform us about causation. Longitudinal analysis would better assess causality as well as potential unmeasured variables. The HCAHPS data are limited in the degree to which they explore satisfaction with nursing care; however, we found that nursing was most strongly associated with the two global measures of satisfaction. This finding suggests that nursing may be an important factor in the overall patient experience.

Our analysis was limited to hospitals that voluntarily submitted HCAHPS data during the initial public reporting period; these hospitals might not be representative of all hospitals. We compared the characteristics of hospitals in our statewide databases that did and did not report HCAHPS data. We found that large, nonprofit, teaching hospitals in urban areas were more

likely than others to participate in the initial, voluntary collection of HCAHPS data—a finding confirmed in voluntary HCAHPS participation nationally.<sup>19</sup>

We also compared the characteristics of the 430 hospitals used in this study with those of the 155 hospitals for which we had nurse survey data but not HCAHPS data. Size was the only characteristic that distinguished the hospitals that were included in the study: smaller hospitals were less likely to have participated in the voluntary HCAHPS.<sup>20</sup> In addition, we found that hospitals in this sample had slightly better and less variable nurse-staffing levels than hospitals that did not report HCAHPS data (mean [standard deviation]: 4.9 [1.0] patients per nurse versus 5.3 [1.2] patients per nurse;  $p = 0.001$ ). This difference provides a possible explanation for why, like other researchers, we found a staffing effect but failed to detect as strong a staffing effect on all HCAHPS outcomes as we found for the nurse work environment.<sup>21</sup> Because the full range of nurse staffing was not reflected in hospitals that voluntarily reported HCAHPS data, the effect of nurse staffing could be stronger when all hospitals report HCAHPS results. Thus, additional research on the impact of nursing on patient satisfaction is warranted when more hospitals are reporting HCAHPS results.

### Implications

Our findings demonstrate that patients' reports of satisfaction are higher in hospitals where nurses practice in better work environments or with more favorable patient-to-nurse ratios. Although obstacles to implementing these changes have been identified, including the nurse shortage and cost containment efforts, the improvement of staffing levels and work environments may ultimately save hospitals money by preventing adverse events.<sup>22</sup> As patient satisfaction becomes integrated into more P4P programs and public reporting plans, hospitals will have further incentives to improve patient satisfaction. The findings of this study provide additional support for the IOM's recommendation to reform nurse work environments, and they offer a promising strategy for improving hospital performance as measured by patient satisfaction: investment in nursing.<sup>23</sup>

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### NOTES

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**EXHIBIT 1**  
Distribution Of Hospital Characteristics In A Four-State Sample Of Hospitals, By Quality Of Nurses' Work Environment, 2006–07

Characteristic	Work environment quality			p value
	All (N = 430)	Poor (n = 130)	Better (n = 127)	
Patients per nurse, mean (SD)	4.9 (1.0)	5.3 (1.1)	4.9 (1.0)	<.001
Bed size, no. (%)				0.06
≤100 beds	38 (9%)	9 (7%)	14 (8%)	15 (12%)
101–250 beds	188 (44%)	70 (54%)	71 (41%)	47 (37%)
>250 beds	204 (47%)	51 (39%)	88 (43%)	65 (51%)
Teaching status, no. (%)				0.65
None	220 (51%)	64 (49%)	90 (52%)	66 (52%)
Minor	176 (41%)	55 (42%)	73 (42%)	48 (38%)
Major	34 (8%)	11 (8%)	10 (6%)	13 (10%)
Core-based statistical area, no. (%)				0.02
Division (>2.5 million)	174 (40%)	48 (37%)	64 (37%)	62 (49%)
Metropolitan (50,000–2.5 million)	221 (51%)	66 (51%)	96 (55%)	59 (46%)
Micro (10,000–50,000)	30 (7%)	16 (12%)	9 (5%)	5 (4%)
Rural (<10,000)	5 (1%)	0 (0%)	4 (2%)	1 (1%)
Ownership				<.001
Government	33 (8%)	8 (6%)	13 (8%)	12 (9%)
Nonprofit	315 (73%)	83 (64%)	126 (73%)	106 (83%)
For profit	82 (19%)	39 (30%)	34 (20%)	9 (7%)

**SOURCE:** Authors' tabulation of data from Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), available on the Hospital Compare Web site (October 2006–June 2007); and nurse survey data, 2006–2007.

**NOTES:** Percentages might not add to 100 because of rounding. *p* values generated from analysis of variance for staffing variable and from chi-square for categorical variables, except for the core-based statistical area variable, where Fisher's exact test was used for cell counts of less than 5.

## Distributions Of HCAHPS Outcomes In A Four-State Sample Of Hospitals, By Quality Of Nurses' Work Environment, 2006–07

## EXHIBIT 2

Outcome	Work environment quality				p value
	All	Poor	Mixed	Better	
Patients gave a rating of 9 or 10 (high)	59.2 (8.8)	55.4 (8.7)	58.6 (7.7)	64.0 (8.2)	<0.001
Patients would definitely recommend the hospital	64.2 (9.8)	59.6 (9.4)	63.6 (8.9)	69.9 (8.7)	<0.001
Nurses always communicated well	68.6 (6.9)	66.8 (7.6)	68.4 (6.7)	70.5 (6.0)	<0.001
Patients always received help as soon as they wanted	54.9 (7.7)	53.5 (8.8)	54.8 (7.3)	56.4 (6.6)	0.01
Always quiet at night	45.6 (7.3)	45.4 (6.6)	45.2 (7.4)	46.3 (7.8)	0.44
Doctors always communicated well	75.4 (4.8)	74.6 (5.5)	75.2 (4.7)	76.6 (3.8)	0.002
Room was always clean	63.4 (7.0)	61.7 (7.2)	63.2 (6.7)	65.5 (6.7)	<0.001
Staff gave patients discharge information	76.0 (4.6)	74.7 (5.1)	76.0 (4.4)	77.4 (4.0)	<0.001
Pain was always well controlled	64.2 (5.8)	62.8 (6.5)	64.0 (5.7)	65.9 (4.8)	<0.001
Staff always explained medications	53.5 (6.1)	51.6 (6.5)	53.3 (5.9)	55.8 (5.3)	<0.001

**SOURCE:** Authors' tabulation of data from Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), available on the Hospital Compare Web site (October 2006–June 2007); and nurse survey data, 2006–2007.

**NOTES:** Values are means, with standard deviations in parentheses. Sample sizes are available in Exhibit 1. *p* values were generated from analysis of variance. A graphical depiction of these data is available in the appendix, online at <http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w669/DC2>



**EXHIBIT 3**

Effects Of The Nurse Work Environment And Nurse Staffing On HCAHPS Outcomes In A Four-State Sample Of Hospitals, 2006–07

Outcome	Unadjusted parameter estimate	p value	Adjusted parameter estimate	p value
Patients gave a rating of 9 or 10 (high)				
Nurse work environment	4.23	<0.001	3.51	<.001
Nurse staffing	-0.24	0.54	-1.00	0.03
Patients would definitely recommend the hospital				
Nurse work environment	4.80	<0.001	4.08	<0.001
Nurse staffing	-0.93	0.03	-1.44	0.01
Nurses always communicated well				
Nurse work environment	2.26	<0.001	1.89	<0.001
Nurse staffing	1.18	<0.001	-0.57	0.10
Patients always received help as soon as they wanted				
Nurse work environment	1.92	<0.001	1.69	<0.001
Nurse staffing	1.35	<0.001	-0.62	0.11
Always quiet at night				
Nurse work environment	1.00	0.03	1.29	0.004
Nurse staffing	1.58	<0.001	-0.01	0.99
Doctors always communicated well				
Nurse work environment	1.15	<0.001	0.69	0.02
Nurse staffing	0.41	0.07	-0.22	0.41
Room was always clean				
Nurse work environment	2.31	<0.001	1.77	<0.001
Nurse staffing	1.17	<0.001	0.18	0.64
Staff gave patients discharge information				
Nurse work environment	1.35	<0.001	1.40	<0.001
Nurse staffing	0.11	0.62	-0.78	0.001
Pain was always well controlled				
Nurse work environment	1.73	<0.001	1.27	<0.001
Nurse staffing	0.49	0.08	-0.42	0.18
Staff always explained medications				
Nurse work environment	2.17	<0.001	1.73	<0.001

Outcome	Unadjusted parameter estimate	<i>p</i> value	Adjusted parameter estimate	<i>p</i> value
Nurse staffing	0.18	0.52	-0.55	0.09

**SOURCE:** Authors' tabulation of data from Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), available on the Hospital Compare Web site (October 2006–June 2007); and nurse survey data, 2006–2007.

**NOTES:** N = 430. Adjusted models included controls for state (CA, NJ, PA, and FL), hospital characteristics (core-based statistical area, bed size, and ownership and teaching status), and patient response rate. Estimates for nurse work environment reflect change in estimate for effect of better versus mixed (or of mixed versus poor) environments. Estimates for nurse staffing reflect the change in estimates for the effect of an increase of one patient per nurse.