SPECIAL ARTICLE

Patients' Perception of Hospital Care in the United States

Ashish K. Jha, M.D., M.P.H., E. John Orav, Ph.D., Jie Zheng, Ph.D., and Arnold M. Epstein, M.D., M.A.

ABSTRACT

BACKGROUND

Patients' perceptions of their care, especially in the hospital setting, are not well known. Data from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey provide a portrait of patients' experiences in U.S. hospitals.

METHODS

We assessed the performance of hospitals across multiple domains of patients' experiences. We examined whether key characteristics of hospitals that are thought to enhance patients' experiences (i.e., a high ratio of nurses to patient-days, for-profit status, and nonacademic status) were associated with a better experience for patients. We also examined whether a hospital's performance on the HCAHPS survey was related to its performance on indicators of the quality of clinical care.

RESULTS

We found moderately high levels of satisfaction with care (e.g., on average, 67.4% of a hospital's patients said that they would definitely recommend the hospital), with a high degree of correlation among the measures of patients' experiences (Cronbach's alpha, 0.94). As compared with hospitals in the bottom quartile of the ratio of nurses to patient-days, those in the top quartile had a somewhat better performance on the HCAHPS survey (e.g., 63.5% vs. 70.2% of patients responded that they "would definitely recommend" the hospital; $P<0.001$). Hospitals with a high level of patient satisfaction provided clinical care that was somewhat higher in quality for all conditions examined. For example, those in the top quartile of HCAHPS ratings performed better than those in the bottom quartile with respect to the care that patients received for acute myocardial infarction (actions taken to provide appropriate care as a proportion of all opportunities for providing such actions, 95.8% vs. 93.1% in unadjusted analyses; $P<0.001$) and for pneumonia (90.5% vs. 88.6% in unadjusted analyses, $P<0.001$).

CONCLUSIONS

This portrait of patients' experiences in U.S. hospitals offers insights into areas that need improvement, suggests that the same characteristics of hospitals that lead to high nurse-staffing levels may be associated with better experiences for patients, and offers evidence that hospitals can provide both a high quality of clinical care and a good experience for the patient.

From the Department of Health Policy and Management, Harvard School of Public Health (A.K.J., J.Z., A.M.E.); the Division of General Medicine, Brigham and Women's Hospital (A.K.J., E.J.O., A.M.E.); and the Boston Veterans Affairs Healthcare System (A.K.J.) — all in Boston. Address reprint requests to Dr. Jha at the Department of Health Policy and Management, Harvard School of Public Health, 677 Huntington Ave., Boston, MA 02115, or at ajha@hsph.harvard.edu.

N Engl J Med 2008;359:1921-31.

The quality of health care in the United States varies according to region and setting and is too often inadequate.[1-3] In response to uneven care among hospitals, federal policy makers and private organizations have launched an important program to collect and publicly report data on the quality of the health care Americans receive. The Hospital Quality Alliance (HQA) program,[2] overseen by private and public entities, including the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission, is leading this effort in the hospital sector, producing quarterly reports on the provision of effective services for common conditions. Although the HQA has made these data increasingly available to the public, there has been little information on the quality of hospital care from the patients' perspective. As the Institute of Medicine points out, the provision of patient-centered care is a key element of a high-quality health care system.[1]

To address this information gap, the HQA program incorporated the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey into its battery of measurements.[4,5] Many of the nation's hospitals have made a commitment to providing responses to the survey from patients discharged from their facilities. The first set of national HCAHPS data became publicly available on March 28, 2008.

The new HCAHPS data allow us to gain key insights into the experiences of patients in the hospital and the ways in which these experiences relate to other aspects of care. We addressed four questions: How do U.S. hospitals perform on measurements of patients' experiences, and is performance with respect to one element of a patient's experience (e.g., communication with physicians) related to performance with respect to another element (e.g., communication with nurses)? Do patients who receive care in hospitals with three key characteristics (being a for-profit hospital, having a higher ratio of nurses to patient-days, and being a nonteaching hospital) report better experiences than patients in hospitals without these characteristics? Is a hospital's ability to provide patient-centered care related to its performance on measures of clinical quality? Finally, how variable is the performance of hospitals across regions?

Methods

HCAHPS and the Domains of Patients' Experiences

The HCAHPS survey, developed by the Agency for Healthcare Research and Quality, asks patients 27 questions about their experiences in the hospital and about their demographic characteristics. Responses to 14 of the questions (possible responses: always, usually, sometimes, and never) are summarized by CMS and reported in 6 domains as composites: communication with physicians, communication with nurses, communication about medications, quality of nursing services, adequacy of planning for discharge, and pain management (for specific questions, see Appendix 1 in the Supplementary Appendix, available with the full text of this article at www.nejm.org). The CMS calculated composite ratings for the domains by averaging the responses to each individual item within that domain, as described in the technical appendix in the Supplementary Appendix. Other domains reflect individual questions about whether the rooms were clean and whether they were quiet (possible responses: always, usually, sometimes, and never) and two overall ratings: a global rating of the hospital on a scale of 0 to 10, with 0 being the worst and 10 being the best a hospital can be, and a question about whether the patient would recommend the hospital to family and friends (possible responses: definitely yes, probably yes, probably no, and definitely no). The global ratings were grouped by the CMS into one of three categories, 0 to 6, 7 or 8, or 9 or 10, rather than made available individually. The details of the development of the survey, psychometric testing, and factor analyses used to create summary ratings within domains have been described previously.[5-10] Data are adjusted for the method of administration of the survey, as well as for eight factors related to the patient (e.g., age, educational level, and health status) in order to substantially reduce nonresponse bias, as described in the technical appendix in the Supplementary Appendix and at www.hcahpsonline.org.

Under the CMS's authority to monitor providers of care and to oversee care for Medicare patients, the CMS and its Quality Improvement Organizations can require that the HCAHPS survey be administered to patients who are being

discharged from hospitals that receive Medicare payment. It seems likely that nearly all hospitals in the nation will participate in the program in the future, although some hospitals chose to withhold data from public reporting in the first year. The HCAHPS data in this study reflect the experiences of patients with respect to care delivered during the period from July 2006 through June 2007.

HQA DATA ON PROVISION OF HIGH-QUALITY CLINICAL CARE

The HQA also provides data on the compliance of hospitals with 24 measures of evidence-based processes with respect to care for three conditions — acute myocardial infarction, congestive heart failure, and pneumonia — and with respect to the prevention of complications from surgery (see Appendix 2 in the Supplementary Appendix). To create condition-specific summary scores, we used a common method,[11] in which the summary score is a percentage derived from the sum of the number of times a hospital performed the appropriate action across all measures for that condition (numerator) divided by the number of opportunities the hospital had to provide appropriate care (denominator). Composite scores for a condition were calculated only if a hospital had at least 30 patients for at least one measure.

STRUCTURAL CHARACTERISTICS OF HOSPITALS

We linked the HCAHPS data to the annual survey of the American Hospital Association, which collects the following information from hospitals: nurse-staffing levels, profit status, status of membership in the Council of Teaching Hospitals and Health Systems, number of beds, census region, location (region and urban vs. rural), percentage of patients receiving Medicaid, and presence or absence of a medical intensive care unit (ICU). We calculated the ratio of nurses to patient-days by dividing the number of full-time-equivalent nurses on staff by 1000 patient-days.

STATISTICAL ANALYSIS

We used chi-square tests and t-tests to compare hospital characteristics between hospitals that reported HCAHPS data and those that chose not to do so. We calculated the average proportion of respondents who rated hospitals in the highest categories in the two overall ratings and in individual domains. We next calculated the correlations between the two overall ratings of hospitals' performance and among the individual domains.

The two highest ratings of overall measures of patients' experiences (global rating of 9 or 10 for a hospital and response of "would definitely recommend the hospital") were, not surprisingly, highly correlated with each other ($r=0.87$). Therefore, we focused primarily on the fraction of patients who rated the hospital in the highest category (9 or 10 on a scale of 0 to 10) as the primary indicator of patient satisfaction. We chose, a priori, to examine three key characteristics that we postulated might be related to a patient's experience in the hospital: the ratio of nurses to patient-days, profit status (for-profit vs. not-for-profit), and academic status (teaching vs. nonteaching, as defined by membership or nonmembership in the Council of Teaching Hospitals and Health Systems). We posited that hospitals with more nurses might provide more patient-centered care because there would be more staff available to tend to patients' needs. We also hypothesized that for-profit hospitals would be highly attuned to patients' experiences and that teaching hospitals might focus more on technical aspects of quality than on optimizing patients' experiences. We examined bivariate relationships between each of these characteristics and HCAHPS ratings and subsequently constructed multivariable linear regression models that adjusted for the other two characteristics as well as other characteristics that might be potential confounders: number of beds in the hospital, census region, location (urban vs. rural), presence or absence of a medical ICU (as a marker of technological capability), and percentage of patients receiving Medicaid (as a measure of the extent to which the hospital provides care for a low-income population). The dependent variable was the proportion of patients who rated their care as 9 or 10.

We examined the relationship between a hospital's performance with respect to the overall experience of the patients and measures of clinical process using the HQA summary scores described above. We categorized all hospitals into quartiles of HCAHPS ratings and examined the mean score for clinical quality within each quartile, using a test for trend to determine whether

a higher rating on the HCAHPS survey was associated with better clinical HQA scores. We subsequently constructed multivariable models to adjust for other hospital characteristics in order to assess the independent relationship between performance on the HCAHPS survey and HQA scores.

Finally, we examined performance on the HCAHPS survey according to hospital-referral regions, which are based on access to tertiary care.[12] We aggregated the total number of patients with each of the four clinical conditions for which we had HQA clinical data and chose the 40 hospital-referral regions with the largest number of patients. We then calculated the performance on each of the HCAHPS measures for each hospital-referral region by averaging the ratings for all hospitals in that hospital-referral region, weighted by hospital size. We subsequently ranked all hospital-referral regions according to the overall proportion of patients who gave their care a high global rating (a score of 9 or 10). We present data on both overall measures (a high global rating and a positive response to the question of whether the patient would recommend the hospital) for the top-ranked and bottom-ranked hospital-referral regions.

RESULTS

CHARACTERISTICS OF HOSPITALS THAT REPORTED HCAHPS DATA

Of the 4032 hospitals that report any quality data to the HQA program, 2429 (60.2%) reported data on patients' experiences to the CMS. More than 75% of the hospitals had 300 or more patients who responded to the survey, whereas only 3% had fewer than 100 respondents. Only data on categorical responses were made available. On average, 36% of the patients who were invited to participate chose to do so. All reported data were adjusted for the method of administration of the survey, the case mix, and nonresponse bias (see the technical appendix in the Supplementary Appendix). Hospitals that were large and private not-for-profit, hospitals with ICUs, teaching hospitals, and hospitals located in urban areas and in the Northeast were more likely to report HCAHPS data than not to report the data (Table 1). Reporting hospitals also had a better performance on HQA measures. Reporting and nonreporting hospitals had similar percentages of Medicaid patients and ratios of nurses to patient-days.

PATIENTS' SATISFACTION WITH HOSPITAL CARE

On average, 63% of patients gave their care a high global rating (9 or 10), and an additional 26% rated their care as 7 or 8, whereas only 11% gave a rating of 6 or less. Sixty-seven percent of the patients said that they would definitely recommend the hospital in which they had received care, and another 27% of patients said they would probably recommend the hospital. The distribution of performance on these two measures is shown in Appendixes 3a through 3d in the Supplementary Appendix. The proportion of patients who reported satisfaction with their care in specific domains varied substantially: on average, 79% of patients reported that doctors always communicated well, whereas only 54% of patients reported that their room was always quiet (Fig. 1).

The domains of patients' experiences were highly correlated overall (Cronbach's alpha, 0.94), with individual correlation coefficients ranging from 0.32 (for the correlation between adequate discharge instructions and adequate nursing service) to 0.84 (for the correlation between communication with nurses and adequate pain control). Fifteen of the 28 correlation coefficients were greater than 0.6, whereas only 2 coefficients were 0.4 or less (Appendix 4 in the Supplementary Appendix).

HOSPITAL CHARACTERISTICS AND PATIENTS' EXPERIENCES

We found that two of the three characteristics of a hospital that we had hypothesized to be associated with HCAHPS performance actually were, but the association of one of the two was in the opposite direction of our hypothesis (Table 2). The ratio of nurses to patient-days was a predictor of performance on the HCAHPS survey: a larger percentage of patients in hospitals in the top quartile of the ratio of nurses to patient-days, as compared with the bottom quartile, gave the hospital a global rating of 9 or 10 (65.9% vs. 60.5%, $P<0.001$ for trend). Fewer patients in for-profit hospitals gave a global rating of 9 or 10 than patients in either private or public not-for-profit hospitals (59.1% vs. 64.8% and 65.4%, respectively; $P<0.001$ for both comparisons). There was no significant difference between teaching and nonteaching hospitals in the percentage of patients who gave the highest global rating (63.3% and 62.8%, respectively; $P=0.51$).

We then examined each of these three characteristics and the ratings on individual HCAHPS

Table 1. Characteristics of Hospitals That Reported and Those That Did Not Report HCAHPS Data.*

Characteristic	Reported HCAHPS Data (N=2429)	Did Not Report HCAHPS Data (N=1603)	P Value
Size — no. (%)			<0.001
6–99 beds	723 (29.8)	983 (61.3)	
100–399 beds	1392 (57.3)	524 (32.7)	
≥400 beds	314 (12.9)	96 (6.0)	
Region — no. (%)			<0.001
Northeast	407 (16.8)	162 (10.1)	
Midwest	668 (27.5)	507 (31.6)	
South	897 (36.9)	657 (41.0)	
West	457 (18.8)	277 (17.3)	
Profit status — no. (%)			<0.001
For-profit	381 (15.7)	237 (14.8)	
Not-for-profit, private	1696 (69.8)	852 (53.2)	
Not-for-profit, public	352 (14.5)	514 (32.1)	
Teaching hospital — no. (%)	204 (8.4)	68 (4.2)	<0.001
Urban hospital — no. (%)	2129 (87.6)	1020 (63.6)	<0.001
Presence of medical ICU — no. (%)	1938 (79.8)	833 (52.0)	<0.001
Presence of cardiac ICU — no. (%)	992 (40.8)	368 (23.0)	0.004
Medicaid patients — %	17±23	17±16	0.91
Ratio of nurses to 1000 patient-days	6.4±3.1	6.6±9.5	0.18
HQA score†			
AMI, 8 measures	94.4±4.2	92.5±5.5	<0.001
CHF, 4 measures	84.9±10.9	77.4±17.3	<0.001
Pneumonia, 7 measures	90.0±5.8	86.7±8.6	<0.001
Prevention of surgical complications, 5 measures	84.4±8.1	80.5±11.0	<0.001
All 24 measures	88.5±4.9	85.9±6.9	<0.001

* Plus–minus values are means ±SD. AMI denotes acute myocardial infarction, CHF congestive heart failure, HCAHPS Hospital Consumer Assessment of Healthcare Providers and Systems, HQA Hospital Quality Alliance, and ICU intensive care unit.

† The HQA score is a percentage derived from the sum of the number of times a hospital performed the appropriate action across all measures for that condition (numerator) divided by the number of opportunities the hospital had to provide appropriate care (denominator).

components in detail (Table 3). Although the performance of hospitals in the highest quartile of the ratio of nurses to patient-days was better than that of hospitals in the lowest quartile for each component, the biggest differences were in the areas of nursing services (4.2 percentage points), discharge instructions (3.2 percentage points), communication with nurses (3.0 percentage points), and communication about medications (3.0 percentage points), whereas the differences were smaller with respect to whether the room was quiet (2.2 percentage points) and clean (2.0 percentage points) and with respect to communication with physicians (0.9 percentage point). The performance of for-profit hospitals was worse than that of private and public not-for-profit hospitals in all areas. Differences between teaching and nonteaching hospitals were small and inconsistently significant.

PATIENTS' SATISFACTION WITH CARE AND QUALITY OF CARE

We found that patients' satisfaction with care was associated with the quality of clinical care in the hospitals for all four conditions measured. In unadjusted analyses, the HQA scores for hospitals

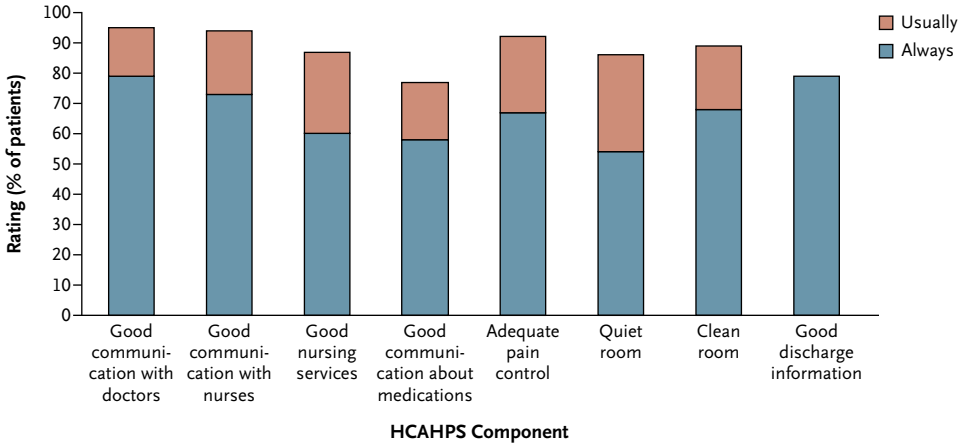

Figure 1. Percentage of Patients Who Reported Satisfaction with Their Care on Specific HCAHPS Components.
The composite rating for a hospital reflects the average of the proportion of patients who answered "always" to the individual questions within that component. For components with "yes" or "no" responses, such as adequacy of discharge information, the rating is the average of the proportion of patients who answered "yes" to the individual questions within that component. HCAHPS denotes Hospital Consumer Assessment of Healthcare Providers and Systems.

in the highest quartile of HCAHPS ratings were, on average, about 2 to 4 percentage points higher than the HQA scores for hospitals in the lowest quartile of HCAHPS ratings. The results were similar when we adjusted the analysis for key hospital characteristics (Table 4). For example, the average adjusted HQA score for the quality of surgical care was 85.7% for hospitals in the top quartile of HCAHPS ratings, as compared with 82.8% for hospitals in the bottom quartile (P<0.001).

PATIENTS' SATISFACTION IN THE 40 LARGEST HOSPITAL-REFERRAL REGIONS

We found a substantial range of performance across the 40 largest regions: in Birmingham, Alabama, on average, 71.9% of the patients gave their care a high global rating (9 or 10), whereas in East Long Island, New York, only 49.9% of patients did so (Table 5). There was a similar range in the percentage of patients who would definitely recommend the hospital (Table 5). There were also differences of 15 to 25 percentage points between the best and worst regions in performance on individual HCAHPS components (data not shown).

DISCUSSION

The HCAHPS data provide a national portrait of patients' experiences in U.S. hospitals; they are likely to provide a baseline for the measures that will be used to monitor patient-reported quality performance in the future. We found that although most patients were generally satisfied with their care, there was room for improvement. Patients who received care in hospitals with a high ratio of nurses to patient-days reported somewhat better experiences than those who received care in hospitals with a lower ratio, and hospitals that performed well on the HCAHPS survey generally provided a higher quality of care across all measures of clinical quality than did those that did not perform well on the survey, although the strength of this relationship was modest. There were large regional variations in patients' experiences with their care, with Birmingham, Alabama, performing better than other regions and the New York City area lagging behind.

Patients' ratings of hospital care are of interest because they are, in many ways, "the bottom line." The ratings we found leave room for improvement. On average, hospitals received a rating of 9 or 10 from 63% of their patients and a rating or 7 or better from 89%; although these ratings suggest that only a small percentage of patients were seriously dissatisfied, very few hospitals received the highest ratings from 90% or more of their patients (see Appendixes 3a and 3c in the Supplementary Appendix). More important, HCAHPS highlights specific areas for improve-

Table 2. Percentage of Patients Who Gave a High Global Rating to a Hospital, According to Hospital Characteristics.

Characteristic	High Global Rating*		P Value†
	Unadjusted	Adjusted	
	% of patients		
Primary characteristics of interest			
Ratio of nurses to patient-days			<0.001
Lowest quartile	60.1	60.5	
Second quartile	60.7	61.6	
Third quartile	64.1	64.3	
Highest quartile	66.7	65.9	
Profit status			<0.001
For-profit	57.9	59.1	
Not-for-profit, private	63.6	64.8	
Not-for-profit, public	65.2	65.4	
Academic status‡			0.51
Teaching	63.5	63.3	
Nonteaching	62.9	62.8	
Other characteristics associated with HCAHPS rating			
Location			0.03
Urban	62.4	62.4	
Nonurban	66.7	63.7	
Size			<0.001
6–99 beds	66.4	64.8	
100–399 beds	61.1	62.0	
≥400 beds	63.0	62.4	
Census region			<0.001
Northeast	61.4	61.8	
Midwest	64.9	63.8	
South	63.2	65.0	
West	61.0	61.7	
Medical intensive care unit			0.001
Yes	62.7	62.3	
No	63.7	63.9	
Medicaid patients			<0.001
Lowest quartile	65.7	65.3	
Second quartile	63.5	63.1	
Third quartile	61.0	62.0	
Highest quartile	61.5	61.9	

* A high global rating was defined as a rating of 9 or 10 (on a scale of 0 to 10, with higher scores reflecting better performance) on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. In the adjusted analysis, performance on the HCAHPS survey was adjusted for all the other characteristics shown.
† P values are for the results of adjusted analyses.
‡ Academic status was defined according to whether the hospital was a member of the Council of Teaching Hospitals and Health Systems.

Table 3. Adjusted High Ratings on Individual Components of the HCAHPS Survey According to Selected Hospital Characteristics.*

Characteristic	High Rating by Patients								
	Communication with Doctors	Communication with Nurses	Nursing Services	Communication about Medications	Pain Control	Quiet Room	Clean Room	Discharge Instructions	Recommend Hospital
Ratio of nurses to patient-days									
Lowest quartile	78.0	70.4	56.4	55.8	64.9	52.4	65.6	77.5	63.5
Second quartile	77.9	71.1	56.9	56.4	65.8	51.7	65.4	78.4	65.3
Third quartile	78.5	72.3	58.7	57.6	67.0	53.0	66.5	80.0	68.0
Highest quartile	78.9	73.4	60.6	58.8	67.8	54.6	67.6	80.7	70.2
P value for trend	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Profit status									
For-profit	75.3	67.4	54.3	52.9	63.1	50.8	62.3	77.2	62.2
Not-for-profit, private	79.0	73.1	59.5	57.9	67.2	52.8	67.2	79.4	68.6
Not-for-profit, public	80.7	74.9	60.6	60.7	68.8	55.2	69.3	80.9	69.6
P value for difference†	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Academic status‡									
Teaching	77.7	71.3	56.6	57.0	65.8	52.3	65.0	79.4	67.4
Nonteaching	78.9	72.3	59.7	57.3	66.9	53.5	67.6	79.0	66.1
P value for difference	0.004	0.06	<0.001	0.72	0.04	0.10	<0.001	0.42	0.14

* The data shown are the percentages of patients who responded that they "always" had a positive experience with respect to the individual components of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. For the question of whether the patient would recommend the hospital, the data are the percentages of patients who responded "definitely yes." The data were adjusted for number of beds, region, profit status, academic status, location, presence or absence of an intensive care unit, percentage of Medicaid patients, and ratio of nurses to patient-days except for the variable of interest.

† The P value is for the comparison among the three categories.

‡ Academic status was defined according to whether the hospital was a member of the Council of Teaching Hospitals and Health Systems.

Table 4. HQA Scores for the Quality of Clinical Care Provided for Four Conditions, According to the HCAHPS Global Rating.*

HCAHPS Rating	Acute Myocardial Infarction	Congestive Heart Failure	Pneumonia	Surgery
		Adjusted Mean Score†		
Lowest quartile	93.5	82.7	88.5	82.8
Second quartile	94.5	85.2	90.1	84.3
Third quartile	94.6	85.9	90.7	85.2
Highest quartile	95.3	86.0	90.8	85.7
P value for trend	<0.001	<0.001	<0.001	<0.001

* The Hospital Quality Alliance (HQA) score is the percentage derived from the sum of the number of times a hospital performed the appropriate action across all measures for that condition (numerator) divided by the number of opportunities the hospital had to provide appropriate care (denominator). See Appendix 2 in the Supplementary Appendix for component measures of each condition. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) rating is based on the percentage of patients who rated their hospital experience as 9 or 10 on a 10-point scale, with higher scores reflecting better performance.

† The score was adjusted for number of beds, academic status, region, location, profit status, ratio of nurses to patient-days, and percentage of patients receiving Medicaid.

ment, such as nursing care, communication about medications, pain control, and provision of clear discharge instructions.

We found a moderate relationship between the ratio of nurses to patient-days and patients' experiences in the hospital. Although ensuring adequate staffing of nurses has been of considerable interest to clinical managers and policymakers, data on the relationship between high nurse-staffing levels and high-quality care have been mixed. Several studies have shown that units with higher nurse-staffing levels have lower complication and mortality rates,[13-15] but others have not shown this relationship.[16,17] Clark et al. found that hospitals in states with nursing shortages had lower levels of patient satisfaction[18] than hospitals in states with no nursing shortages, and others have also found a relationship between the nurse-staffing levels and patient satisfaction, although the data are usually derived from a small number of providers[19] or from hospitals outside the United States.[20-22] Our study of U.S. hospitals offers preliminary evidence that a higher ratio of nurses to patient-days may be associated with somewhat better performance with respect to certain interpersonal aspects of patient care. Whether this relationship is causal or a marker of the hospitals' commitment to better service is not clear.

It is perhaps surprising to note that there was suboptimal performance in areas that have been the target of quality-improvement initiatives for some time. Nearly a third of the patients did not give high ratings in the domain of pain control, despite the focus on this area by the Joint Commission.[23] In addition, despite long-standing interest by the CMS and others in reducing the rate of readmission, many patients did not rate their discharge instructions highly. It is less surprising to see that communication about medications was often not rated highly, given reports of difficulties with adverse events related to medications.[24,25] Poor communication at discharge is likely to exacerbate these problems.

Previous studies on the relationship between patients' experiences and the quality of clinical care have had mixed results. Schneider et al. found that although enrollees in Medicare managed-care plans that had better performance on the measures in the Healthcare Effectiveness Data and Information Set reported better experiences in obtaining information on health plans and in dealing with customer service,[26] they did not give higher global ratings of the plan. Chang et al. found no relationship between patients' experiences and the quality of clinical care among elderly patients in two managed-care organizations.[27] Others have also failed to find a relationship between patients' experiences and the quality of clinical care.[28,29] We found a positive relationship between patients' experiences and the quality of clinical care in U.S. hospitals. Although the differences in quality between hospitals that received high ratings on the HCAHPS

Table 5. Overall HCAHPS Ratings for Hospitals in the Top-Ranked and Bottom-Ranked Cities among the 40 Largest Hospital-Referral Regions.*

Hospital-Referral Region	Would Definitely Recommend Hospital	Gave Global Rating of 9 or 10
	% of patients	
Top-ranked		
Birmingham, AL	76.5±13.2	71.9±13.4
Knoxville, TN	75.5±7.6	69.9±7.3
Charlotte, NC	72.6±7.7	69.4±6.2
Milwaukee	71.3±6.8	67.0±5.3
Indianapolis	69.6±7.3	65.8±6.9
Bottom-ranked		
Orlando, FL	62.6±10.3	57.5±9.7
Chicago	61.3±16.9	56.3±12.2
New York	60.7±15.4	52.3±11.1
Fort Lauderdale, FL	58.5±10.5	51.9±10.2
East Long Island, NY	56.8±14.0	49.9±12.5

* Plus–minus values are means ±SD. HCAHPS denotes Hospital Consumer Assessment of Healthcare Providers and Systems.

survey and hospitals that received low ratings were not large, care was consistently better in the hospitals that received high ratings across all conditions independently of other covariates measured. Our findings suggest that there is no need for tradeoffs between these two areas of performance.

Finally, we found substantial differences in patients' experiences across hospital-referral regions. These probably reflect regional differences in the interpersonal quality of care related to the style of caregiving and in organizational leadership and quality management that are focused on optimizing patients' experience. However, unmeasured confounders, such as cultural differences in patients' perceptions and expectations of care, may also contribute substantially to these patterns. Some portion of the differences observed between for-profit hospitals and not-for-profit hospitals may also reflect confounding; the patient population seen at for-profit hospitals might differ in important ways, including expectations, from the population seen at not-for-profit hospitals.

Our study has several limitations. Although we examined patients' experiences at more than 2400 hospitals, nearly 40% of U.S. hospitals failed to provide HCAHPS data. The quality of clinical care at nonresponding hospitals was slightly lower than that at responding hospitals, and their performance on the HCAHPS survey may differ as well. Although the number of nonresponding hospitals should diminish quickly over time, perhaps lowering overall performance, the relationships we found between patient-reported quality and nurse staffing or clinical-quality measures are unlikely to change. High ratios of nurses to patient-days may identify hospitals that are more broadly focused on optimizing a patient's experience. Further investigation of the causality and strength of the relationship between nurse-staffing levels and patients' experiences would be helpful. Our data represent a snapshot of patients' experiences, and it will be critical to understand the ways in which these scores change over time and the factors that underlie their improvement. The CMS does not make data available according to the specific item in the composite domains or according to a specific rating. Thus, we were limited to the categories we report. Although efforts to account for nonresponse bias seem to have been effective in pilot testing[6,8] and with current data,[30] we cannot be sure that the responses are fully reflective of patients' experiences in all hospitals.

In summary, the data presented here provide a comprehensive portrait of patients' experiences in U.S. hospitals. It is clear that the performance of hospitals is variable and that there are plentiful opportunities for improvement. Public release of data on clinical performance has previously prompted improvements in the quality of clinical care in hospitals.[31] We are hopeful that regular reporting of performance on patient-reported measures of quality will catalyze similar improvements in patient-centered care.

Supported by a grant from the Commonwealth Fund, New York, and in part by the Robert Wood Johnson Foundation Faculty Scholar Program (to Dr. Jha).

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Corrigan JM, Donaldson MS, Kohn LT, eds. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academy Press, 2001.
2. Jha AK, Li Z, Orav EJ, Epstein AM. Care in U.S. hospitals — the Hospital Quality Alliance program. N Engl J Med 2005;353:265-74.
3. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. N Engl J Med 2003;348:2635-45.
4. Darby C, Hays RD, Kletke P. Development and evaluation of the CAHPS hos-

pital survey. Health Serv Res 2005;40:1973-6.
5. Goldstein E, Farquhar M, Crofton C, Darby C, Garfinkel S. Measuring hospital care from the patients' perspective: an overview of the CAHPS Hospital Survey development process. Health Serv Res 2005;40:1977-95.
6. O'Malley AJ, Zaslavsky AM, Elliott MN, Zaborski L, Cleary PD. Case-mix adjustment of the CAHPS Hospital Survey. Health Serv Res 2005;40:2162-81.
7. O'Malley AJ, Zaslavsky AM, Hays RD, Hepner KA, Keller S, Cleary PD. Exploratory factor analyses of the CAHPS Hospital Pilot Survey responses across and within medical, surgical, and obstetric services. Health Serv Res 2005;40:2078-95.
8. Elliott MN, Edwards C, Angeles J, Hambarsoomians K, Hays RD. Patterns of unit and item nonresponse in the CAHPS Hospital Survey. Health Serv Res 2005;40:2096-119.
9. de Vries H, Elliott MN, Hepner KA, Keller SD, Hays RD. Equivalence of mail and telephone responses to the CAHPS Hospital Survey. Health Serv Res 2005;40:2120-39.
10. Keller S, O'Malley AJ, Hays RD, et al. Methods used to streamline the CAHPS Hospital Survey. Health Serv Res 2005;40:2057-77.
11. Kahn CN III, Ault T, Isenstein H, Potetz L, Van Gelder S. Snapshot of hospital quality reporting and pay-for-performance under Medicare. Health Aff (Millwood) 2006;25:148-62.
12. Wennberg JE, ed. The Dartmouth atlas of health care 1998. Chicago: American Hospital Publishing, 1998.
13. Needleman J, Buerhaus P, Mattke S, Stewart M, Zelevinsky K. Nurse-staffing levels and the quality of care in hospitals. N Engl J Med 2002;346:1715-22.
14. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. JAMA 2002;288:1987-93.
15. Person SD, Allison JJ, Kiefe CI, et al. Nurse staffing and mortality for Medicare patients with acute myocardial infarction. Med Care 2004;42:4-12.
16. Mark BA, Harless DW, McCue M, Xu Y. A longitudinal examination of hospital registered nurse staffing and quality of care. Health Serv Res 2004;39:279-300. [Erratum, Health Serv Res 2004;39:1629.]
17. Numata Y, Schulzer M, van der Wal R, et al. Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. J Adv Nurs 2006;55:435-48.
18. Clark PA, Leddy K, Drain M, Kaldenberg D. State nursing shortages and patient satisfaction: more RNs — better patient experiences. J Nurs Care Qual 2007;22:119-29.
19. Sovie MD, Jawad AF. Hospital restructuring and its impact on outcomes: nursing staff regulations are premature. J Nurs Adm 2001;31:588-600.
20. Tervo-Heikkinen T, Kvist T, Partanen P, Vehviläinen-Julkunen K, Aalto P. Patient satisfaction as a positive nursing outcome. J Nurs Care Qual 2008;23:58-65.
21. McGillis Hall L, Doran D, Baker GR, et al. Nurse staffing models as predictors of patient outcomes. Med Care 2003;41:1096-109.
22. Hurst K. Does workforce size and mix influence patient satisfaction? Nurs Stand 2007;21:15.
23. Phillips DM. JCAHO pain management standards are unveiled. JAMA 2000;284:428-9.
24. Bodenheimer T. Coordinating care — a perilous journey through the health care system. N Engl J Med 2008;358:1064-71.
25. Bates DW, Cullen DJ, Laird N, et al. Incidence of adverse drug events and potential adverse drug events: implications for prevention. JAMA 1995;274:29-34.
26. Schneider EC, Zaslavsky AM, Landon BE, Lied TR, Sheingold S, Cleary PD. National quality monitoring of Medicare health plans: the relationship between enrollees' reports and the quality of clinical care. Med Care 2001;39:1313-25.
27. Chang JT, Hays RD, Shekelle PG, et al. Patients' global ratings of their health care are not associated with the technical quality of their care. Ann Intern Med 2006;144:665-72. [Erratum, Ann Intern Med 2006;145:635-6.]
28. Rao M, Clarke A, Sanderson C, Hammersley R. Patients' own assessments of quality of primary care compared with objective records based measures of technical quality of care: cross sectional study. BMJ 2006;333:19.
29. Gandhi TK, Francis EC, Puopolo AL, Burstin HR, Haas JS, Brennan TA. Inconsistent report cards: assessing the comparability of various measures of the quality of ambulatory care. Med Care 2002;40:155-65.
30. The Mode and Patient-Mix Adjustment of the CAHPS Hospital Survey. Baltimore: Centers for Medicare & Medicaid Services, April 30, 2008. (Accessed October 6, 2008, at http://www.hcahpsonline.org/Files/Final.)
31. Fung CH, Lim YW, Mattke S, Damberg C, Shekelle PG. Systematic review: the evidence that publishing patient care performance data improves quality of care. Ann Intern Med 2008;148:111-23.